

# Jobs in public and private sectors: does the state underpay?

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February 1, 2016

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# Motivation

- Underpayment is risky: we either will lose doctors and teachers or adverse selection will lead to the replacement of workers with worse characteristics.
- Overpayment: private sector will lose competitiveness attacked by pressure on search cost.
- Consequently, we need a mechanism which guarantees fairness.

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# Theory behind

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- Theory of human capital: only total and specific human capital matters, differences in the work places do not matter;
- Theory of compensating wage differentials: workers should obtain compensation for worse work conditions;
- Theory of segmented labor markets: high administrative barriers or high costs of transition between sectors. Source of segmentation: rigid wages or restrictions on the number of work places.

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- Analysis of the US and West Europe shows that public sector has a wage premium in comparison with private sector (5%). For women it's high than for men (15% against 2,5%). Reason: premium for qualification (Bargain and Melly, 2008; Lee, 2004).
- In developed countries there is also a positive gap. Reason: secure social services (Glinskaya and Lokshin, 2007).
- Countries of East and Central Europe had the same mechanism of wage formation as in Russia before joining the European Union, after that the wages were equalized (Sharunina, 2013).

# Data

- cross-section 2010-2015
- people from 15-72 are taken into consideration
- 1% of the poorest and 1% of the richest were deducted because of possible mistakes in the errors
- missing observations were excluded
- workers employed in agriculture were excluded because of specific mechanism of wage formation

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# Main trends



# Summary statistics: representative agent

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VARIABLES	Private						Public					
	Female			Male			Female			Male		
	N	Mean	Std.D	N	Mean	Std.D	N	Mean	Std.D	N	Mean	Std.D
age	15,187	39.33	11.91	17,105	38.79	12.05	8,619	42.93	12.00	1,712	44.39	13.21
wage	15,187	9.530	0.632	17,105	9.862	0.565	8,619	9.309	0.638	1,712	9.410	0.713
tenure	2,106	31.72	5.959	1,618	31.01	9.713	2,199	30.14	5.591	344	32.24	8.418
marstatus	15,177	0.657	0.475	17,098	0.818	0.386	8,615	0.674	0.469	1,712	0.849	0.358
size	11,461	532.1	7,618	11,337	759.9	3,461	6,968	172.1	544.9	1,241	208.5	558.6
kids	12,963	0.791	0.406	14,605	0.731	0.443	7,363	0.869	0.338	1,482	0.792	0.406
shortweek	15,187	0.168	0.374	17,105	0.0630	0.243	8,619	0.399	0.490	1,712	0.212	0.409



# Methods of estimation

- Inclusion of the dummy variable (being employed in the public or private sector);
- Maximum likelihood estimation of endogenous switching regression models;
- Quantile regressions, Blinder-Oaxaca decomposition and Machado-Mato decomposition.

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# Basic approach

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$$\ln(Wage_i) = \sum_j \beta_j x_{ij} + sD_i + \epsilon_i$$

$\ln(Wage_i)$ - logarithm of a wage obtain by a respondent during last month;

$X$ - control variables;

$D_i$ - dummy variable which equals 1 if the respondent is employed in the public sector;

$\epsilon_i$  - independent and identically distributed residuals.

# Basic approach: control variables

## **Individual characteristics**

education

sex

age

specific experience

marital status

professional status

## **Work place characteristics**

week endurance

size of the enterprise

secondary employment

subordinate

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# Basic approach: results

Variables	(1)	(2)	(3)	(4)	(5)	(6)
public	-0.157*** (0.0529)	-0.0627 (0.0662)	-0.152*** (0.0440)	-0.0782* (0.0426)	-0.148*** (0.0227)	-0.0981*** (0.0336)
sex	0.0812 (0.112)	0.288*** (0.0631)	0.0732 (0.0758)	0.235*** (0.0524)	0.0325 (0.0578)	0.143*** (0.0455)
publicsex		-0.406** (0.157)		-0.321*** (0.0973)		-0.219** (0.0886)
age			-0.0199*** (0.00405)	-0.0185*** (0.00415)	-0.0158*** (0.00303)	-0.0149*** (0.00320)
tenure			0.00657 (0.00419)	0.00723* (0.00407)	0.00416 (0.00405)	0.00467 (0.00391)
Constant	9.415*** (0.0964)	9.367*** (0.0978)	9.863*** (0.149)	9.729*** (0.160)	9.076*** (0.134)	8.991*** (0.140)
Observations	4,214	4,214	4,214	4,214	4,214	4,214
R-squared	0.016	0.033	0.155	0.165	0.259	0.263
cov.1	-	-	+	+	+	+
cov.2	-	-	-	-	+	+

Standard errors in parentheses: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

# Basic approach: drawbacks

Estimates will be unbiased if following conditions hold:

- 1) return on human capital characteristics- coefficient  $\beta$ - are equal between sectors;
- 2) choice of the sector by individuals is random and does not depend on any observed and unobserved characteristics.

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# Switching regression

Wage equations: private sector

$$\ln(Wage_{ni}) = \beta_n X_{ni} + u_{ni} \text{ if } I_i = 0$$

Wage equations: public sector

$$\ln(Wage_{bi}) = \beta_b X_{bi} + u_{bi} \text{ if } I_i = 1$$

Sector choice:

$$I_i^* = \delta(\ln(Wage_{ni}) - \ln(Wage_{bi})) + \gamma Z_i + \epsilon_i$$

$I_i = 0$  if  $I_i^* \leq 0$  – private sector is chosen

$I_i = 1$  if  $I_i^* > 0$  – public sector is chosen

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# Switching regression

Intersectoral gap equals the average of individual gaps:

$$\Delta Wage_i = (Wage_{bi} - Wage_{bi}^C), \text{ where}$$

$$\begin{aligned} Wage_{bi}^C &= E\{Exp(Ln(Wage_{bi})|I_i = 0)\} = \\ &= Exp(\beta_n X_{bi} + \sigma_n \lambda_n + \frac{\sigma_n^2}{2}) \end{aligned}$$

$Z_i$  in addition to  $X_i$  includes

- availability of children less than 7 years and children of age 8-15
- reduced work week (less than 36 hours)

# Switching regression: results

	<i>wage<sub>private</sub></i>	<i>wage<sub>public</sub></i>	<i>sector select</i>
<i>sex</i>	0.071 (0.047)	-0.008 (0.094)	-0.946*** (0.057)
<i>age</i>	-0.020*** (.003)	-0.011*** (0.003)	0.014*** (0.004)
<i>tenure</i>	0.009*** (0.002)	0.004 (0.003)	-0.014*** (0.004)
<i>mar.st.</i>	0.078*** (0.005)	-0.017 (0.029)	0.102** (0.049)
<i>workweek</i>	0.005*** (0.001)	0.010*** (0.002)	0.000 (0.003)
<i>kids</i>			-0.029 (0.092)
<i>shortweek</i>			0.569*** (0.063)
<i>const</i>	9.566*** (0.152)	8.711*** (0.181)	-0.636*** (0.289)

Standard errors in parentheses: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Wage gap: -20.2%

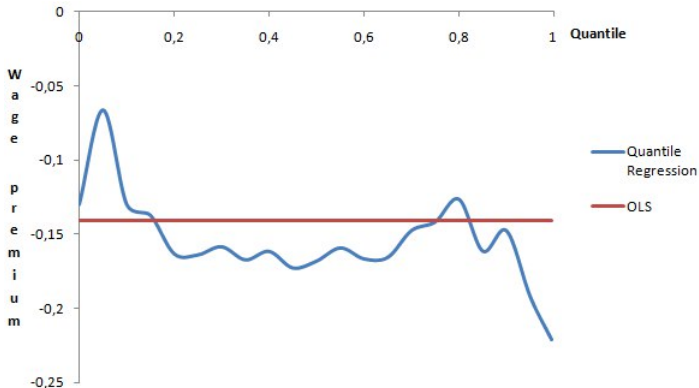


# Quantile regression: results

	(10)	(25)	(50)	(75)	(90)
Variables	wage	wage	wage	wage	wage
public	-0.130*** (0.0323)	-0.164*** (0.0252)	-0.168*** (0.0251)	-0.142*** (0.0240)	-0.148*** (0.0275)
sex	0.0923** (0.0380)	0.0991*** (0.0296)	0.117*** (0.0295)	0.144*** (0.0283)	0.0887*** (0.0324)
age	-0.0126*** (0.00296)	-0.0209*** (0.00231)	-0.0188*** (0.00230)	-0.0153*** (0.00220)	-0.0144*** (0.00253)
tenure	0.00489* (0.00274)	0.00753*** (0.00214)	0.00668*** (0.00213)	0.00784*** (0.00204)	0.00314 (0.00233)
workweek	0.00717*** (0.00141)	0.00636*** (0.00110)	0.00617*** (0.00109)	0.00720*** (0.00105)	0.00746*** (0.00120)
lnsize	0.0866*** (0.00836)	0.0817*** (0.00652)	0.0761*** (0.00650)	0.0718*** (0.00622)	0.0675*** (0.00713)
Constant	8.452*** (0.168)	9.120*** (0.131)	9.368*** (0.131)	9.531*** (0.125)	9.996*** (0.144)
Observations	4,488	4,488	4,488	4,488	4,488
Pseudo R2	0.1217	0.1425	0.1455	0.1312	0.1207

Standard errors in parentheses: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

# Quantile regression: illustration



# Conclusion

- government underpays 20%
- government underpays men at least 1.5 times more than women
- government underpays more to the high income groups and underpays less to low income groups compare to private sector

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Thank you for attention!