DISCUSSION PAPER SERIES

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ABSTRACT

Economics and Politics of the Public-Private Wage Gap (The Case of Russia)*

The paper explores the public-private wage gap in the Russian economy over time and along the whole wage distribution. Using the RLMS-HSE panel data set, we examine how gaps at various points of wage distribution changed from 2005 to 2015 and present decompositions of the gaps into components explained by differences in characteristics and differences in returns. The results suggest that the gap persists over time and varies along the wage distribution. During the 2000's, low-skilled public sector workers had smaller pay gaps than higher-skilled workers had. Multiple governmental policy interventions and the economic crisis of 2008-2009 contributed to the narrowing of the gap and its partial equalization along the distribution. A new set of policy changes associated with the May 2012 Presidential Decrees strengthened these tendencies but failed to eliminate the gaps.

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1. Introduction

Workers are expected to be paid according to their human capital productive power irrespective of what sector or industry they are employed in, given that job disamenities are compensated. To achieve that, the public sector labor markets in developed countries are usually designed with the explicit objective to maintain the inter-sectoral pay balance [Lamo et al., 2012]. In practice, public sector workers can often earn a small positive premium relative to their private sector counterparts, other things being equal [Ehrenberg and Schwarz, 1986; Gregory and Borland, 1999; Giordano et al., 2015]. This deviation can have multiple reasons. The government may pursue political priorities while the public sector is not constrained by profit maximization. Higher unionization in the public sector as well as some clout around many public sector activities may strengthen its bargaining power and generate sources of political rent. Additionally, governments often seek to look like good employers for the less skilled and are ready to pay them higher wages. Robinson et al. (2006) point 'to the centrality of public sector employment as a tool for influencing people's voting behavior'.

However, in some transition economies (as documented for Russia and Ukraine) the deviation from the one wage law is large and has the opposite sign signaling that public sector workers are underpaid relative to their private sector counterparts.[1] This finding seems to be robust to the methodology and data sources used, and stable over time. Suggested explanations for the persistent gap vary and include corruption [Gorodnichenko and Sabirianova, 2007], institutional peculiarities of wage setting [Gimpelson et al., 2015], and incomplete accounts of job amenities and for non-random selection of workers into the public sector [Zhuravleva, 2016].

Our paper focuses on the public-private wage gap in the Russian economy and explores its evolution along the wage distribution over the period 2005-2015. Within this period the economy experienced a boom, two episodes of recession and two spells of stagnation. In the political domain, the country went through three Presidential and three Parliamentary elections, and gradual strengthening of the authoritarian rule. Public sector workers have always been considered a politically important part of the Russian electorate as they usually are in most authoritarian regimes. Different income groups vary in their political priority to the government

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[1] The tendency to underpay to those employed here goes back to the planned economy when education, healthcare or culture were heavily underfunded as non-productive and low priority sectors for the state.

and the time dimension allows us to see the flow and consequence of targeted policy interventions.

What motivates our interest? First, unexpectedly persistent, large and negative gap deserves special scrutiny. Second, the issue of underpayment of public sector workers reflects the institutional capacity of the Russian Government; despite being at the core of the policy agenda it remains unresolved. Multiple policy actions concerning the minimum wage, the wage setting machinery and sector-specific wage rises during the last 25 years were motivated by intentions of politicians to close the gap. Addressing the Federal Assembly in 2005, President Putin noted the fact that public sector workers were underpaid relative to their private sector counterparts and considered it a hot policy issue[2]. However, the wage gap was closed neither then, nor later, and ultimately became one of the core points of the Presidential Decree issued in May 2012 when Putin was re-elected for the new term[3]. If successful, closing the gap was expected to reshape the middle class and to strengthen the political support to his Presidency among numerous public sector employees. Unlike all previous policy interventions in this domain, the implementation of the decree became one of the top political priorities of the Presidential Administration and the Russian Government in the consequent years and was thoroughly statistically monitored and administratively enforced.

The key question we are addressing here is how the public –private wage has evolved over time and how this is associated with shocks and policy changes over the period. We estimate the gap along the whole earnings distribution and over time, and examine how it was affected in the course of policy interventions. Then we decompose the gaps (estimated at various points of earnings distribution) into components explained by compositional differences in the labor force (the effect of characteristics) and by differences in labor market values of these characteristics (the effect of returns). Two particular episodes when the negative gap was narrowing are of special interest. The first one was in 2009 and reflected the joint effect of the reform of the public sector pay and consequences of the global economic crisis. The second one was the adoption of the Presidential (May 2012) Decree on the public sector wage increase. This type of empirical analysis (using unconditional quantile regression and related decomposition techniques) is novel for Russia and for the transition economies in general. It provides new insights into the nature of wage disparities and the impact of policies pursued over the period under consideration.

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[2] http://kremlin.ru/events/president/transcripts/22931 (in Russian)

[3] http://kremlin.ru/events/president/news/15233 (in Russian)

The rest of the paper is structured as follows. In the next section, we briefly describe the main trends in employment and earnings and the institutional framework of public sector wage setting. Section 3 overviews previous empirical research of public-private wage differentials. Section 4 presents the empirical methodology, data description and main definitions. In Section 5, we discuss the main results and Section 6 outlines some limitations of our findings. Section 7 concludes.

2. Public sector: major developments and trends

2.1. Institutional developments

The Russian public sector comprises of various establishments which are state-owned and funded from the budget. It includes such activities as Public Administration, on the one hand, and Health, Education, Science, and Culture which make jointly the so called 'budgetary sector' (in the Russian terminology), on the other hand. Employment in Public Administration (about a quarter of all public employees) is regulated by a special law on the public service. Labor contracts in the budgetary sector are stipulated by the Labor Code and are largely similar to those in the private sector. In this paper, we concentrate on the latter segment ('the budgetary sector').

The wage gap – large or small – is shaped jointly by interaction of market forces and institutions. The public sector is not exposed to profit maximization but, instead, is subject to political constraints (for the theory and international surveys see: Ehrenberg and Schwarz, 1986; Gregory and Borland, 1999; Disney, 2007; Giordano et al., 2015). On the contrary, private sector wages are largely set by market forces. For one wage law to hold – or to have equal pay for equal labor regardless of the sector or industry – market generated wage signals should be transmitted to the public sector. Then the sign and magnitude of the gap depend on how receptive wage-setting institutions in the public sector are to market-based wage signals. In order to transform wage signals from the private sector into wages in the public sector, complex wage setting machinery is needed.

In most European countries public sector wages are set within the framework of national or local wage bargaining. The same unions can negotiate for both sectors, but separately and in different time periods [Giordano et al., 2015]. If wage rates paid by private employers to workers with different human capital endowments are known, this information can be used to translate prevailing (in the private sector) wage to observably comparable public workers. This provides rigidity to public sector wages and constrains manipulation by bureaucrats, leaving them to regulate the quantity of employment within the given budget constraints [Elliot et al., 1999]. In

any case, the wage determination process involves systematic wage comparisons between the market and non-market sectors. Any significant deviation from parity becomes suboptimal, not stable and incurs losses to both sectors [Algan et al., 2002]. As multiple empirical studies suggest, in most countries, public sector employees enjoy parity or a small premium compared to their private sector counterparts with similar characteristics.

The Russian case looks different. The salient feature of the Russian labor market is the combination of flexible wages and rigid employment. While large and prompt employment adjustments are prohibitively costly, wages can move up and down relatively easily enjoying enormous flexibility [OECD, 2011; Gimpelson and Kapeliushnikov, 2013]. This non-standard adjustment is supported by stringent employment protection (on the quantity side of the labor market) and by a wide use of various bonuses and premiums (on the price side) which supplement a relatively small fixed part of labor compensation. The variable part is linked to performance in the private sector and to funds available to the public one. This institutional setting emerged in the early 1990's at the start of the transition, and helped to keep low unemployment over time despite multiple strong shocks and generally mediocre economic performance.

In the (Russian) public sector the wage setting mechanism operates largely autonomously from the private one and generally does not account 'ex ante' for relative wages as they emerge at the competitive labor market segment. The government allocates state funds to pay salaries given its current political priorities and general budget constraints, while the quantity of employment remains highly inertial and path-dependent. This inertia is maintained by the rigid employment protection rules built in the Labor Code and by extralegal administrative interventions; both aim to minimize mass job losses. Within this framework, employment quantity is set 'exogenously' while the variable part of wage (including various supplementary payments, premiums and bonuses) makes the adjustment margin.[4]

But what is the role for collective bargaining which is so important in the EU within this framework? It plays a mostly decorative role despite its almost universal coverage [Pasynkova, 2010]. National tripartite agreements set common guidelines for pay determination but do avoid any exact provisions for pay and benefit levels. These guidelines recommend that the fixed (in the labor contract) 'base' part of wage should make on average at least 70% of the total labor

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[4] This correlates with the wage setting in the private sector.

remuneration, though this target has varied across time.[5] The rest makes the variable fraction and consists of any additional supplemental payments available to state-run establishments (schools, hospitals, research institutions). Collective agreements at the establishment level do not usually include any binding commitment on wages but largely reproduce terms and conditions prescribed vaguely by the Labor Code and by the national guidelines.

Though the main wage setting framework has been remaining largely intact since the early 1990's, some notable changes have been introduced. They include institutional modifications to the wage setting rules and increases in minimum wage. We will discuss them consequently.

Until the end of 2008, the fixed-part of the wage was based on the so-called Unified Tariff Scale (UTS) – a highly centralized wage grid designed specifically for the public sector. The lowest grade was linked to the statutory minimum wage. All budgetary sector workers (at the federal, regional, and municipal levels) were entitled to the 'base' wage according to the UTS grade. They could also get additional bonuses and allowances if extra funds were available. The additions could come from higher public funding that relatively richer regions could afford and/or that was provided by transfers and subsidies from the federal budget. If schools or hospitals earned additional revenues providing the fee-based services to local populations, workers could also enjoy supplementary performance-related payments. Off-UTS payments, which could be substantial, introduced significant flexibility into the otherwise very rigid pay schedule. In 2015, the fraction of the fixed part of earnings was as low as 50% in Health and 62% in Education having changed little compared to 2007 (59% and 68%, respectively). However, the incidence and magnitude of non-budgetary revenues were very uneven across subsectors, regions, locations, establishment types, and occupational groups, thus contributing to significant earnings inequality within the public sector.

In August 2008, the Russian Government announced replacement of the UTS with the so called New Pay System (NPS)[6]. The idea was to make wage-setting more flexible, less centralized and more sensitive to local economic conditions and individual productivity. The NPS intended to better institutionalize a wide use of variable performance-related premiums and

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[5] Unified Recommendations for Wage Setting of State and Municipal Workers on Federal, Regional and Local levels in 2017 http://www.fnpr.ru/n/2/15/313/13309.html (in Russian). In some previous years this proportion was even smaller.

[6] Russian Federation Government Decree №583 from August 5, 2008 http://www.przrf.ru/docs/full/oplata_truda1/o_vvedenii_novyh_sistem_oplaty_truda_rabotnikov_federalnyh/ (in Russian)

bonuses, treating them as explicit incentive tools. According to this new system, wages were determined by regional and sectoral collective agreements that fixed the basic salary for each occupational and skill group, while local regulations introduced additional compensation and incentive payments. Each budgetary subsector (education, health, science and culture) was supposed to get its own pay system with no reference to the former UTS. Regional governments were allowed to design their own pay systems for employees in their jurisdictions. Public sector administrators gained more flexibility in determining schedules and amounts of individual incentive payments. The reform, however, turned out to be ill-conceived and short-lived, and for its rigorous evaluation there are no data. The NPS did not introduce any mechanism for cross-sectoral pay comparisons or for transmitting the prevailing market wage into the public sector. Neither was there a rise in public spending.

The Russian model of tripartism leaves the minimum wage (MW) largely with a role of political propaganda. As Sobel (1999) shows, short-term earnings gains from the MW increases can be positive even if longer-term effects are negative, thus justifying its use just before elections. Between 2005 and 2015, the MW was raised 9 times but all increases were modest except for two occasions. In 2007, the MW jumped from 1,100Rbl to 2,300 Rbl, or more than doubled and, in 2009, it rose from 2,300Rbl to 4,330 Rbl, or by 1.9 times. The latter rise was announced in the beginning of 2008 emerging as a pre-electoral promise[7]. Many Russian public sector employees being low paid were expected to become first beneficiaries of this promise (though the public-private wage gap at the lower tail of distribution had always been small). However, since their wages contained a significant variable component (premiums and bonuses), increase in the fixed part induced by the MW rise could be partially off-set by decrease in the variable part making the potential implications of the MW increase for the public-private wage gap less sizable.

New amendments to the Labor Code (adopted in 2007) changed the minimum wage legislation. Before it the MW was set at the national level uniformly across all regions. The amendments allowed Russian regions to introduce their own regional MW's on the top of the federal minimum. Any establishments in federal jurisdiction were exempt from the regional MW legislation in order to protect the Federal Government from additional fiscal pressures. By 2015, about 80% of the regions had some experience with setting the regional MWs [Lukiyanova, 2016].

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[7] The Presidential elections were held on March 2, 2008.

The last and the most intensive phase of the Governmental intervention into the wage setting regulations began in 2012 with the Presidential Decree[8] on wages in the budgetary sector. By this Decree, President Putin fixed wage targets for major occupational groups in the public sector (doctors, teachers, academic researchers, associate professionals in education, health and science sectors, and some junior staff), which, if combined, made about half of the total personnel. The targets fixed salaries as percentages of the regional average wage and they varied by selected occupational groups from 100 or 200% (depending on occupation). Occupations not listed in the Decree (mostly supporting technical personnel or low skilled workers) were left out the mandatory targets. [9] This system coupled with the introduction of very stringent administrative monitoring and enforcement began to function in 2013. Regional governors became personally responsible for achieving the wage targets and, if failed to ensure this, were on risk to be fired. The statistical agency (Rosstat) introduced special indicators to monitor fulfillment of the Decree in all Russian regions. The targets were expected to be reached before the 2018 elections but consequent salary rises started already in 2013.

If achieved, the pay targets assumed a sharp increase in the public sector wages on average. However, this would automatically shift-up the regional average wage, thus provoking a self-perpetuating wage race. Given that some occupational groups in the public sector were left out from the target list and were not monitored, they could become relative losers being exposed to discrimination and redistribution towards targeted occupations. As an outcome of this Decree one could expect to see a narrowing the negative gap on average as well as for higher wage workers on the target list but widening it for non-targeted lower wage occupations.

2.2. Major trends

To illustrate the differences within the public sector, we present some aggregate trends in employment and wages based on official estimates from Rosstat, the Russian State Statistical Service. The public sector is broadly defined here as the sum of three sections according to the International Standard Industrial Classification of All Economic Activities (ISIC, Rev.3): L

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[8] The Decree #597 of May 7, 2012 http://kremlin.ru/acts/bank/35261 (in Russian).

[9] Apart from increasing salaries in Health and Education, the May decrees stated significant pay increases for senior government officials, police, the military, state security bodies, presidential administration, etc. – the groups not discussed in this paper.

(Public Administration and Defense), M (Health and Social Work), and N (Education)[10]. Figure 1 presents change in the public sector employment from 2005 to 2015. Over the whole period, the total number of public employees declined by two percent. Divergent trends were observed in sub-sectors within the public sector. Public Administration has been growing (by 8% over the whole period with even greater rise in 2009-2010), Education has been gradually shrinking by 8%, the other budgetary sub-sector – Health – did not change. The downsizing in the budgetary sector became more visible after 2008. Faster reduction of employment in Education can be partly attributed to demographic trends – low fertility in the 1990's and early 2000's led later to fewer pupils entering schools. However, employment in Health has been decreasing in spite of rapid ageing of the Russian population. Upward pressures on public sector wages could also stimulate gradual downsizing.

Figure 2 shows evolution of the average monthly wage in the public sector relative to the average monthly wage in the rest of the economy. The raw wage gap is strongly negative for Education and Health (20-40% below the average for the rest of the economy) but strongly positive for Public Administration (20-30% above the average for the rest of the economy). Some reduction in employment numbers in Public Administration after 2008 was accompanied with an acute rise in its relative wages. The contrast between these components reflects implicit priorities of the government where bureaucrats are valued much higher than doctors, teachers, or scientists. Since the public sector appears to be a large employer, it is expected to affect wages in the rest of the economy.

But what did happen with public funding that was expected to pay for labor services? If the government is going to raise wages in establishments which are in its jurisdiction, this funding is supposed to rise. Otherwise, mass downsizing is the only only. Over the period that we are exploring, there were two episodes when real expenditures from the budgetary system (the consolidated budget) were on the rise and two episodes when they went on the slide (see Figure 3). Unsurprisingly, they rose when the budgetary revenues rose, force-fed by expensive hydrocarbons as it was before the 2008-2009 crisis and in 2011-2012. As expected, they fell in times of crisis when the budget faced problems and expenditure consolidation was needed. However, it seems, quite surprisingly, that main governmental initiatives to raise public wages coincided with declining expenditures on health and education. This was during the 2008 crisis

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[10] Though some employees in health and education may deliver services in privately-owned establishments, their percentage is relatively small (about 10% of incorporated employment in Health and 3% in Education in 2015 and even less in the previous years) and confined to a few large cities.

and soon after, and then again after 2003 when Putin's Decree on public sector wages was put into effect.

Summing up this section, we can say that institutional machinery of public sector wage setting was not tailored to ensuring equal pay for equal work across the sectors. Multiple institutional interventions that took place brought little substantive change in the system. These interventions were not supported by adequate growth in budgetary expenditure. The raw or unconditional gap as the difference between sectoral averages remained negative over the whole period. However, if we account for individual characteristics the conclusion can differ. Below we explore whether this is the case.

3. Previous empirical findings

In most countries, if the public-private wage gap exists, it is likely to be small and positive benefiting the public sector. Use of more sophisticated econometric estimation techniques and better controls tends to narrow the gap estimates.

Under the Soviet central planning system (before the early 1990's), education and health establishments were chronically under-funded and on average payed much less than industrial employers did. The difference reflected low political priorities of these activities. The market economy was expected to change this and in most of the transition countries it did, as empirical studies for the Central and Southern Europe largely show (see the survey in Lausev, 2012a). Adamchik and Bedi (2000) documented private sector wage advantages, albeit of small magnitude, for Poland in the mid-1990s. Lokshin and Jovanovic (2003) received the same results for Yugoslavia. Falaris (2004) did not find any evidence of the public-private wage gap in Bulgaria already in the early 2000's. Leping (2006) reported large and negative gaps in Estonia at the beginning of the transition period that eventually faded off by the early 2000's. According to Lausev (2012a and 2012b), public sector workers experienced a significant improvement in their financial position with the progress of the economic transition in Hungary and Serbia. In Hungary, the narrowing gap was related to large scale reforms of the public sector in the early 2000's, that were specifically aimed at increasing the relative pay in this sector.

Russia makes up one of few exceptions (other documented cases are in the CIS as well). Controlling for observable and unobservable characteristics narrows the gap but leaves it looming large. Jovanovic and Lokshin (2004) estimated it to be around 14% for men and 18% for women. They suggested that state-sector workers received non-wage benefits which partially could compensate for lower pay. Gimpelson and Lukiyanova (2009) ended up with very close

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estimates for 2000-2004 in the specification that controlled fringe benefits and sector selection. Additionally, Gimpelson and Lukiyanova (2009) estimated remarkably similar gaps exploiting cross-section data for 2003 and Sharunina (2013) confirmed the size of the gap for the end of the decade[11]. The gap persisted over time in spite of substantial worker mobility across sectors. This short review suggests that the negative pay gap in Russia might cause adverse selection into the public sector.

The estimates cited above show the gap at the mean. They can obscure how the gap varies along the distribution and misinform the policymakers. While some groups of public sector employees can be deep losers (relative to their private sector counterparts with similar characteristics), others may emerge as winners or, if not, their gaps are small. Such variation in gaps can reflect different things, including differences in bargaining power on the labor market, availability of alternative employment options and political priorities of the government.

Recently, use of quantile regressions to examine the public-private wage gaps has become popular. Poterba and Rueben (1994), who were the first to apply this method, reported that the US wage distributions were more compressed in the public sector. This inequality-reducing effect worked at both tails of wage distribution as the public sector had 'higher floors' and 'lower ceilings'. Public sector workers received a wage premium relative to the private sector employees at the lower tail of the distribution, but a small premium or even a wage penalty at the upper tail. Other studies exploiting quantile regression produce generally similar results. Typically, they document the monotonic decline of the public sector advantage along the conditional wage distribution. These results suggest that low-skilled public sector workers are overpaid, while highly-skilled ones are underpaid or paid fairly. Females are often found to have a premium along the entire wage distribution, while male workers suffer from wage penalty in the top part of the distribution. The results hold for both developed countries (see Blackaby et al. (1999) and Disney and Gosling (1998) for the UK; Melly (2005) for Germany; Cai and Liu (2011) for Australia) and poor countries (see Nilesen and Rosholm (2001) for Zambia; Hyder and Reilly (2005) for Pakistan).

In the transition context, quantile regressions were used by Leping (2006), Gorodnichenko and Sabirianova-Peter (2007), and Lausev (2012a and 2012b). Gorodnichenko and Sabirianova-Peter (2007) demonstrated that the public sector was the least attractive employer for the most productive workers in Ukraine. They found that the penalties from

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[11] Gorodnichenko and Sabirianova-Peter (2007) reported even larger and stable conditional wage penalties (24-32%) for Ukraine.

working in the public sector were relatively small for low paid workers but large (up to 60%) for high-paid workers. The size and the distribution of the wage gap were largely determined by the differences in returns, i.e. by the differences in wage structures between the sectors. This finding contrasts with the results usually obtained for mature market economies (see the review above) where the gap is mainly explained by differences in characteristics especially in the upper part of the wage distribution.

Larger penalties for higher skilled groups were reported for the Hungarian public sector by Lausev (2012a). Leping (2006) documented similar results for the first part of the transition period in Estonia. However, by the early 2000's differences in wage gaps between the top and bottom end of the distribution decreased substantially from 53 percentage points in 1989 to 11 percentage points in 2004. Lausev (2012b) presented qualitatively similar results for Serbia and later Nicolic, Rubil, and Tomic (2017) – for Serbia and Croatia. Findings from these papers suggest that as a transition economy matures, one can expect to see elimination of the public-private differential at the mean and narrowing of the differences between the gaps at the flanks of the wage distribution. However, in most cases this outcome was a consequence of complex reforms.

4. Methodology and data

4.1. Data and definitions

The data used in this paper came from the 2005-2015 waves of the Russia Longitudinal Monitoring Survey (RLMS-HSE)[12]. The RLMS is a well-known panel survey of the Russian households based on a national probability sample.

The sample used in this paper includes full, and part-time workers, and is restricted to those aged from 16 to the retirement age (55 for females and 60 for males). We drop observations with missing data in key variables, including age, education, occupation, earnings, and hours worked. Furthermore, we exclude the military, individuals who report working more than 150 hours per usual week and those who report earnings of more than five times that of the 99th percentile of the distribution for each year. These restrictions leave 63,701 observations in the baseline sample.

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[12] The Russian Longitudinal Monitoring survey (RLMS-HSE) has been conducted since 1992 by the National Research University Higher School of Economics and ZAO "Demoscope", together with the Carolina Population Center, University of North Carolina at Chapel Hill, and the Institute of Sociology RAS. Further for brevity we will call it the RLMS.

Our definition of the public sector relies primarily on the industry affiliation of the employer. An individual is treated as a "public sector worker" if he/she is employed in a fully state-owned establishment in education, health and social work. This implies that workers employed in other state-owned enterprises (SOE's) or in mixed public-private companies are classified into the private sector (or what would be called more correctly – the commercial or market sector). In fact, most of the SOE's are profit-oriented establishments that produce market goods and provide commercial services. Employees in public administration are also excluded from the sample.

The earnings variable is based on average monthly earnings over the last 12 months from the main job net of taxes and social security contributions. To compare wages over time we deflate the nominal wage by the annual national CPI and focus on monthly wages.

4.2.   Empirical strategy

We start with estimating multivariate OLS regression to present the development of the gap at the mean of the overall earnings distribution. Our wage equation includes the following regressors: age and age squared, gender, marital status, education, occupation, firm size, tenure and duration of the working week. We also control for location and settlement type. Being in the public sector is indicated by the sector dummy. This specification assumes that returns to all personal and job characteristics are identical in both sectors and there is no sector selection based on unobservable characteristics. Another limitation comes from the fact that the complete set of fringe benefits is not controlled. For example, many public-sector employees have longer annual vacations and enjoy stricter and better established job protection. At the same time, informal workers in the private sector are often deprived of pension insurance and have limited access to all non-monetary benefits[13]. Therefore, some public-sector advantages may bias the wage gap level but not its change over time if these differences are constant. Under these assumptions, the coefficients for the public sector dummy show the wage gap at the mean point of the distribution.

Acknowledging the fact that wage structures in public and private sectors can be dissimilar, we estimate separate regressions for each sector and perform Oaxaca-Blinder decomposition [Oaxaca, 1973; Blinder, 1973]. We break down the raw mean wage gap into components attributable to differences in observable individual and job characteristics (composition effect or 'explained part') and differences in returns to these characteristics (wage

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[13] According to some previous studies, controlling for fringe benefits did not affect the gap in any important way [Gimpelson and Lukiyanova, 2009].

structure effect or 'unexplained part'). The latter component measures the true wage consequences of being employed in the public sector. It can be viewed as a treatment effect which mainly reflects the outcomes of policy interventions and changes in the wage setting mechanisms [Fortin et al, 2011].

More specifically, we 'impose' the wage structure of the private sector on public sector workers. The coefficients from the private sector wage equation are used to construct a counterfactual wage distribution of public sector workers and decompose the gap:

$$\bar{Y}_B - \bar{Y}_P = \left[(\hat{\beta}_{B0} - \hat{\beta}_{P0}) + \sum_{k=1}^{K} \bar{X}_{Bk}(\hat{\beta}_{Bk} - \hat{\beta}_{Pk}) \right] + \sum_{k=1}^{K} (\bar{X}_{Bk} - \bar{X}_{Pk})\hat{\beta}_{Pk} \qquad (1)$$

where $\hat{\beta}_{.k}$ are the estimated coefficients (k = 0,..., K) of the wage equations for the public (B) and private (P) sectors. The first component reflects the wage structure effect, the second one makes the composition effect.

Similar technique can be used to estimate and decompose the wage gaps at different points of the distribution. Our approach employs unconditional quantile regression (UQR) decompositions proposed in Firpo et al (2009) and Fortin et al (2011). Recently this method was applied to the analysis of the public-private wage differentials [Depalo et al., 2015; Fournier and Koske, 2013].

The method relies on estimating the re-centered influence functions (RIF) that create a linear approximation for the distributional statistics of interest. For quantiles, the RIF-regressions of τ-th quantile is given by:

$$RIF\left(Y, q^{\tau}\right) = q^{\tau} + \left(\frac{\tau - I\left(Y \leq q^{\tau}\right)}{f_Y\left(q^{\tau}\right)} \right), \qquad (2)$$

where $I\left(Y \leq q^{\tau}\right)$ is an indicator function indicating whether the value of Y is below q^{τ}, f_Y is the marginal density of Y at the point q^{τ} estimated by kernel methods.

The expectation of the RIF in (2) equals the population quantile of the unconditional distribution. We replace the dependent variable, Y, with the RIF of the respective quantiles and estimate standard linear regressions on the set of explanatory variables. These RIF-regressions are then used in Oaxaca-Blinder decompositions[14].

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[14] Such decompositions are often combined with reweighting to account for possible non-linearities in conditional RIFs. However, reweighting procedure is not robust in small samples when reweighting factor cannot be estimated consistently. For this reason, we present decompositions without reweighting.

5. How the gap has changed: empirical investigation

5.1. Descriptive analysis

To begin with we present simple descriptive evidence concerning employment and wages. Table 1 shows how public employment evolved between 2005 and 2015. Its fraction in the RLMS sample remained stable over the period making about 21% of total employment and was similar to that in the official statistics[15]. The public sector provides one out of three jobs for women in Russia and 1 out of 8 jobs for men. Table 2 describing the main variables used later in the regression analysis suggests that public sector employees are on average better educated and concentrate in white collar occupations. Over time the private sector has been more active in attracting university educated workforce and expanding white collar jobs. Private sector workers here tend to be younger and more likely to reside in urban areas. However, they have shorter tenures and longer working hours. Some of the public sector attributes (like older age and better education) can be positively correlated with wages, while most others expect negative correlation.

Workers employed in the Russian private sector are paid relatively better. From 2005 on, an average public-sector worker earned two-thirds of the private sector monthly wage, while after 2010 this proportion rose to three-quarters. Given the difference in working hours, the hourly wage gap at the mean narrowed from 31% in 2005 to 15% in 2015. The persistent wage gap could have an effect on the composition of employment through negative selection. The proportion of young workers declined in the public sector and increased in the private one. Working in the former stimulates moonlighting and search for additional earning opportunities, though the incidence of such behavior is modest in both sectors.

Table 3 reports mean earnings and earnings ratios for both groups of workers. Public sector workers have lower earnings in all groups, though some of them have improved their relative status over time. Public sector workers with longer tenures have persistently been in a relatively better position, while those from larger cities, highly educated workers, and those with shorter tenures, enjoyed faster wage growth. These results, although only descriptive, indicate that the earning gap may vary across certain groups, suggesting heterogenous positions of workers within the sector.

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[15] We use different volumes of Russian statistical yearbook, for example, Russian statistical yearbook (2017), p. 113 http://www.gks.ru/free_doc/doc_2017/year/year17.pdf.

Figure 4 shows the raw log-wage differentials between public and private sectors at various percentiles making the picture more complex. In 2005, the raw wage gap was negative for all quantiles but varied across them. The public sector disadvantage generally increased along distribution towards the highest percentiles. However, already by 2010 the gap became more uniform across wage quantiles. The raw wage disadvantage for high wage earners shrank faster than that for low wage earners. Further changes happened during the next 5 years. The wage gap started to increase in the lower part of distribution but decrease in its upper part while remaining negative across all percentiles. This can suggest that wage policy in the public sector became more redistributive: better paid public sector workers have gained from pay reforms while the lower paid have lost. Since the May 2012 Decree set wage targets for medium and high skilled public sector workers leaving the less skilled (and less paid) uncovered, the observed outcome is not surprising given the budgetary tightness Russia faced by 2015.

5.2.   The gap and its components at the mean of wage distribution

The coefficients from the OLS estimation for all years are presented in Figure 5. The wage gap at the mean conditional on observed characteristics remained negative (and statistically significant at 5% confidence level) over the whole period, but tended to decrease gradually. It narrowed from 27-30% in the early 2000's to about 15-20% in most recent years.

Possible drivers of the wage gap reduction could differ across sub-periods. Before the 2009 crisis, public sector workers benefited from commodity-driven growth that enriched the budget. Following the boom in the commodity markets, the Russian government expanded public spending during the 2000's, with some windfall revenue being redistributed to increase wages in the public sector without notable structural reforms inside the sector. However, the private sector gained as well, and the gap between sectors stayed almost unchanged. In 2009 (compared to 2008), it decreased from about 30% to about 20%, or by 10 percentage points. This was the largest annual contraction in the gap over the whole study period. The gap was compressed from both sides: by pushing up public wages and by freezing private ones. Increase in MW by 1.9 times was announced in 2008 but came into effect from January 2009. Meanwhile, the private sector affected by the crisis had to freeze so as not to cut wages. After the crisis, during the short period of slow recovery, the gap moved gradually backwards – towards its pre-crisis values. The next round of the gap contraction started in 2012 with the May Decrees.

If the gap persists, what fuels it? Is it driven by negative selection into the public sector, or is it that the labor market values observationally similar workers so differently? The Oaxaca-

Blinder decomposition provides some insights into the nature of the gap (Table 4). Figure 5 presents this decomposition in a more reader friendly form for all years.

Public sector workers are better educated and are overrepresented in white collar occupations but are older. This affects earnings positively and even overcompensates the opposite effects of other characteristics, which can be relatively more productive in the private sector (where workers are more likely to be male and urban, and work longer hours) than in the other. As a result, the overall composition effect is negative and significant in all years. It has been roughly stable over time.

As one can see, most of the gap comes from the fact that the same characteristics are valued differently in both sectors, and less so due to different compositions of the sectoral labor force. The wage structure effect is significantly negative for all years. None of the observable characteristics can be a good candidate to explain this disadvantage. In fact, education and tenure tend to bring higher returns in the public sector. Location characteristics produce significantly negative returns in a few years. However, most of the overall negative effect comes from the constant and can be attributed to unobservable characteristics. This calls for closer examination of sorting into the public sector, which is beyond the scope of this paper.

5.3. Going beyond the mean

Given significant heterogeneity of jobs looking at the mean gap only is not informative enough. In addition, jobs located in different parts of wage distribution can have divergent earnings dynamics. This makes us go beyond the mean and apply related analytical techniques.

Fig.4a and 4b present the evolution of the wage gap. Fig.4a looks at wage gaps at three-time points (2005, 2010 and 2015) along the whole distribution. Fig. 4b presents the same story under a different angle – the wage gaps are estimated at three key points of the earnings distribution (the 1st decile is for low paid, the median - for the central part, and the 9th decile is for sampled rich) but for all years in a row. These gaps are 'raw' since they are calculated without controlling for individual characteristics.

The story is straightforward: the median gap slides down, thus gradually narrowing the wage distance between the median public sector and the private sector workers. The log-wage differential declined from 0.4 to 0.3. However, on the flanks of the distribution the dynamics were less definitive. Those who were in the central and the right parts of the wage distribution, for example, from the 30th percentile and on, emerged as winners since their gaps tended to

shrink. The relative gain for higher paid public workers is clearly seen on Fig.4b. The better paid were workers in 2005, moreover he/she gained in relative terms by 2015. On the contrary, for low paid workers the wage discrepancy from their private sector peers increased: the gap in 2015 was somewhat larger than it was in 2005 and especially in 2010.

This multidirectional and multi-speed evolution of (different parts of) the gap can mirror structural changes within employment in either sector. Let us imagine that productive workers' characteristics in the both sectors tend to get closer for those in the upper part of the distribution and move apart for those in the lower part. Then the movement of the gap we are observing fits to this change. But if structural changes in employment during the period did not exist or had the opposite direction, then the evolution of the gap needs a different explanation. Any observed gap can be driven either by compositional effects or by differential market returns. Which of these were at work in this case? We look deeper into the story exploiting the RIF based wage gap decompositions.

Figure 5 presents results of aggregate decomposition for three different points in the distribution (the 10th, the 50th and the 90th percentiles) and for all consequent years from 2005 to 2015. Table 5 shows a detailed decomposition to reveal the contributions of different variables.

The RIF-decomposition shows that the reasons for the sectoral gap vary remarkably across quantiles. At the bottom of the distribution, the gap between two sectors is driven by both composition and wage structure effects. Both effects are significantly negative and stable over time. The raw gap has been shared in approximately equal proportions between differences in characteristics and differences in returns.

Composition effect loses its explanatory power while moving along the distribution. At the median, it is still negative but much smaller in magnitude and insignificant in some years. At higher quantiles the composition effect is significant in a few years and has the positive sign. The detailed decomposition sheds light on where these differences come from. In all parts of the distribution, public sector workers work shorter hours, are more likely to live in lower paid locations and be female, which significantly reduces the earnings in this sector. Similarly, in all parts of the distribution, though public sector workers are better educated, this advantage is not strong enough to compensate for deficiencies in other characteristics. Differences in tenure, firm size and age are either insignificant or small all along the wage distribution. The major variable which shapes the differences in size of the composition effect across quantiles is occupation. Differences in occupational structure are beneficial for the public sector. They grow along the wage difference and outweigh the negative influences of other characteristics for high-paid workers who are underpaid for their qualifications. It is also worth noting that differences in the

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working time contribute more to the wage disadvantage of public sector workers at the bottom of distribution in comparison with their higher-paid co-workers. This effect was especially distinct in 2008-2014.

The differences in returns emerge as the dominant explanation for the sectoral gap at the middle and top quantiles. The effect is still strongly negative though it has been declining over the period. It suggests that in all years and at all selected percentiles the pay gaps were driven (largely or completely) by lower (relative to the private sector) returns provided by the public sector. If private sector wages are set by market forces, the public sector is more constrained by governmental regulations and by government-provided training. The public sector is also not free in employment adjustment. This brings us back to the issues of institutional wage setting and funding in the public goods provisions sector.

As we have already mentioned (in Section 2.1), within the Russian labor market model there are no binding constraints on wage offers while political priorities of the social stability and high costs of employment adjustments make wages paid the residual outcome under any level of funding. Budgetary constraints increase likelihood that doctors and teachers are underpaid relative to their private sector counterparts but this depends on availability of outside employment options to various groups of public sector workers. These options are easier for low skilled and auxiliary technical workers who have no sector-specific skills which constrain mobility. This gives advantage to this group and results in smaller gaps. The 2009 crisis brought down gaps in all deciles but again those in the lower tail of the distribution gained relatively more.

The 2012 May Decree did not eliminate the public-private wage gap but changed distribution of returns reducing their negative size for more skilled and better paid workers. Until 2012, the difference in returns penalized workers in the top quantiles harder than workers in the bottom quantiles. Since 2013, the effect of returns has been fairly flat along the whole distribution. Effects of characteristics were positive and statistically significant only for those public sector workers who were located at the upper part of the distribution and not in all years.

What institutional and fiscal developments could be behind these changes? In early 2008, at the peak of commodity-fueled growth and in expectation of the Presidential elections the Russian Government announced doubling the minimum wage and later that same year promised additional budgetary allocations. The doubled minimum wage came into the effect in January 2009 at the apogee of the crisis and contributed to the left-side compression of the wage distribution. In addition, the public sector got massive governmental support for the wage bill while the private sector had to adjust its wages downwards. Meanwhile, the upper and central

parts of the private sector wage distribution were negatively affected first. These opposite wage adjustments compressed the gap.

The second episode of the gap reduction started with the Presidential May 2012 Decree. The list of occupational groups in the public sector, for which wage had to be raised, included largely high and medium skilled parts of the public sector workforce. It left low-skilled and auxiliary occupations (like technical personnel in Education and Healthcare) off the board. Given the fiscal stringency that increased with the post-Crimea crisis, sparing on non-listed (in the May Decree) occupations was a politically rational strategy public sector administrators could follow. Unsurprisingly, main beneficiaries of this quasi-reform were those placed in higher conditional deciles while the gap for lower conditional deciles increased. As a result of this intervention, the distribution of the penalty along wage distribution has changed. Figure 5 illustrates this tendency.

6. Why does the gap persist?

Persistence of the large wage gap and its variation across the wage distribution raise the obvious question of why it has not equalized over time. It would be quite logical to expect that underpaid public sector workers move to higher paid private jobs while private sector employers try to adjust wages downward bringing them closer to public sector alternatives. A few tentative explanations of why this has not happened follow below.

The first set of explanations assumes that the observed gap is of a virtual nature and reflects poor or incomplete measurements. According to this, if we were better in capturing monetary and non-monetary components of earnings on the one hand, and unobserved properties of workers and jobs on the other, the gap would nearly evaporate or even become slightly positive as it emerges elsewhere. In other words, there should be no significant earnings penalty to public sector workers if all important features (concerning measured incomes, characteristics of workers and jobs) are properly accounted for.

We consequently checked for these possibilities. We started with exploring whether unmeasured (or poorly measured) incomes of public sector workers could have the equalizing effect. There are a few potential options for that. We may expect that public sector workers with shorter hours benefit from a higher frequency of moonlighting. However, adding the dummy for secondary employment into the wage equations does not change the general picture. As Table 2 suggests, the public sector has just marginally more (by 3-3,5 percentage points) second job holders than the private sector has and most of these jobs are unstable.

Then we can assume that there are non-labor incomes to which public and private sector workers have different access. For example, if public sector workers have a privilege for early retirement, then they may have a period with combined labor and pension incomes. This 'happy' period with combined incomes when the pension is an explicit subsidy for private sector workers is shorter. However, even if this is the case, only a small group of workers is eligible for early pension retirement. According to the male/female gap in public/private sector, for females, this should be less but appears to be the opposite.

Finally, an unobservable fraction of labor income in the public sector may have come from corruption. This can be if masses of ordinary doctors and teachers get additional supplements selling their services for envelope money. If public sector workers are not that different than their private sector counterparts in terms of consumption while getting lower wages, the differential can be accrued to some forms of bribery. Gorodnichenko and Sabirianova-Peter (2007) see this option as the major explanation for the persistent wage gap in the Ukraine. This explanation as a major clue does not seem convincing enough. If this were the case, it would be logical to assume that all or the majority of public sector workers have access to corruptive practices. While some doctors or teachers can strongly benefit from delivery of unregistered services, most medium and low skilled workers have few reasons for extra rents.

Large gaps in estimates can erroneously emerge due to important unobservables. On the supply side these form the omitted variable of workers' characteristics related to unmeasured abilities. If, other things being equal, private sector workers have better (statistically) unobserved productive abilities, the latter can drive productivity up and therefore generate higher wages. Controlling abilities would narrow or close the gap. But there are reasons to believe that the unobserved abilities are unevenly distributed across workers and better pay is positively correlated with this unobserved property. Then the gap should decrease along wage distribution while we see the opposite (recent years being an exception) with the wage gap between low and high skill workers increasing due to high penalties imposed on workers in the public sector.

Another set of unobserved characteristics relates to jobs. Longer vacations, earlier retirement age, additional social guarantees, higher social prestige and status can be valued highly by employees and therefore can make an important component of non-wage amenities. If attached to the public sector jobs, they can explain lower monetary wages that workers are ready to accept. Probably, better controls would diminish the gap. Unfortunately, we can control few parameters of that sort, leaving most of them unaccountable. However, this cannot explain gap variation over time and across quintiles of the distribution. Besides that, such intangible

properties are difficult to capture with survey data in any country but the wage gap remains usually slightly positive.

The second set of explanations can tell us a kind of segmentation story. If workers do not have better outside options due to some characteristics associated with their public sector attachment, they stick to low paying jobs. The rigidity can be due to stigma of low productivity if public sector jobs are widely considered by private sector employers in this way. This would decrease potential mobility gains while increasing costs: the public-to-private sector transition would require either a large loss in potential earnings (given the existing human capital) or a significant downgrade in the social status (to do a job for which they are greatly overeducated). Another reason for the segmentation story may be caused by the fact that public sector jobs require poorly transportable sector-specific education and skills that are not highly valued elsewhere. For example, graduates from pedagogical universities can, probably, be good school teachers of biology or chemistry but of little demand as biologists or chemists outside the educational system. Longer they are in schools, more costly becomes the exit. This attaches them to educational jobs leaving few alternative options.

Still another explanation is associated with the institutional specifics of wage-setting and labor market adjustment in the public sector. Why does the private sector not pay a lower wage, if the alternative wage in the public sector is much lower? Also, why doesn't the public sector pay less if a negative selection already exists within the sector? Private sector employers compete with each other and are afraid of losing the best workers if wages are unilaterally cut down. The public sector is limited in its upward wage adjustment due to its inherently political nature and strict budget constraints. As we discussed earlier, wage setting in the Russian public sector is independent from that in the private sector and has a low sensitivity to alternative wage signals.

Any wage adjustments here need complex governmental decisions and require additional expenditure from regional budgets most of which are in deficit. The logic can be the following: the competition within the private sector leads to higher earnings enlarging the gap, while the public sector reacts incompletely and with a delay. Meanwhile, elements of segmentation associated with sector specific education and skills constrain exit mobility from the public sector, thus helping to preserve the gap.

The last but not least is how generous is the public sector funding but it has definitely been not. One can say that this is the key explanation that makes all other explanations redundant from the start. We do not think so. In all countries where the public-private sector pay gap is either negligible or even slightly positive, complaints on the underfunding of public goods are

mounting. The standard way for adjustment to underfunding goes through employment downsizing and making use of funds more efficient. The latter calls for complex and painful reforms in the public sector. If wages are rigid, as they are usually expected to be, hard budget constraints affect employment through freezing hiring, and stimulating firing. But if employment is fixed and over-regulated, then adjusting wages can remain the last resort.

7. Conclusions

This paper explores how the public-private wage gap in Russia measured at various points of the wage distribution curve has changed since 2005 (until 2015). It presents two major empirical findings.

First, public sector workers earn less than their private sector counterparts and this holds throughout almost the whole wage distribution. The negative wage gap persisted despite multiple governmental interventions that were pretending to close it. Controlling for a broad set of observed characteristics does not change the outcome. Though the gap tended to decline over time, it remained negative at the end of the studied period. Second, the pay gap was not even for all public sector workers and varied along the wage distribution. In the early 2000's, low skilled public sector workers experienced small gaps if any, while higher skilled workers were penalized heavily. Major changes in gaps over the period were confined to two episodes attributed to 2008-2009 and 2013-2015. The 2008-2009 economic crisis caused reduction in the wage gap when public sector wages, pushed up by the government, kept growing while the private sector had to freeze, if not to cut its wages. By 2015, after two years of the targeted governmental intervention into the public sector wage setting, the gap became largely flat over the quantiles, thus suggesting that public sector workers at the low end lost in relative terms while those at the upper end gained.

These gap reductions reflect a complex interaction of institutional, economic and political factors. The timing of gap-reducing events coincides with two major governmental interventions and two economic crises. These were MW hike in 2009 and the Presidential Decree announced in May 2012, and 2009 and 2015 recessions.

The reform of 2009 was intended to decentralize wage-setting and to make it more flexible. However, it has never been completed but coincided with other important events that might be the main reason for shifting relative wages. These are doubling of the minimum wage put in effect in January 2009 (but announced early in 2008) and the economic crisis of 2008-2009. The crisis caused a freeze in private sector wages improving thus relative positions of

public sector workers in the middle and upper parts of distribution. However, with the start of economic recovery in 2010-2011 the gap bounced back to its previous levels offsetting almost all earlier gains in the relative pay.

The 2012 Presidential Decree put forward a completely different approach to the public sector pay. By linking occupational public wages to regional wage averages it introduced explicit pay targets for the public sector. The federal and regional authorities were obliged to strictly enforce the implementation of the Decree in all regions through mobilization of additional funding that was left to regional governments. These led to severe cuts in other expenditures and to extraordinary fiscal strain in sub-federal budgets.

The introduction and timing of the NPS and the May 2012 Presidential Decree had a clear political background. They were aimed to attract popular support before the Presidential elections in 2008 and 2012. The second case is especially explicit. Public funds were redirected to favor certain groups within society (public sector workers) at the expense of other social groups and this decision was enacted by the President but not by the law. If successful this initiative should be associated with his name and contribute to his political popularity. Partially this outcome was achieved but the gap problem left unresolved.

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Table 1. Public sector, % of total employment

Year	Budget sector	Civil servants	Private sector
2005	22.5	1.7	75.9
2010	21.5	2.5	76.0
2015	20.3	2.5	77.2

Note: Civil servants are excluded from further analysis.

Table 2. Summary statistics: 2005-2015

	Budget sector			Private sector		
	2005	2010	2015	2005	2010	2015
Age (years)	37.7	38.1	38.8	38.0	36.7	38.1
Aged under 30 (%)	23.5	22.8	22.1	25.6	32.9	28.8
Females (%)	71.4	70.7	75.7	43.7	42.5	41.9
Rural (%)	31.0	34.2	36.2	23.7	22.8	23.0
University educated (%)	39.1	40.5	45.2	19.5	26.5	30.4
Occupation (%)						
White collar	68.7	70.2	70.9	29.4	35.1	38.0
Services	21.0	20.2	18.3	19.1	20.7	20.9
Blue collar	10.3	9.6	10.8	51.5	44.2	41.1
Tenure (years)	8.7	9.4	9.7	6.6	6.2	6.4
Working hours per week	40.1	40.0	40.3	45.3	45.6	44.7
Part-time[*] (%)	8.1	9.8	6.9	2.9	2.9	3.1
Monthly wage[**] (rubles)	4559	7077	7715	7195	9897	10018
Hourly wage[**] (rubles)	27.4	44.6	48.2	39.7	54.1	56.8
Incidence of the second job (%)	7.6	7.3	6.8	4.2	3.3	2.9
Incidence of other labor incomes (%)	3.9	3.1	3.5	3.9	2.3	2.2
Number of observations	923	1623	1217	3087	5487	4373

Note: [*] - working less than 30 hours per week. [**] - in 2005 constant rubles.

<p style="text-align:center">Table 3. Mean earnings and public-private wage gaps for sub-groups</p>

	2005			2010			2015		
	Private	Budget	B/P	Private	Budget	B/P	Private	Budget	B/P
Age									
Under 30	6987	3974	57%	9379	6651	71%	9460	7494	79%
30-40	7739	4861	63%	11278	7399	66%	11326	8283	73%
40-50	7138	4795	67%	10004	7362	74%	10225	7571	74%
50+	6863	4364	64%	9133	6477	71%	9492	7545	79%
Gender									
Female	5770	4072	71%	8371	6403	76%	8556	7318	86%
Male	8296	5794	70%	11193	8641	77%	11316	9127	81%
Location									
Moscow and St-Pet	12047	7013	58%	17159	13880	81%	15764	13599	86%
Regional capitals	6934	4762	69%	9590	6976	73%	9770	8076	83%
Other urban	6743	4303	64%	9276	6490	70%	9970	7259	73%
Rural	4935	3651	74%	7903	5637	71%	8096	6311	78%
Education									
High school dropouts	5099	2990	59%	7646	4293	56%	8174	4264	52%
Vocational	6442	3742	58%	8656	5605	65%	8840	5708	65%
High school	6716	3410	51%	9151	5400	59%	9303	5028	54%
College	6849	4179	61%	9114	6428	71%	9214	6976	76%
University	10135	5696	56%	13225	8655	65%	12803	9681	76%
Tenure									
1 year and less	6482	3606	56%	9101	5887	65%	9229	6283	68%
1-5 years	7594	4079	54%	10211	6604	65%	9828	7497	76%
5-10 years	7956	4965	62%	10765	7264	67%	10479	7249	69%
More than 10 years	6834	5069	74%	9386	7721	82%	10616	8480	80%
Occupation									
Managers and professionals	10841	5084	47%	14410	7738	54%	14707	8820	60%
Technicians	8193	4630	57%	11073	7095	64%	10486	7483	71%
Clerks, sales and services	5300	3809	72%	7315	6299	86%	7726	6663	86%
Production workers	7104	4668	66%	9699	5891	61%	9930	6336	64%
Elementary occupations	4570	2219	49%	5469	4650	85%	6665	3577	54%

<p style="text-align:center">Table 4. Oaxaca-Blinder decompositions</p>

	2005		2010		2015	
	coef	se	coef	se	coef	se
Raw gap at the mean	**-0.416***	**0.026**	**-0.338***	**0.018**	**-0.284***	**0.021**
Composition effect (total)	**-0.062***	**0.025**	**-0.062***	**0.015**	**-0.068***	**0.016**
Demographics	0.003	0.003	0.006*	0.002	0.004	0.003
Gender	-0.105*	0.010	-0.078*	0.006	-0.099*	0.007
Education	0.058*	0.009	0.046*	0.005	0.036*	0.005
Tenure	0.008	0.006	-0.008	0.004	0.007	0.004
Firm size	0.000	0.005	0.006	0.003	-0.004	0.004

|						
Occupation	0.074*	0.018	0.051*	0.010	0.065*	0.010
Location	-0.050*	0.012	-0.023*	0.007	-0.034*	0.007
Working time	-0.043*	0.008	-0.062*	0.006	-0.043*	0.005
Wage structure (total)	**-0.353***	**0.028**	**-0.277***	**0.018**	**-0.216***	**0.020**
Demographics	-0.093	0.036	0.013	0.024	-0.098*	0.030
Gender	0.008	0.014	0.001	0.009	-0.005	0.011
Education	0.062*	0.023	0.006	0.017	0.101*	0.022
Tenure	0.015	0.023	0.037	0.019	0.012	0.016
Firm size	-0.008	0.020	-0.005	0.013	0.002	0.018
Occupation	-0.050	0.029	-0.005	0.020	0.013	0.024
Location	0.002	0.019	-0.055*	0.014	-0.018	0.018
Working time	-0.030*	0.015	-0.003	0.012	-0.038*	0.016
Number of observations	4010		7110		5 590	

Note: * $p<0.05$. Demographics: age, age squared, marital status. Location: region, settlement type.

Table 5. Decomposition of the gap at different points of the distribution

|	Lowest decile (P10)			Median (P50)			Highest decile (P90)		
	2005	2010	2015	2005	2010	2015	2005	2010	2015
Raw gap	**-0.339***	**-0.243***	**-0.375***	**-0.506***	**-0.354***	**-0.340***	**-0.552***	**-0.380***	**-0.165***
Composition effect (total)	**-0.154***	**-0.160***	**-0.143***	**-0.070***	**-0.066***	**-0.106***	**0.075**	**0.064***	**0.025**
Demographics	-0.002	-0.001	-0.001	0.004	0.005	0.004	0.008	0.014*	0.007*
Gender	-0.098*	-0.061*	-0.069*	-0.113*	-0.095*	-0.123*	-0.109*	-0.071*	-0.080*
Education	0.049*	0.046*	0.026*	0.060*	0.046*	0.034*	0.048*	0.043*	0.036*
Tenure	-0.016	-0.007	-0.001	0.017*	-0.006	0.006	0.006	-0.013	0.008
Firm size	0.018	0.009	0.006	-0.004	0.003	-0.005	-0.000	0.008	-0.012
Occupation	0.032	0.000	0.004	0.048*	0.041*	0.046*	0.221*	0.144*	0.117*
Location	-0.059*	-0.035*	-0.042*	-0.047*	-0.020*	-0.036*	-0.050*	-0.017	-0.022*
Working time	-0.077*	-0.111*	-0.064*	-0.036*	-0.040*	-0.033*	-0.048*	-0.044*	-0.029*
Wage structure effect (total)	**-0.185***	**-0.083***	**-0.233***	**-0.436***	**-0.289***	**-0.234***	**-0.627***	**-0.444***	**-0.190***
Demographics	0.019	0.052	-0.037	-0.130*	-0.019	-0.156*	-0.063	-0.018	-0.013
Gender	-0.077*	-0.037*	-0.030	0.046*	0.013	-0.018	-0.027	0.009	0.032
Education	0.094*	-0.013	0.155*	0.100*	0.052*	0.074*	-0.051	-0.031	0.065
Tenure	-0.008	0.030	0.006	0.015	0.041	0.021	-0.004	0.074	0.005
Firm size	0.039	0.012	-0.017	-0.022	-0.005	-0.003	-0.101*	0.020	0.001
Occupation	-0.028	0.007	0.068*	-0.018	0.032	0.009	-0.153*	-0.099*	-0.109*
Location	0.005	0.005	0.009	-0.003	-0.053*	-0.013	0.014	-0.134*	-0.042
Working time	-0.079*	-0.075*	-0.021	-0.015	0.019	-0.058*	0.037	0.052*	-0.060*
Constant	-0.151	-0.063	-0.365*	-0.408*	-0.368*	-0.090	-0.279*	-0.318*	-0.069

Note: * $p<0.05$. Demographics: age, age squared, marital status. Location: region, settlement type.
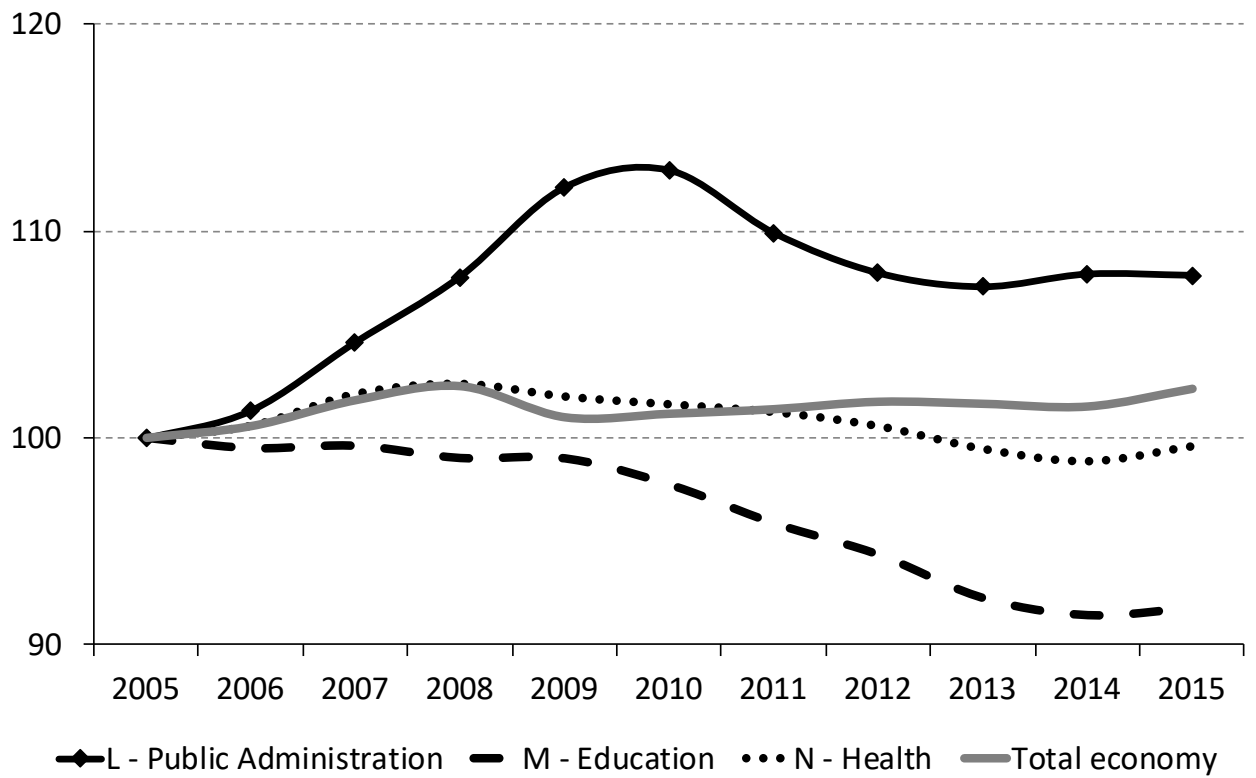
Note: Authors' calculations from Rosstat data

Fig. 1. Employment trends, 2005 = 100%
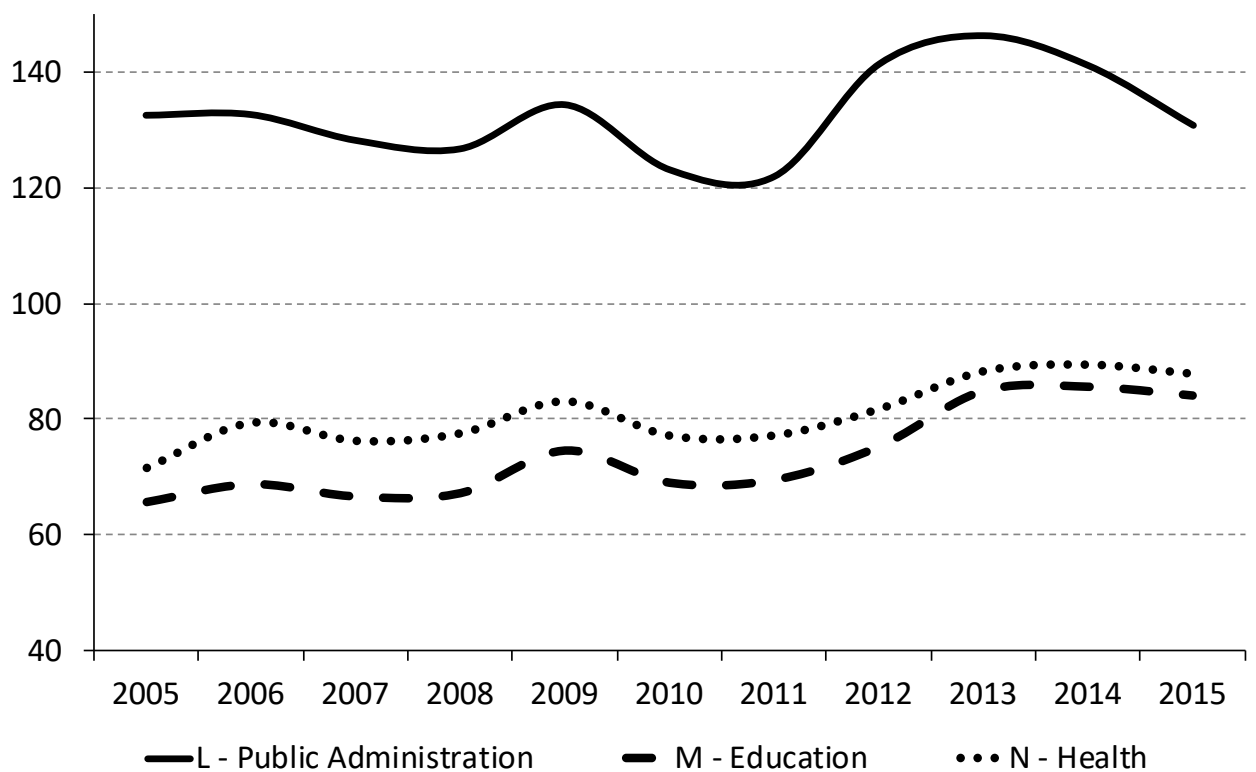
Note: Authors' calculations from Rosstat data

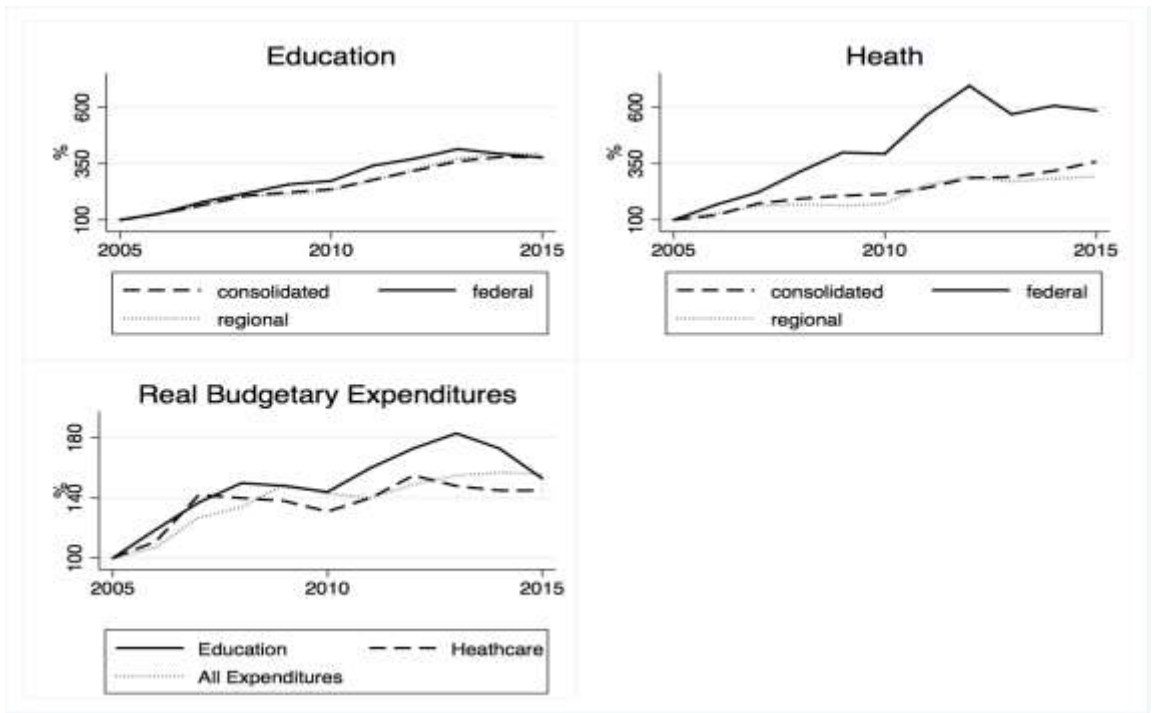Fig. 2. Average wages, % to average wage in total economy

Fig.3. Growth in Budgetary Expenditures on Education and Healthcare, 100% = 2005
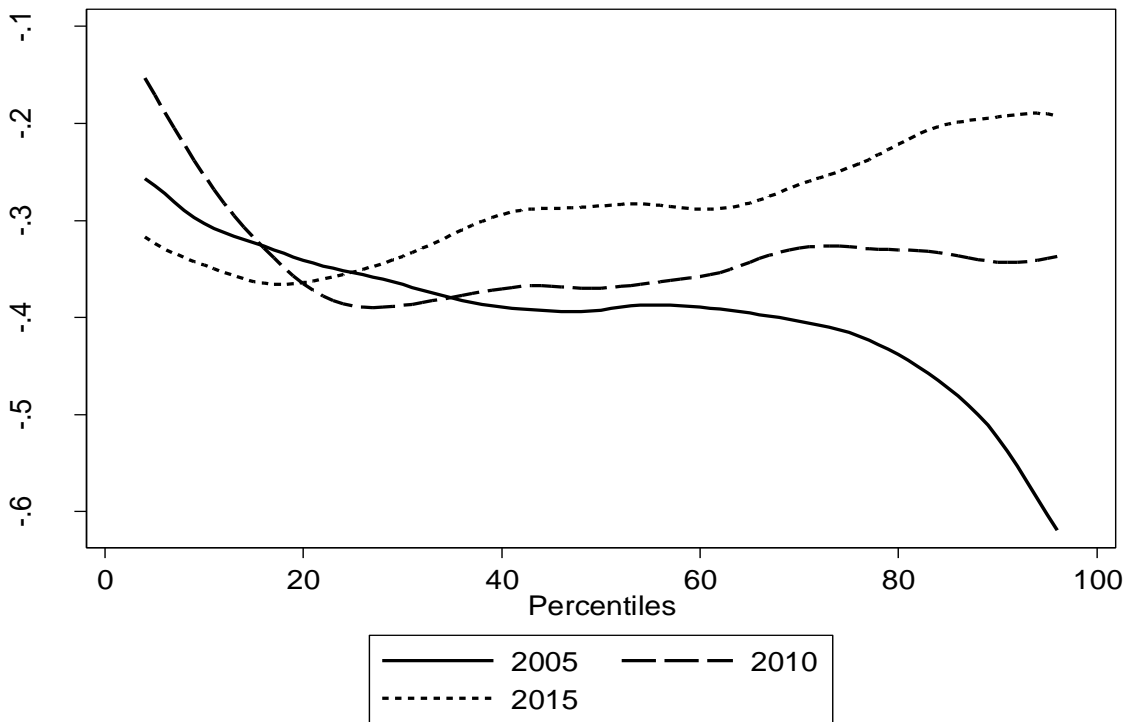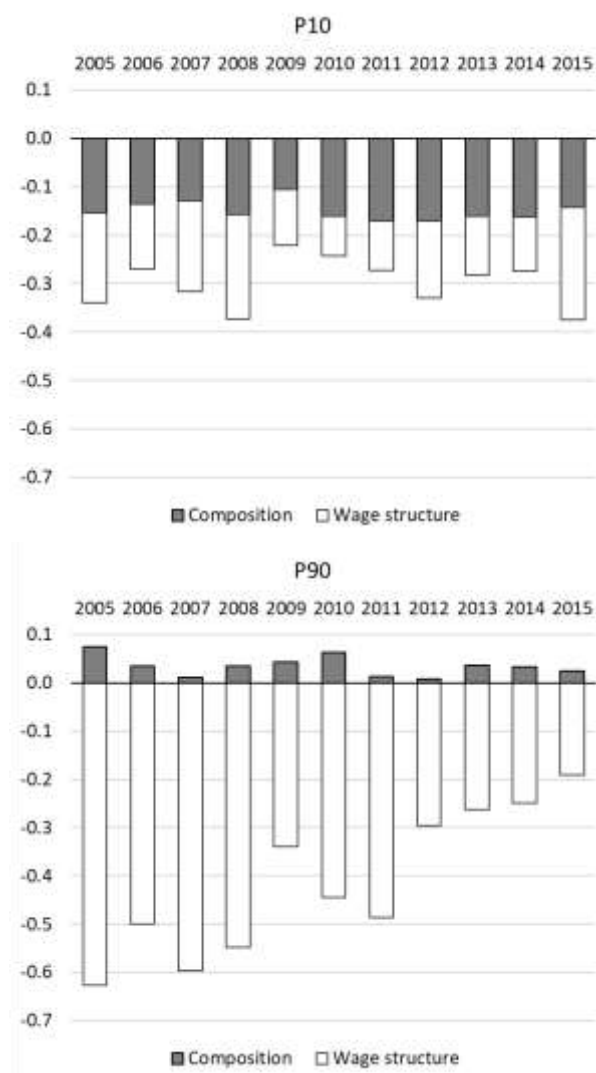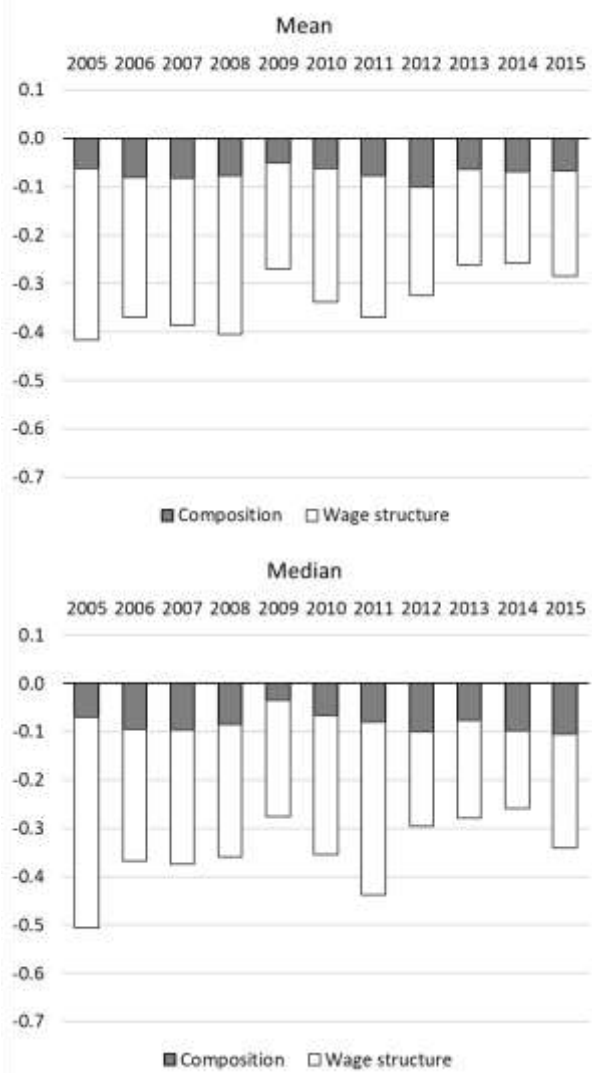

Fig.4. Raw public-private wage differentials by percentiles

Fig. 5. Aggregate decompositions