

IZA/Higher School of Economics Workshop: Labor Market Adjustment in the CIS, Central Asia and China in the Wake of the Great Recession

EFFECTS OF MINIMUM WAGES ON THE RUSSIAN WAGE DISTRIBUTION

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EXISTING EVIDENCE

● **Developed countries:**

- MW narrow the wage distribution and have a small adverse effect on employment (Brown, 1999; Neumark and Wascher, 2007).

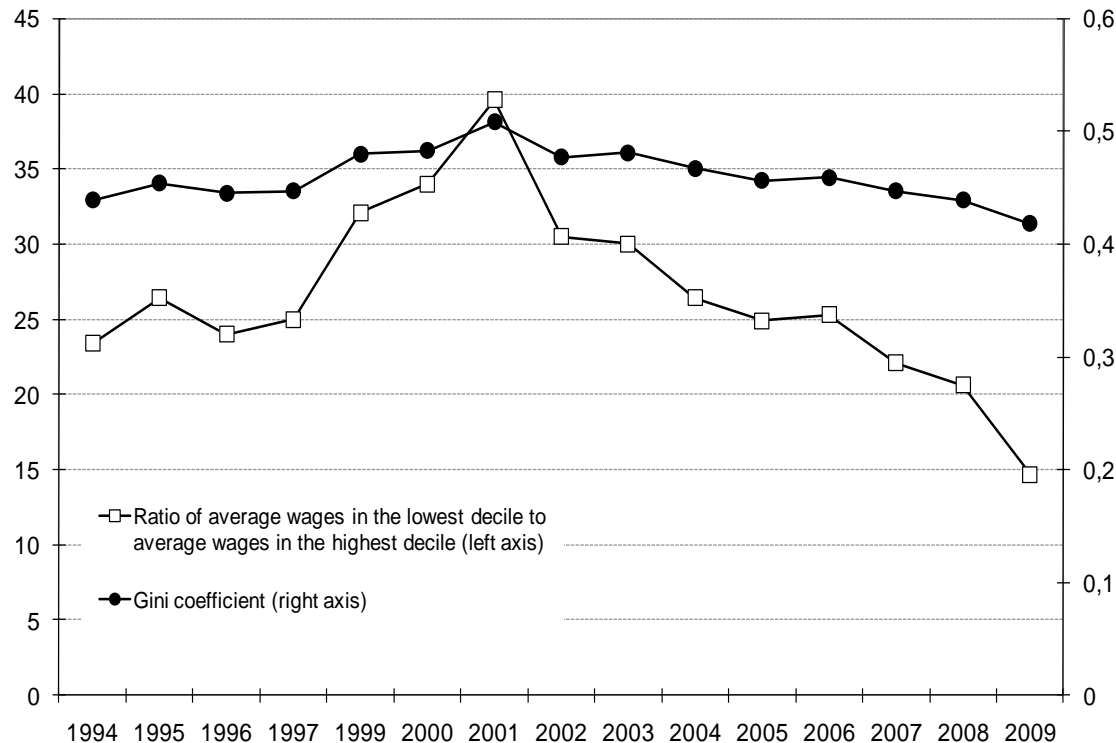
● **Developing countries:**

- Evidence mostly from Latin America,
- Wage compression effects are larger than in developed countries
- No consensus on the sign and the magnitude of employment effects (Gindling and Terrell, 1995; Maloney and Mendez, 2004; Lemos, 2009).

● **Transition countries:**

- Ganguli and Terrell (2006) use data for Ukraine to study the impacts of MW on the wage distribution in 1996-2003. By 2003, the MW in Ukraine reached 40% of the average wage. Ganguli and Terrell demonstrate that the MW hikes played an important role in lowering the growth in inequality, more for women than for men.
- Kertesi and Köllő (2003) use data for Hungary and find that large increase in the MW (by 57% in nominal terms) caused significant job losses in small firms.

EVOLUTION OF EARNINGS INEQUALITY

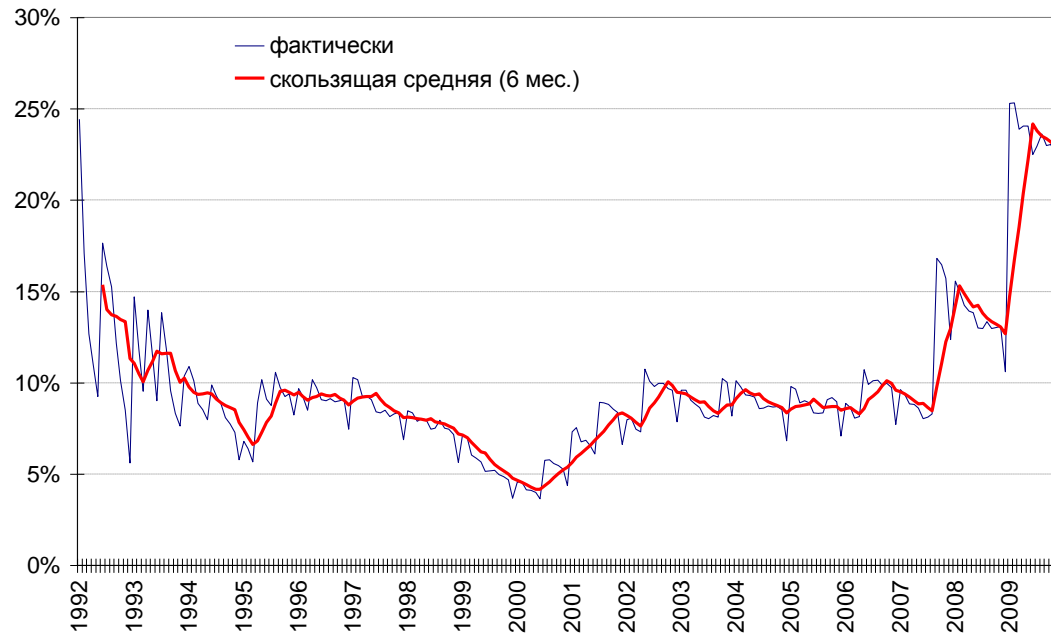


- The introduction of market reforms led to an immediate increase in wage inequality.
- The peak of inequality was recorded in 2001 after economic recovery began. Since 2002, earnings inequality has been declining.
- Real wages has been growing since 2000. Wage growth has been more rapid at the bottom of the distribution

WAGE ADJUSTMENT IN THE RUSSIAN TRANSITION AND INSTITUTIONAL BACKGROUND

- Most of the labour market adjustment went through wages, which were extremely flexible during transition.
- Labour market institutions failed to moderate the growth of wage inequality in the early transition period.
- **Trade unions** have a weak voice and low mobilization capacity. Managers often have broad discretion to make decisions regarding pay.
- **Unemployment benefits** have never been generous in Russia. I. At the peak in 1998, the ratio of average unemployment benefit to average wage reached 30% but then gradually decreased to less than 10%
⇒ unemployment has never been an attractive option and unemployment benefits were not able to exercise upward pressure on the wage floor.
- The **federal minimum wage** is legally binding and covers all full-time employment contracts. It is not differentiated by age groups, occupation categories, branches of economic activity, establishment types, ownership, or firm size.

EVOLUTION OF THE MW



- In 2005-09 the federal MW increased from 800 RUB to 4330 RUB and by a factor of 3.6 in real terms. MW reached 25% of the AW and became binding for low-wage workers.
- MW reforms in 2007:
 - Automatic regionalization through regional coefficients has been removed. Regions were allowed to set regional MWs.
 - Before 2007 the MW related to gross monthly earnings net of mandatory regional wage supplements, bonuses and compensations ("tariff" wage). Since 2007 it has been applied to the total wage amount, including all bonuses and compensations.

DATA

- The Survey of Occupational Wages – Establishment survey by the Rosstat
- October: 2005, 2007, 2009
- Sample size: in each round $\approx 700,000$ workers from 79 Russian provinces
- Coverage:
 - Large and medium-size firms
 - Full-time workers except CEO
 - All industries except agriculture, forestry, fishery, finance and public administration
 - Gross monthly wages
- Data on workers are taken from establishment records
- All calculations account for individual weights.
- Wages are in October 2005 prices (CPI used)



The data do not cover agriculture, small firms and the informal sector where wages are low \Rightarrow my estimates are likely to be a lower bound of the impact of MW hikes on the wage distribution in Russia

CHANGES IN BINDINDNESS OF THE MW

2005: MW = 800 RUB

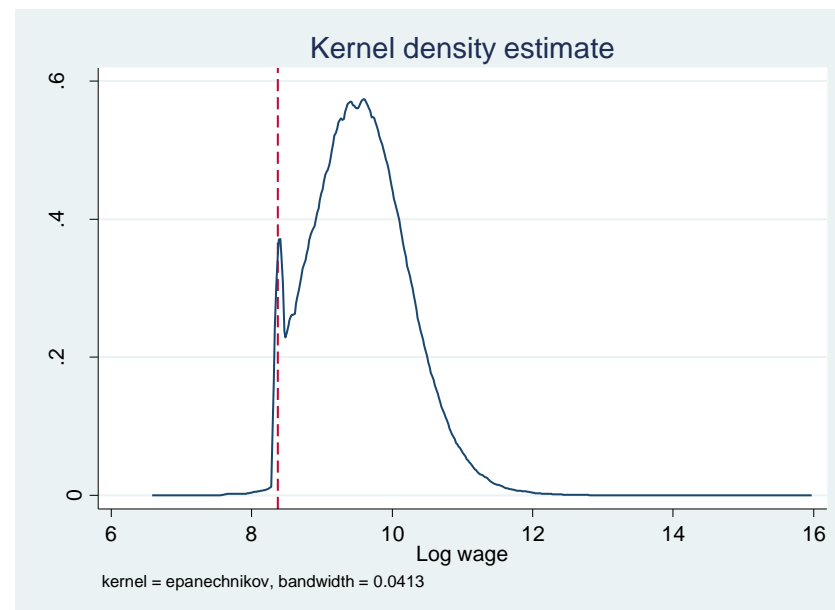
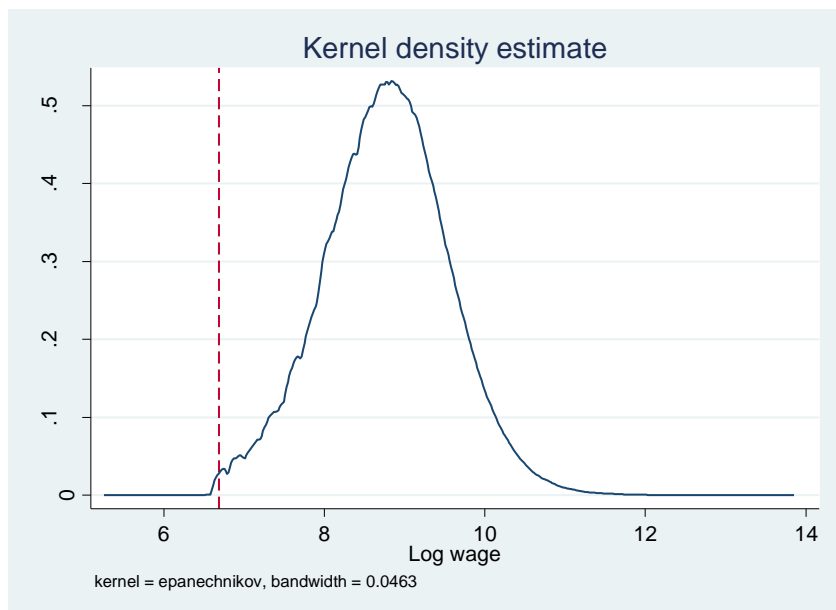
**$\%(\text{WAGE} \leq \text{MW}) = 0.3\%$
(0.4% - REGIONAL COEFF.)**

**$\%(\text{TARIFF WAGE} \leq \text{MW}) = 1.1\%$
(2.1% - REGIONAL COEFF.)**

2009: MW = 4330 RUB

**$\%(\text{WAGE} \leq \text{MW}) = 4.1\%$
(6.2% - RMW)**

$\%(\text{TARIFF WAGE} \leq \text{MW}) = 14.1\%$

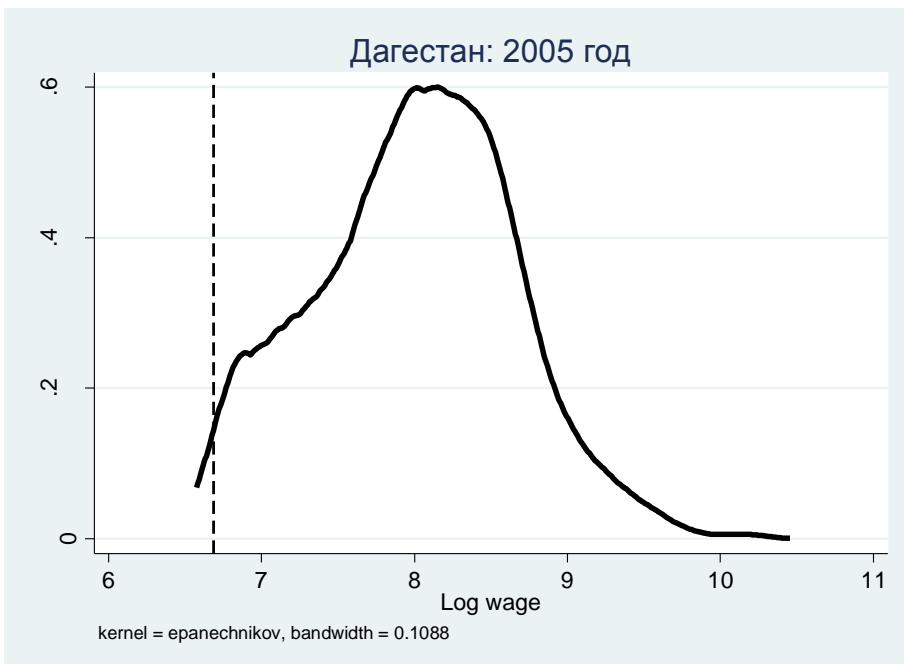


In 2005, the MW was equal 20% of the average unskilled wage.

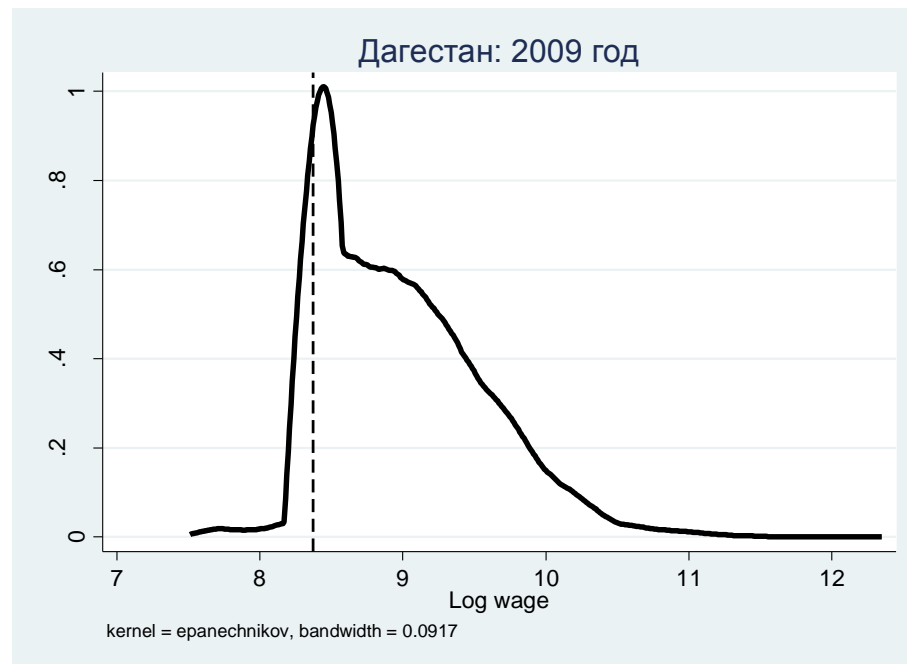
By 2009 this ratio increased to 52%.

LOW-WAGE REGIONS: REPUBLIC OF DAGESTAN

2005



2009



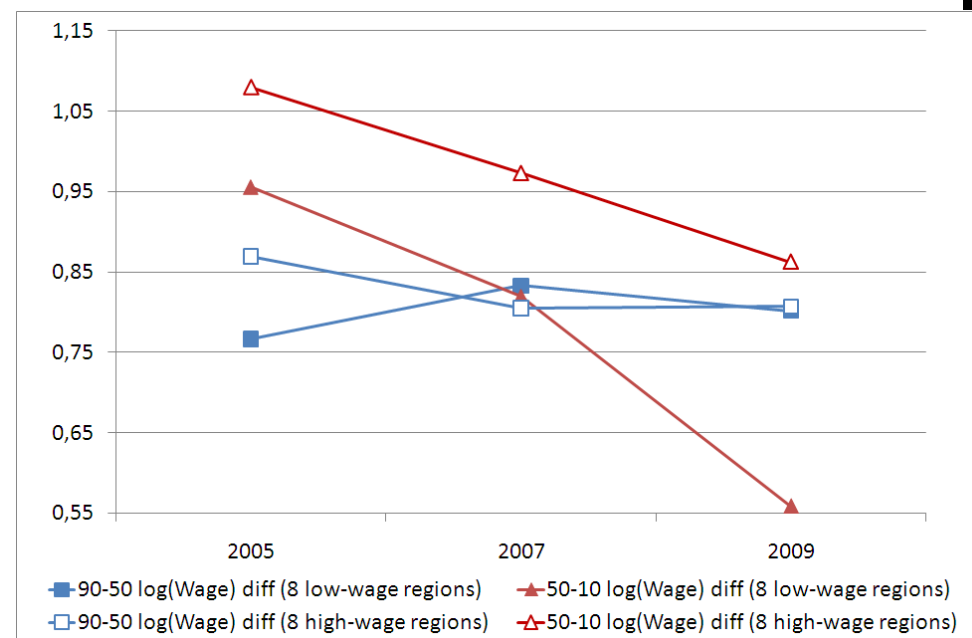
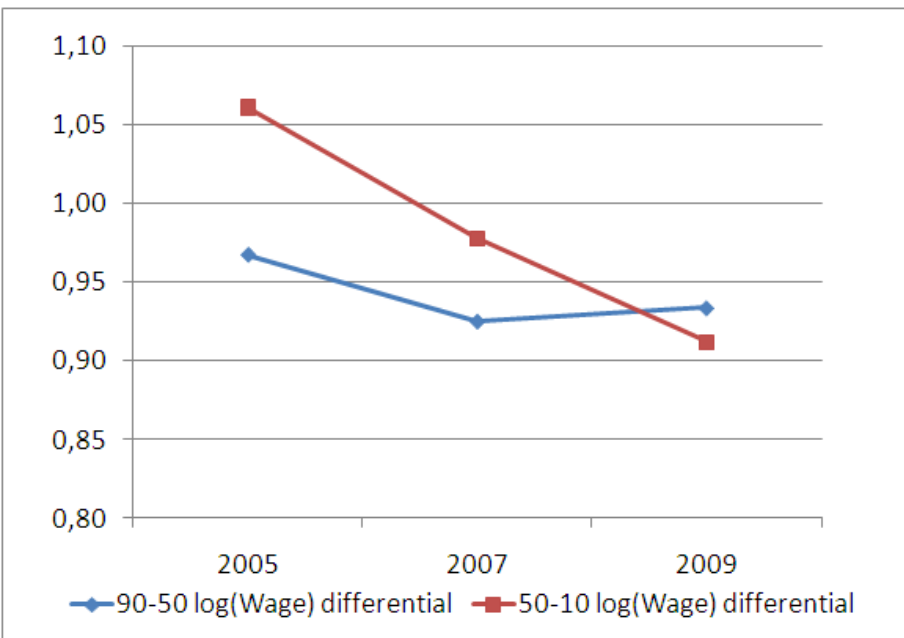
2005: Fraction at MW (Tariff Wage \leq MW) = 3%

2009: Fraction at MW (Total Wage \leq MW) = 23%

CHANGES IN EARNINGS INEQUALITY

RUSSIA: INEQUALITY WAS DECLINING IN THE BOTTOM HALF OF THE DISTRIBUTION

LOW-TAIL INEQUALITY WAS DECLINING FASTER IN LOW-WAGE REGIONS



Observed changes in earnings inequality conform with predictions from the theory

RISKS OF BEING AT THE MW OR BELOW - 1

		Tariff wage		Total wage	
		2005	2009	2005	2009
Gender					
	Males	0.9	9.6	0.3	2.5
	Females	1.3	17.5	0.3	5.1
Education					
	University	0.3	4.2	0.1	0.8
	Some university	1.3	15.5	0.4	4.7
	2-year college	0.9	14.7	0.3	4.0
	Vocational	1.0	19.0	0.3	5.2
	Upper secondary	1.9	22.6	0.5	7.0
	Low secondary and less	2.7	32.6	0.6	11.4
Age					
	below 19	3.6	26.5	0.9	8.5
	20-29	1.2	12.6	0.3	3.2
	30-39	0.9	12.3	0.3	3.4
	40-49	0.9	13.2	0.2	3.8
	50-59	1.0	14.9	0.3	4.2
	60+	2.1	19.8	0.3	6.6

RISKS OF BEING AT THE MW OR BELOW - 2

	Tariff wage		Total wage	
	2005	2009	2005	2009
Ownership type				
State & municipal	1.3	19.5	0.3	6.5
Domestic private	1.1	7.5	0.0	0.6
Foreign & joint	0.2	2.9	0.1	0.2
Domestic mixed (private-public)	0.3	6.0	0.1	0.5
Industry				
Recreation, arts and sports	2.8	24.7	0.9	9.5
Mining and quarrying	0.3	5.9	0.1	0.2
Manufacturing	0.6	7.3	0.1	0.5
Electricity, gas and steam supply	0.2	8.0	0.0	0.4
Construction	0.5	5.4	0.1	0.5
Wholesale and retail trade	2.0	7.5	0.9	0.9
Hotels and restaurants	1.0	12.6	0.2	1.1
Transport and communications	0.3	5.6	0.1	0.7
Real estate and business services	0.9	9.4	0.3	1.1
Education	2.4	24.3	0.5	10.4
Health	6.6	22.3	0.1	6.0

METHODOLOGY: GENERAL IDEA

GOAL –

To model the gap between the observed earnings distribution ('distorted' by the MW) and the latent earnings distribution (the distribution of wages that would prevail in the absence of MW)

PROBLEM –

«Latent» distribution is unobservable!

METHOD –

Lee(1999), Autor et al. (2010): use regional variation in the gap between the minimum wage and median wages to identify parameters of the latent distribution

Assumptions: No effects on employment

BUT direct and spillover effects on wages.

METHODOLOGY: FORMULAS

1. For each Russian region I calculate an 'effective minimum wage' which is a measure of bindingness of the MW in the region:

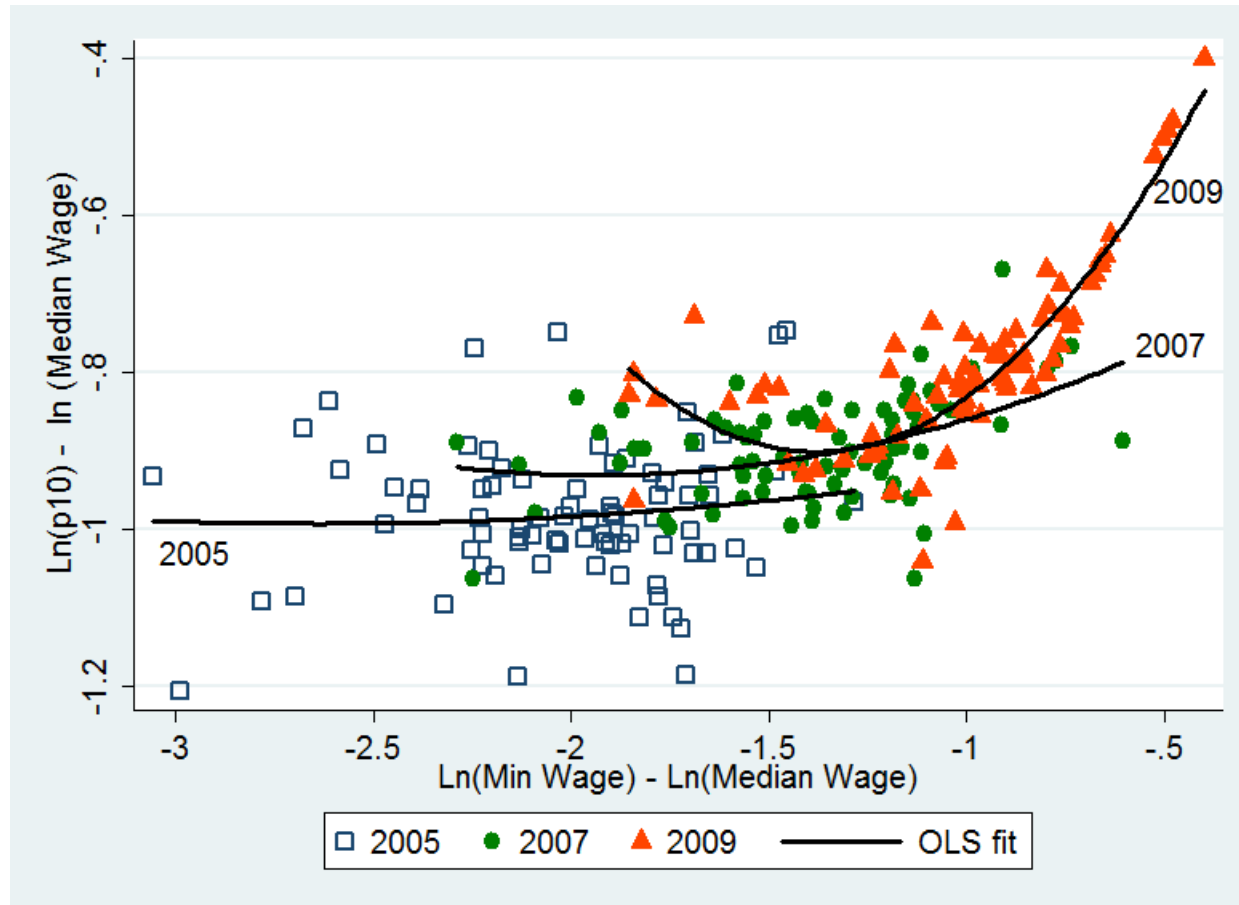
$$\log\left(\frac{MW}{MedianWage_{reg}}\right) = \log(MW) - \log(MedianWage)_{reg} = w^m - w_{reg}(50) = m_{reg}$$

2. I assume that the shape of earnings distribution in the region depends on the effective minimum wage.

With the region-level data I estimate the following equation for each percentile of the distribution:

$$\begin{aligned} \log\left(\frac{Wage(p)_{reg}}{MedianWage_{reg}}\right) &= w_{reg}(p) - w_{reg}(50) = \\ &= (w_{reg}^*(p) - w_{reg}^*(50)) + \beta_1 m_{reg} + \beta_2 m_{reg}^2 + \varepsilon_{reg} \end{aligned}$$

GRAPHIC PRESENTATION OF THE MODEL



2005, 2007 – flat lines, low MW → no relationship

2009 – emergence of the upward-sloping segment

METHODOLOGY: FORMULAS

$$w_{reg}(p) - w_{reg}(50) = \alpha + \beta_1 m_{reg} + \beta_2 m_{reg}^2 + \\ + h_1 H_{reg} + u_1 U_{reg} + s_1 State_{reg} + YearDummies + \varepsilon_{reg}$$

- Equation was estimated on a panel of Russian regions constructed from original data.
- Regional observations are weighted by the number of individual observations in each region-year.
- Equations were estimated for the 5th, 10th, 20th, 30th, 40th, 75th and 90th percentiles of the earnings distribution for the whole sample and separately for males and females

POTENTIAL PROBLEMS WITH OLS

Autor et al (2010): The assumption that the shape of the latent wage distribution in year t is constant across regions and uncorrelated with the median

⇒ use regional fixed effects.

⇒ I use fixed effects for macro-regions defined as 7 federal districts plus a dummy for residing in Moscow or Saint Petersburg

Autor et al (2010): The second source of misspecification is the division bias that stems from the inclusion of the regional median wage variable in both the dependent and independent variables in Equation. It may cause an upward simultaneity bias in the estimates, since the median enters with the same sign on both sides of the equation.

⇒ to instrument the effective minimum with the region-specific statutory minimum wage in each state and year.

⇒ OR to model regional median wages as a function of time effects, region effects, region-specific time trends, and an error term.

$$w_{reg}(50) = \alpha_t + \gamma_s + (\gamma_s \times t) + e_{reg}$$

⇒ I also use the effective minimum wage based on tariff wages. It allows both to reduce the division bias and to control whether employers have quickly adapted their wage-setting practices to the changes in the MW regulation

SPECIFICATIONS

	Effective minimum variable	Controls
1	Effective minimum: $w_{reg}^m - w_{reg}(50)$	Effective minimum, effective minimum squared, year dummies
2	Effective minimum: $w_{reg}^m - w_{reg}(50)$	Specification (1) + regional dummies, dummy for living in Moscow or St. Pet
3	Effective minimum: $w_{reg}^m - w_{reg}(50)$	Specification (2) + average hours worked last month, unemployment rate, % of state and municipal employment
4	Reduced-form effective minimum: $w_{reg}^m - \hat{w}_{reg}(50)$	As in Specification (2)
5	Reduced-form effective minimum: $w_{reg}^m - \hat{w}_{reg}(50)$	As in Specification (3)
6	Effective minimum based on tariff wage: $w_{reg}^m - w_{reg}^{tariff}(50)$	As in Specification (2)
7	Effective minimum based on tariff wage: $w_{reg}^m - w_{reg}^{tariff}(50)$	As in Specification (3)

RESULTS: MARGINAL EFFECTS

Log-wage differential	All	Males	Females
Specification 4			
5-50	0.125*	0.099*	0.136*
10-50	0.063*	0.021	0.076*
20-50	0.019	-0.005	0.024*
30-50	0.008	-0.005	0.009†
40-50	0.005	-0.003	0.005
75-50	0.000	0.011†	-0.003
90-50	0.000	0.006	-0.018

- ★ As expected the effect of the MW is larger for lower percentiles and insignificant for high percentiles
- ★ The MW is hardly binding for males. For females spillover effects are very large - the effect persists up to at least the 30th percentile of the distribution.
- ★ In the pooled distribution the effect still survives at the 10th percentile - females with lower wages prevail in the bottom part of the pooled distribution.

SIMULATIONS

GOAL

To construct counterfactual wages that would have been observed had the real MW been held at the 2005 level, i.e. if the MW would have been indexed only by the rate of inflation.

METHOD

- For each individual in the dataset, I calculate her percentile position in the regional wage distribution for 2009.
- Then, I adjust each wage below the regional median by the magnitude:

$$\Delta w_{reg}^p = \hat{\beta}_1^p (\tilde{m}_{reg,2005} - \tilde{m}_{reg,2009}) + \hat{\beta}_2^p (\tilde{m}_{reg,2005}^2 - \tilde{m}_{reg,2009}^2)$$

Where $\tilde{m}_{reg,2009}$ is the observed effective minima in region *reg* in 2009, $\tilde{m}_{reg,2005}$ is the hypothetical relative level of the minimum wage for region *reg* in period τ_0 , and $\hat{\beta}_1^p$ and $\hat{\beta}_2^p$ are point estimates of corresponding coefficients

$$\tilde{m}_{reg,2005} = \tilde{m}_{reg,2009} - (w_{reg,2009}^m - w_{reg,2005}^m - \Delta w_{reg}(50))$$

SIMULATION RESULTS: EARNINGS INEQUALITY

Log-wage differential	Actual, 2009	Counterfactual, 2009	Difference, 2009
ALL			
90-10	1.85	1.94	-0.09
90-50	0.93	0.94	-0.01
50-10	0.91	0.99	-0.08
FEMALES			
90-10	1.73	1.85	-0.12
90-50	0.91	0.93	-0.01
50-10	0.82	0.92	-0.11
MALES			
90-10	1.82	1.87	-0.05
90-50	0.86	0.87	-0.01
50-10	0.96	1.00	-0.04

About 50% of the compression of lower tail inequality in the overall earnings distribution, 75% of the decline in female lower tail inequality, and 30% of the decline in male lower tail inequality is attributable to the increase in the real value of the MW.

SIMULATION RESULTS: AVERAGE EARNINGS

	Average earnings, 2009		Difference
	Actual	Counterfactual	
ALL	9.12	9.09	0.04
Males	9.31	9.28	0.02
Females	8.96	8.91	0.05
Age			
Do 19	8.71	8.62	0.09
20-29	9.12	9.09	0.03
30-39	9.20	9.17	0.03
40-49	9.14	9.11	0.03
50-59	9.09	9.05	0.04
60+	8.98	8.92	0.06
Education			
University	9.42	9.41	0.01
Some university	8.99	8.95	0.04
2-year college	9.01	8.97	0.04
Vocational	9.01	8.96	0.04
Upper secondary	8.94	8.88	0.06
Low secondary and less	8.79	8.71	0.08

SIMULATION RESULTS: AVERAGE EARNINGS

	Average earnings, 2009		Difference
	Actual	Counterfactual	
Ownership type			
State & municipal	8.97	8.91	0.06
Domestic private	9.23	9.21	0.02
Foreign & joint	9.51	9.49	0.01
Domestic mixed (private-public)	9.28	9.27	0.02
Industry			
Recreation, arts and sports	8.81	8.72	0.09
Mining and quarrying	9.61	9.60	0.01
Manufacturing	9.15	9.13	0.02
Electricity, gas and steam supply	9.28	9.26	0.01
Construction	9.38	9.37	0.02
Wholesale and retail trade	9.12	9.10	0.03
Hotels and restaurants	8.94	8.90	0.05
Transport and communications	9.34	9.32	0.02
Real estate and business services	9.32	9.29	0.03
Education	8.77	8.68	0.09
Health	8.85	8.79	0.06

CONCLUSIONS

Impact on the earnings distribution:

- about 50% of the compression of lower tail inequality in the overall wage distribution (75% for females and 30% for males) – as measured by the log-wage differential between the 50th and 10th percentile – is attributable to the increase in the real value of the MW.
- Since a relatively small fraction of workers is directly affected by the MW regulation in modern Russia, spillover effects account for a significant part of the overall impact. High spillover effects are likely to be caused by the Unified Wage Grid in the budgetary sector.

Impact on the wage structure:

- The gender wage gap in average earnings declined by an extra 3 p.p.
- The university premium (compared to secondary education) would have been higher by 5 p.p. had the real minimum wage been constant at its real 2005 level.
- The public-private gap declined by 4-5 p.p. mainly because of rising wages in education, health and other sectors that are funded from the government budget.

IMPLICATIONS FOR FUTURE RESEARCH

1. While the MW was certainly an important contributing factor to narrowing of lower tail inequality, especially for females, it was not the only one. The rapid growth of wages at the bottom of the distribution started in 2001 when MW remained symbolic. Between 2005 and 2009, about 50% of the reduction in overall lower tail inequality and 70% of the reduction in male lower tail inequality cannot be attributed to the MW and still needs to be explained.
2. I concentrated on the impact of changes in the federal MW and ignored regional MWs that were introduced since 2007.

Limitations of the study:

- Because of data constraints I did not consider wages in the informal sector and at small firms where low-wage private sector workers are concentrated.
- The paper overlooks disemployment effects and the possibility of crowding out workers to the informal sector. I believe that these effects were small, but this should be proved with more scrutiny.