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The gender gap in wages in Russia from 1992 to 1995

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Abstract. This paper examines the gender gap in wages in Russia from 1992 to 1995. It uses data on prime aged men and women from the Russia Longitudinal Monitoring Survey (RLMS) and focuses on those living in urban areas. Differences in hours of work appear to explain about one half of the gender differential, but there is still a large differential in average hourly wages between men and women. Observable differences in characteristics between men and women explain almost none of the differential or the changes through time.

JEL classification: J16, J31, P23

Key words: Wage inequality, gender differences, Russian transition

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1. Introduction

Dramatic changes in the Russian economic structure started in early 1992, following the price liberalization of January 1992. As old enterprises closed down and other enterprises faced the constraints of the free market, one certainly would expect to see changes in how different productive characteristics would be rewarded in Russia. In 1992, for example, only 5% of the total workforce was employed at the enterprises with private ownership. By the fall 1995, 38% worked for privately owned enterprises. These dramatic changes could easily alter gender differences across time. Our research examines how gender inequality in wages changed during the early years of the economic reforms.

There is a growing concern about an increase in the gender differential in labor compensation since the beginning of market reforms. Polls (*by the Public Opinion Fund*) show that *''Women make up 87% of employed Russian urban residents with a personal income of less than 100,000 rubles ($21) a month. The higher the income bracket, the lower the proportion of women. ITAR-TASS said that women constitute 71% of those with earnings between 200,000 and 400,000 rubles; 57% of those earning 400,000 to 600,000 rubles; 45% of those with incomes between 600,000 and 1 million; 38% of those earning from 1 to 1.5 million; and only 32% of those earning more than 1.5 million.''* (The Open Media Research Institute, August 1996.)

There are many reasons why women might perform differently than men in the labor market during the transition from a planned to a market economy. Initially, women were over-represented among low-paid workers. Centrally set wages could have kept these low wages from being even lower, and one might expect female wages to fall when the central government stopped setting wages. This could give rise to increases in inequality. The declining State support of the ''budget sectors'' (e.g. teaching and medicine), in which women are more likely to be employed, also lowers salaries of workers in these sectors.

Unfortunately, there were no surveys with representative samples that contained detailed wage and occupational information in the Russian Federation before June 1992. Consequently, it is impossible to examine the dramatic change that took place immediately following the price liberalization of January 1992. With the present research we aim to investigate in detail the variations in the gender gap in wages of urban, prime-aged Russian adults from the Summer of 1992 to the Fall of 1995.

2. Background

2.1. A labor market inherited from the socialist past

One of the political goals of the Soviet Union was to achieve equality between men and women. Free education and a great number of educational establishments provided equal educational opportunities to all. As a result, the educational attainments of Russian women are slightly higher than those of Russian men. Russia had a very high labor force participation rate among married women even though few part time jobs were available. It was easy to find a job and layoffs were extremely rare. Authorities at the enterprises always had incentives to keep a large work force.

Despite housework and child-care being primarily women's responsibilities, Russian labor laws required women to work in the labor market. Many managers of State enterprises, recognizing the real, and legal, costs of the generous maternity leaves and sick leaves policies, might have been reluctant to hire women. It probably was easier for women to find employment in occupations where leave policies or extended absenteeism did little to hinder the future productivity. Faced with such constraints women had to compromise. This resulted in a highly segregated labor market, and "male" and "female" professions evolved. Women's professions had more flexible schedules, fewer responsibilities, and consequently lower pay. The low prestige and low pay of many white collar occupations, such as medical doctors and lawyers, made these professions mostly female. The higher starting pay and generous fringe benefits (housing, etc.) attracted men to the blue collar jobs in factories and plants. Occupational segregation might be an important determinant of the gender wage gap. But as we demonstrate below, even within occupations large and significant gender gaps in wages remain.

2.2. Inequality and discrimination measures

Why, on average, do women earn less than men? Most explanations center on one of two themes. The first is Smith's theory of equalizing differences. Women might select themselves into less stressful occupations or pick different career paths than men. They also might invest less in acquiring human capital because they experience more interruptions in the labor market. The second explanation is that women are discriminated against, i.e. they are paid less than their male counterpart even if they have the same characteristics and perform the same tasks.

A standard approach is to attempt to hold constant all productive characteristics for men and women and examine whether gender explains any of the remaining wage differential. A gender dummy variable used in a regression analysis, for example, can uncover a crude measure of the gender differential. Alternatively, one can estimate separate earnings functions for men and women to allow for different rewards to the productive characteristics by gender. Blinder (1973) suggested a technique to examine gender differentials from these separate earnings functions, and Oaxaca (1973) extended his analysis. Their approach allows one to express the fraction of the gender wage differential that might be attributed to the "difference in productive characteristics" and the fraction that is a result of "discrimination". Jones (1983), however, pointed out important identification problems in many applications of the Blinder-Oaxaca approach.

Additional insights could be gained by examining gender inequality by skill groups. These groups are often defined by productive characteristics – education or experience levels, or by occupations. In the framework of a standard Mincer-type regression analysis, different returns to "measured skills" constitute between group inequality, and residuals are called "unmeasured skills" or withing group inequality. The concept of "skill groups" is further extended by employing a general notion of "skills." In this way observed (or predicted) wages are used to define a generalized measure of skills.

Examining the extent of inequality by the skill levels could be informative for understanding natures of inequality. "Between skill group" inequality re-

flects prices of skills, but if prices of the same male and female skills are different there is not much a researcher can say about the relative contributions of the gender-specific prices of these observed wage determinants. This is the Oaxaca's "unexplained" portion of the gap. The size of this gap is determined by the differences in quality of the "same skill", by discrimination, and by the fact that the proxy for a particular skill may not be very good. Examination of the "within skill group" inequality could be further carried out by uncovering the skill groups where inequality is most prevalent.

When comparing inequality over time or among different countries, additional insights about the nature of gender difference in pay could be gained by studying the size of the gender gap that is determined by the gender specific factors (including differences in market skills and gender discrimination) and by the overall wage structure. See Blau and Kahn (1996, 1997) for a more complete discussion of this approach. Gender specific factors determine the percentile ranking of women in the male wage distribution, while the overall inequality within the wage distribution (usually within the male distribution) measures the penalty or payoff associated with having below or above the average skills.

Any study of why men and women earn different wages is complicated by the fact that the true determinants of wages are not known. Almost always one must use proxies for true wage determinants and develop arguments about discrimination on the basis of the observable relationships between wages and these proxy measures. As Rapaport (1995) states these proxies can yield spurious evidence of gender differences "... when the proxy variables do not map uniquely to the points of support of the true variables. Proxy errors are in effect a non-linear measurement error, and conventional measurement error corrections are generally unsuitable in this context." Differences in male and female wages could be a result of differences in mapping or differences in the proxies for wage determinants. Any changes over time in male-female wage differentials could be attributed to the time/business cycle effect or to the change in the relationship between the proxy determinants and true determinants.

2.3. Previous studies of wages and gender inequality in pay in Russia

Besides emigrant surveys, little information on Russian wages before the economic transition has been available outside the former Soviet Union. Katz (1994, 1996), for example, used the 1989 Taganrog data to examine gender wage differentials. This data source is representative of a medium size city, but that is only one type of settlement in the Russian Federation. She reports the ratio of average hourly wages of women to those of men as being 0.73, and the ratio of average monthly earnings as being 0.66. Male employment in Taganrog is concentrated in heavy industry, while women work in many different sectors. Working women in Taganrog worked fewer hours per week, had less labor market experience, tended to work in jobs with lower qualifications and worked in less prestigious sectors. Differences between working men and women in the last three characteristics explain about 25% (about 8.5% each) of the difference in average log wages.

Newell and Reilly (1994) used the Russia Longitudinal Monitoring Survey

(RLMS 1992) to analyze the gender gap using the Oaxaca/Blinder approach. They found that different treatments of men and women within regions is the largest individual factor explaining the gender differential in wages. They also reported that severe occupational segregation contributed to the wage gap. Men in senior white collar jobs and skilled blue-collar occupations commanded a sizable wage premium in 1992.

Brainerd (1998) used the May 1991, April, May and June 1993, and May and June 1994 "All-Russian Center for Public Opinion Research – VTsIOM – Survey" to look at changes in the overall inequality in wages. She found that the overall wage dispersion increased dramatically from 1991 to 1994 and reports an increase in the unadjusted female-male salary gap from 1991 to 1994. The ratio of average monthly salaries for women and men was 0.795 in May 1991. It decreased to 0.603 in 1993, and then increased to 0.635 in May 1994. The ratio of median salaries decreased substantially from 0.833 in 1991 to 0.60 in 1994 . Little of the change in the gender wage gap appears to be due to the occupational and industrial shifts. She concludes that the general trend towards more wage inequality in Russia, in conjunction with women tending to hold jobs in the lower tail of the wage distribution, appears to be the only way to explain the changing gender gap in wages.

There are several important places where Brainerd's results differ from those presented here, but there are also good reasons for why her analysis could differ from ours. First, her analysis examines monthly earnings rather then hourly wages. Second, her analysis ends in a year that has an unusually high gender wage differential (1994). Third, we found no easily obtainable documentation on the sampling procedures used to collect this sample. Consequently, we were unable to verify or assess the representativeness and accuracy of the VTsIOM sample.

3. Data and descriptive statistics

This study uses two panels of the Russia Longitudinal Monitoring Survey (RLMS). The RLMS is a household-based survey designed to measure systematically the effects of Russian reforms on the economic well-being of households and individuals. The first panel spans 1992 and 1994, and we use data from the second panel covering October 1994 and December 1995. For more information on the RLMS see Popkin and Mroz (1995) and the RLMS home page on the World Wide Web. The current address of the home page is http://www.cpc.unc.edu/projects/rlms/.

In this article we use RLMS data from the Fall 1992 (Round I), Summer 1993 (Round III), Fall 1994 (Round V) and Fall 1995 (Round VI). We focus on the earnings of prime-aged adults (ages 24–54) living in urban areas. The occupation information covers only the formal sector (State, private, and combined ownership), so we analyze only earnings from the formal sector. There is no information on occupations for the Round III data set, so much of the analysis centers on the other three years. We use the Russian Central Statistical Bureau (Goskomstat) Consume Price Index (CPI), published in Russian Economic Trends, to deflate rubles earned at different times to June 1992 rubles. All wages throughout the paper are expressed in these real June 1992 rubles unless specifically stated otherwise.

Main explanatory variables

We measure wages as average hourly earnings on the main job. The sum of "salaries, wages bonuses, grants, benefits, revenues, profits" plus the monetary value of the in kind payments *actually received* in the last 30 days from the main place of employment gives total earnings on the main job. We divide this by hours of work at the main job in the last 30 days to calculate hourly wages. Nominal hourly wages are then converted into real rubles.

Individuals were asked about their educational attainment. For the regression analysis we used seven education categories: less than 7 years of schooling; 8–9 years; 10 years; 11–12 years; 13–14; 15 years; and at least 16 years of education. In other places we used three education groups. Individuals who finished college or had more than 15 years of schooling belonged to the "high" education group. Individuals with technical and vocational degrees, in particular those with 11–14 years of schooling, belonged to the "medium" education group; and individuals who stayed at school for 10 or fewer years were assigned to the "low education" group. Individuals were grouped by their age. We defined three age categories: "older" for 44–55 years old individuals, "middle" for 34–43 years old, and "younger" for those who were 25–33 years old.

Rounds I and III (in Phase 1 of the RLMS) contain 20 sampling sites, and Rounds V and VI (phase 2) have 33 secondary sampling units. We collapsed these sites into 8 regions: "Moscow and St. Petersburg", "North and North-Western" region, "Central and Central Black Earth", "Volga-Vyatski and Volga Basin", "North Caucasian", "Ural", "Western Siberia", and "Eastern Siberia and Far East" regions. Occupations were classified into the International Standard Classification of Occupations (ISCO -88) four digit codes. In this paper we aggregate occupations to one and two digit occupational titles.

Tables 1, 2 and 3 present characteristics of the sample and summary statistics of the main variables used in the analysis for RLMS 1992, RLMS 1993, RLMS 1994 and RLMS 1995. As can be seen from Table 1, there is a large fraction of people for whom we cannot compute wages. We believe that nonpayment of wages is a main source of missing salaries. The fraction of workers owed back wages was about 35% in both 1994 and 1995. The fraction of workers who worked in the last 30 days and received no pay for this work was 14% in 1994 and 17% in 1995. A possible reason for not reporting hours of work is that those on unpaid leaves did not work on their main jobs during the previous month.

4. Decomposition of male-female wage differential

A commonly used method of decomposing the wage differential, first introduced by Blinder (1973) and later developed by Oaxaca (1973), suggests the following approach. Consider the coefficients resulting from log wage regressions on the exclusively male sub-sample and on the exclusively female subsample. The difference between the estimated coefficients for men and women is called the difference due to the "reward structures." Multiplying it by a particular set of characteristics yields the gender differential attributed to the difference in the reward structures for individuals with that particular set of characteristics.

Table 1. Sample Characteristics

	Men				Women			
	1992	1993	1994	1995	1992	1993	1994	1995
Total number of observations	2678	2295	1661	1534	3255	2804	1882	1755
Employment rate	90.6	84.6	87.5	88.2	83.9	80.6	76.9	77.7
Percent of total employed with positive salaries	80.5	74.3	69.5	68.1	72.0	70.3	64.1	62.8
Percent of total working in the formal sector, with positive salaries	79.1	71.9	63.4	65.6	71.3	68.8	61.3	58.1
Percent of total working in the formal sector, with positive hours reported	83.0	71.7	77.1	74.3	74.8	68.0	69.6	68.4
Percent of total working in the formal sector, with positive wage rate	74.5	63.2	60.1	56.4	67.3	61.4	58.9	55.3

Table 2. For those working in the formal sector, with positive wage rate (In order to convert June 1992 rubles in to December 1996 rubles multiply these rubles by 179.)

Summary Statistics (Means and Standard deviations)	Men				Women			
	1992	1993	1994	1995	1992	1993	1994	1995
Monthly salary from formal employment (June 1992 rubles)	4412	4380	5282	4707	2893	3024	3197	3048
	(3352)	(3636)	(4863)	(4560)	(2261)	(2459)	(2754)	(2729)
Monthly hours of work	174.5	167.7	174.1	179.6	157.3	153.0	150.0	155.8
	(56.1)	(48.7)	(62.4)	(57.5)	(46.1)	(45.2)	(51.4)	(50.3)
Wage rate	28.57	29.5	34.72	29.35	21.51	23.63	24.62	22.91
	(28.5)	(30.7)	(35.9)	(31.9)	(25.0)	(28.5)	(26.3)	(27.9)
Age	38.9	38.8	37.9	37.9	39.4	39.7	38.8	39.1
	(8.3)	(8.1)	(8.4)	(8.4)	(8.1)	(7.9)	(8.2)	(7.8)
Education in years	12.05	12.08	12.55	12.41	12.38	11.87	12.91	12.67
	(2.6)	(2.6)	(2.6)	(2.7)	(2.5)	(2.7)	(2.5)	(2.3)
Total number of observations used in the analysis	1992	1450	995	866	2186	1723	1107	970

Table 3. For those working in the formal sector, with positive wage rate

Summary Statistics (Proportions of the total in occupation)	Men				Women			
	1992	1993	1994	1995	1992	1993	1994	1995
based on National Standard Classification of Occupations (ISCO -88), one digits titles. We do not present information on agriculture related occupations (ISCO one digit title 6 – Agriculture). We also excluded "Armed force" (ISCO one digit title 10) from the analysis.								
Senior officials and managers	4.6	n/a	2.9	5.8	2.1	n/a	1.0	3.2
Professionals	16.4	n/a	18.2	11.7	28.0	n/a	28.1	22.5
Technicians and Associate Professionals	5.4	n/a	6.3	9.5	22.3	n/a	25.4	26.7
Clerks	0.9	n/a	0.7	2.1	12.8	n/a	10.9	13.2
Service and sales workers	3.1	n/a	4.4	6.1	7.4	n/a	10.8	11.8
Craft and related trades	34.3	n/a	32.8	31.9	9.0	n/a	7.9	6.1
Plant and Machine operators and Assemblers	28.9	n/a	29.4	27.3	8.0	n/a	7.4	6.8
Elementary occupations	6.4	n/a	5.3	5.7	10.3	n/a	8.7	10.0
Total	100%	n/a	100%	100%	100%	n/a	100%	100%

Differences between men and women in the values taken by the explanatory variables can also lead to the gender differentials. Such differentials are said to be due to the differences in "observable characteristics." The product of the vector difference in observable characteristics and either the male or the female vector of regression coefficients is called difference due to the difference in "observable characteristics". The sum of the two sources of differences equals the aggregate differential in log wage between men and women.

Using the Oaxaca notations, by the property of ordinary least squares regression one can express: $\overline{\log(\text{wage}_{\text{male}})} = \bar{Z}_{\text{male}}\hat{\beta}_{\text{male}}$ and $\overline{\log(\text{wage}_{\text{female}})} = \bar{Z}_{\text{female}}\hat{\beta}_{\text{female}}$. The over bar represents the sample mean of the variable. The sample mean is taken over the logarithm of each worker's wage rate. Define the row vector of the difference in mean characteristics and the column vector of the difference in the coefficients as, $\Delta\bar{Z} = \bar{Z}_{\text{male}} - \bar{Z}_{\text{female}}$ and $\Delta\hat{\beta} = \hat{\beta}_{\text{male}} - \hat{\beta}_{\text{female}}$ Substituting in the original equation yields: $\overline{\log(\text{wage}_{\text{male}})} - \overline{\log(\text{wage}_{\text{female}})} = \Delta\bar{Z}\hat{\beta}_{\text{female}} + \bar{Z}_{\text{male}}\Delta\hat{\beta} = \Delta\bar{Z}\hat{\beta}_{\text{male}} + \bar{Z}_{\text{female}}\Delta\hat{\beta}$. The $\Delta Z\beta_{\text{female}}$ term is the gender "difference due to the difference in the observed characteristics" (employing the female wage structure), and the $Z_{\text{male}}\Delta\beta$ term is the gender "difference due to the different treatments", or discrimination (employing male weights.) Similarly, $\Delta Z\beta_{\text{male}}$ is the gender "difference due to the difference in the observed characteristics" (employing the male wage structure), and $Z_{\text{female}}\Delta\beta$ is the discrimination measure employing female weights.

Many researchers attempt to decompose the "difference due to different treatments," or the discrimination measure, into sub-components. For example, Oaxaca (1973) reported that educational discrimination accounts for 1.2% of the gap in log wages (employing female regression weights), while difference in rewards within the same industry for men and women accounts for 17.3% of the difference in log wages. There is no justification for such a decomposition.

Any decomposition of the differential treatment effects must rely upon arbitrary normalizations. Jones (1983) demonstrated that the discriminatory portion of the wage gap "cannot be further decomposed in any intelligible fashion, since the decomposition depends critically on the reference point from which differences are calculated." Briefly, the definition of the intercept in the linear regression model plays a key role in any such decomposition. With a set of categorical variables, for example, using different excluded categories will produce different estimates of the portion of the discrimination attributed to that set of variables; this happens even though all predicted wages, wage derivatives, and wage contrasts are are identical across specifications. Appendix A1 contains further algebraic support for Jones's statement; Appendix A2 presents a vivid empirical illustration of this point. Decomposition of the "difference due to different endowments" is location invariant, however, and can be further analyzed.

5. Empirical Results

We specify earning functions for men and women and regress the natural log of real hourly earnings on seven education dummy variables, age, age squared,

eight occupation dummies, and controls for eight regions. We perform the decomposition of the difference in average log wages (geometric average) into the difference due to different reward structures of men and women and the difference due to gender specific endowments. We further decompose the "difference due to difference in endowments" into a difference due to regional dispersion of working men and women, due to differences in age and education levels, and due to different distributions across occupations.

5.1. Overview of the decomposition

Table 4 presents these decompositions for the years we have data on occupations: 1992, 1994, and 1995. Appendix Tables A2.1 and A2.2 contain the parameter estimates from the Ordinary Least Square Regressions used to construct the estimates of the decomposition. From the top panel of Table 4 we see that men earned approximately 31% higher wages per hour than women in 1992. This rose to 33% in 1994 and fell to 25% in 1995.

The two other panels in this table present breakdowns of the differential for each year by using the male and female characteristics and wage structures as bases for the comparisons. From the top row of the second panel, we see that if men had been paid according to the female wage structure they would have received 24% lower wages in both 1992 and 1994, and 20% lower wages in 1995 (the $Z_{\text{male}}\Delta\beta$). Using the male characteristics as the base, we see that differences in how men and women are rewarded account for 74% to 80% of the gender differentials. Using the female wage structure as the base, differences in characteristics explain the other 20 to 26% of the wage differential (the $\Delta Z\beta_{\text{female}}$). Differences in the occupations held by men and women alone account for more than the total amount of the gender differential that can be attributed to differences in characteristics. This, however, is only about one quarter of the total wage differential.

Using the female characteristics as the base (third panel, Table 4), we see that 95 to 117% of the gender gap in wages can be attributed to differences in rewards (the $Z_{\text{female}}\Delta\beta$). In 1994, for example, if women had been paid according to the same wage function as men they would have received 17% higher wages, on average, than men. Differences in the distribution of occupations between men and women make up nearly all of the wage differential that can be attributed to observable productive characteristics.

There is a simple interpretation of the decompositions in the lower two panels of Table 4. First, note that the absolute amount of the gender difference attributed to occupation differentials is higher when one uses the female reward structure than when one uses the male reward structure. This suggests that there are larger occupational differences in wages for women than for men. In particular, women who work in male dominated occupations tend to receive wages close to what their male counterparts receive in those same occupations. Men who work in female dominated occupations, however, are paid more like men in other occupations than like the women who work with them in the female dominated occupations. Under the female reward structure, occupational distribution might explain as much as 30% of the total difference (i.e., in 1994). However, under the male reward structure it explains at most 7% of the gap (in 1992).

Table 4. Decomposition of difference in log wages onto difference due to observable characteristics ($Z'_{\text{gender}}\Delta\beta$) and difference due to different treatments ($Z'_{\text{gender}}\Delta\beta$)

	RLMS 1992		RLMS 1994		RLMS 1995	
	Levels	Percentages	Levels	Percentages	Levels	Percentages
Total difference in log earnings: $\overline{\log(\text{wage}_{\text{male}})} - \overline{\log(\text{wage}_{\text{female}})}$	0.31	100	0.33	100	0.25	100
Male characteristics and female reward structure						
Due to difference in rewards $Z'_{\text{male}}\Delta\beta$	0.24427	79.5	0.24365	73.9	0.19834	79.6
Due to difference in endowments $\Delta Z'\beta_{\text{female}}$:						
Total	0.06295	20.5	0.08614	26.1	0.05087	20.4
Regions	0.00116	3.8	−0.001895	−0.6	−0.00074	−0.3
Occupation	0.07925	25.8	0.103443	31.3	0.07096	28.5
Age	−0.00095	−0.3	−0.003112	−0.9	−0.00452	−1.8
Education	−0.01650	−5.3	−0.01229	−3.7	−0.01482	−6.0
Female characteristics and male reward structure						
Due to difference in rewards $Z'_{\text{female}}\Delta\beta$	0.29049	94.6	0.38612	117.0	0.23959	96.1
Due to difference in endowments $\Delta Z'\beta_{\text{male}}$:						
Total	0.016732	5.4	−0.05635	−17.0	0.00962	3.9
Regions	0.00294	1.0	−0.0024	−0.7	−0.00085	−0.3
Occupation	0.02123	6.9	−0.0519	−15.8	0.01327	5.3
Age	−0.01497	−0.5	0.00073	0.2	−0.00421	−1.7
Education	−0.00594	−1.9	−0.00272	−0.8	0.00141	0.6

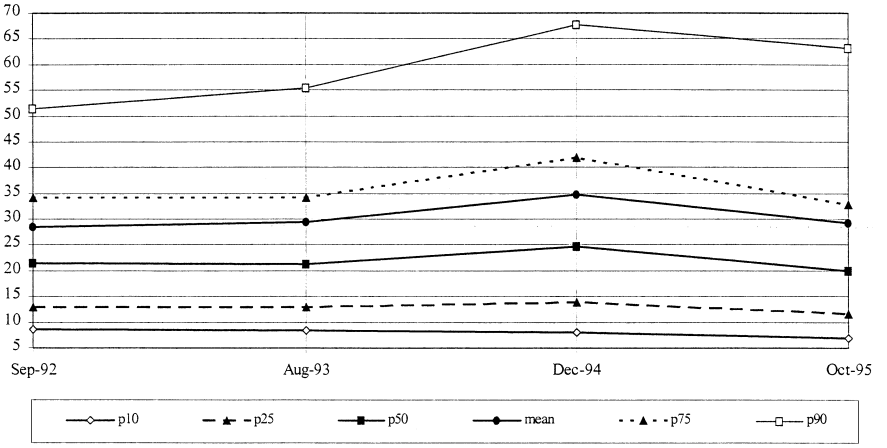


Fig. 1. Trends in men's hourly wage (June 1992 rubles) at five percentiles of the distribution and at the mean

5.2. Trends in male and female average hourly wages over time

Figure 1 displays five selected percentiles of the male wage distributions from 1992 to 1995. This figure also presents the trend in mean male average hourly wages. Figure 2 presents similar information for female workers. There were no sizable changes in the distributions of male and female wages between the Fall of 1992 and Summer of 1993. The only exception is at the 90th percentiles of the distributions. For men, this rise in the highest wages was followed by a substantial rise at the 90th percentile in the Fall of 1994. For women, the rise in the highest wages subsided after 1993. For both men and women the 75th and 50th percentile wages increased from 1993 to 1994. Women's wage distributions varied much less over time than did the men's.

Wages at each of these five percentiles, and on average, declined from 1994 to 1995 for both men and women. By the Fall of 1995, wages in the upper tail of the wage distributions ended up at higher levels than they had in 1992. At the lower tail of the wage distributions, however, wages declined from 1992 to 1995. The increases in inequality for men were larger than the increases for women.

To gain insights on the nature of these changes in the distribution of male and female wages we employ a method developed by Juhn et al. (1993) to study changes in male inequality in the US by race. This technique allows one to decompose the changes within the gender specific wage distribution into changes in the quantities of observed skills, the prices of observed skills and the changes in the residual distribution over time. The residual distribution is a measure of quantities and prices of the unobserved skills. This method allows one to decompose difference in inequality at various percentiles of the distributions. Table 5 presents this decomposition for male and female wages at the 10th, 50th and 90th percentiles of the distributions. See Brainerd (1998) for the same decomposition of monthly earnings for Russian men and women between 1991–1994.

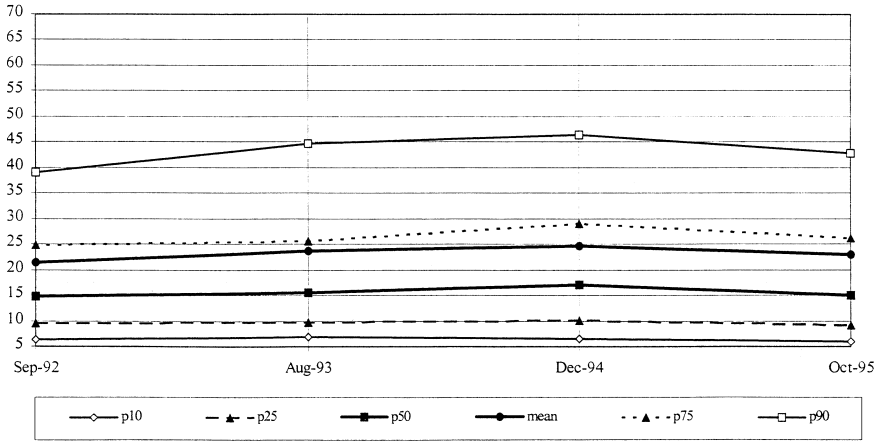


Fig. 2. Trends in women's hourly wage (June 1992 rubles) at five percentiles of the distribution and at the mean

Table 5 verifies that inequality in male wages increased more than inequality in female wages, with the rate of increase in inequality being large in the upper half of the wage distribution. The increase in men's inequality in the lower half of the wage distribution are mostly driven by the increase in residual inequality. Almost three quarters of the increase in the inequality in the upper half of the distribution is brought about by the increase in prices of observable men's skills. Increases in inequality in both halves of the women's distribution came about by almost equal increases in the residual inequality and increases in prices for observable characterisitics. Changes in the quantities of the observed skills did not play a major role in the changing inequality in wages for women.

5.3. The gender differentials over time

Figure 3 displays the ratios of male to female wages for the same five percentiles of the wage distributions as in Figs. 1 and 2 and for the mean wage from 1992 to 1995. Figure 4 graphs the evolution of the absolute difference in male–female wages over time. For both measures gender inequality declined from 1992 to 1993 at all points in the wage distribution. In 1994 the differential rose approximately to the level of 1992. It then declined at all percentiles, except 90^{th} percentile. At 10^{th} percentile the decline was dramatic.

Overall, from 1992 until 1995, there were few changes in gender inequality within the *interquartile* range of the wage distribution. At the 90^{th} percentile there was a dramatic increase in gender inequality, while at the 10^{th} percentile wages became much more equal for men and women. Based on Figs. 3 and 4 there is little evidence of a persistent increase in the gender inequality in wages except at the highest percentiles. The absolute level of gender inequality, however, is substantial.

Table 5. Decomposition of changes in the male and female wage distributions RLMS 1992–RLMS 1995 (in log points.)

	Total change in differential	Change due to changes in:		
	(1992 base year)	Quantities of observed skills	Prices of observed skills	Residuals (unobserved prices and skills)
Men:				
50–10	0.151	0.027	0.027	0.097
90–50	0.282	0.061	0.146	0.074
90–10	0.432	0.088	0.173	0.171
Women:				
50–10	0.059	−0.012	0.040	0.032
90–50	0.082	0.003	0.043	0.037
90–10	0.142	−0.010	0.083	0.069

The decomposition is based on the regression presented in Tables A2.1
The calculations are done as following: consider four distributions, two actual (the base and the comparison distributions) and two counterfactual distributions. Compute relevant statistics for the actual (the base and the comparison) distributions. Let 1992 be the base. Construct the counterfactual distribution (1) by using the skill prices from the base year (1992 regression coefficients) and the observed characteristics for the comparison year (1995); for each set of explanatory variables from 1995 add the corresponding comparison year residual after normalizing these residuals to have the same standard deviation as the base year residuals (e.g. multiply each 1995 residual by the ratio of the standard deviations of the regression residuals in 1992 to the standard deviation of the regression residuals in 1995). Construct the counterfactual distribution (2) by using the distribution of skills and prices from the comparison distribution (i.e. 1995 predicted values) and add the 1995 residual after normalizing as above. Differences in summary statistics between the base distribution and counterfactual distribution (1) are attributed to the changes in quantities; differences in summary statistics between counterfactual distributions (1) and (2) are attributed to the change in observed skills prices. The remaining changes are attributed to the changes in the residual distribution. See Juhn et. al. (1993) for a full description of this technique.

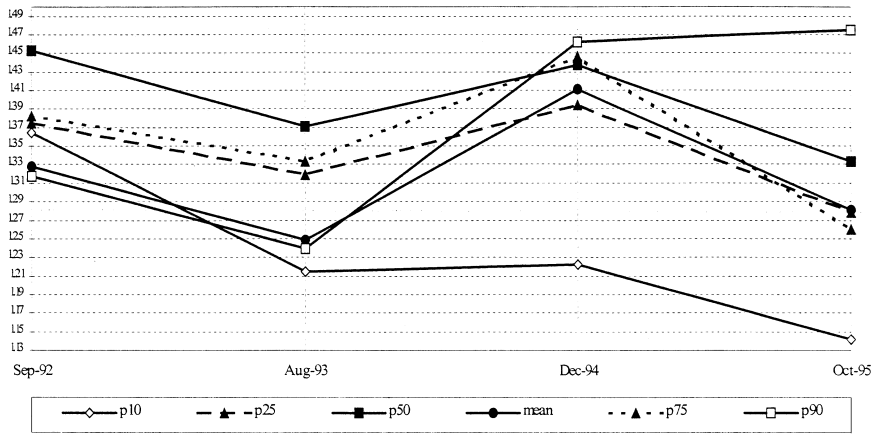


Fig. 3. Male wage as a percent of female wage at the 10th, 25th, 50th, 75th, 90th percentiles of wage distributions and at the mean.

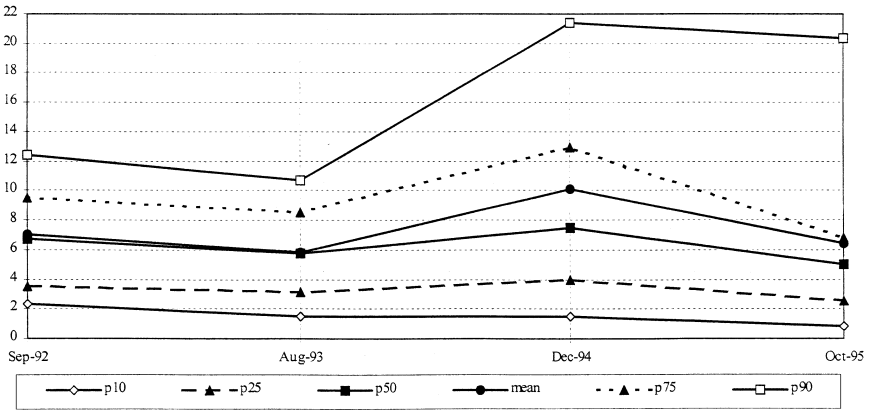


Fig. 4. Male wage at the 10th, 25th, 50th, 75th, 90th percentiles of wage distributions and at the mean minus female wage at the same point of wage distributions.

Table 6. The position of female wages in the male wage distribution in 1992 and 1995

Position in the female wage distribution	10th	25th	50th	75th	90th
Corresponding position of the wage rate in male wage distribution					
1992	4.5	13	31.5	59	80.5
1995	7.5	16.5	35.5	66	83.5

5.4. Understanding the changing gender differentials

Table 6 presents women's rankings in the male wage distribution in 1992 and 1995. At all percentiles women gained relative to men. (At each of the five percentiles of female skills, women's wages corresponded to higher percentiles of male wages.) These trends indicate that relative female skills did not deteriorate, nor did gender discrimination increase during these early years of the economic transition. Brainerd (1998) presents similar analysis between 1991 and 1994.

As Table 5 demonstrates, the increase in the inequality of men's wages in the lower half of the wage distribution was driven by the increase in residual inequality, while the increase in the top half was driven by the increase in prices for the high skilled male labor. The increase in inequality within women's wages, both in the upper and in the lower parts of the distribution, was brought about by almost equal increases in the residual inequality and increasing prices for skills. Unfortunately, it is impossible to say why the prices for observed high skills for men increased while prices for the same observed high skills for women did not increase to the same extent. However, it is possible to further examine residual inequality. Importantly, the increase in residual inequality of men in the lower half of the distribution is three times higher than it is for women; and in the top half of the wage distribution re-

sidual inequality is twofold higher than for women. We proceed with examining whether these increases in within group inequality are concentrated among workers with particular skill levels. To do so we examine trends in wages by occupation groups, by education level, and by age.

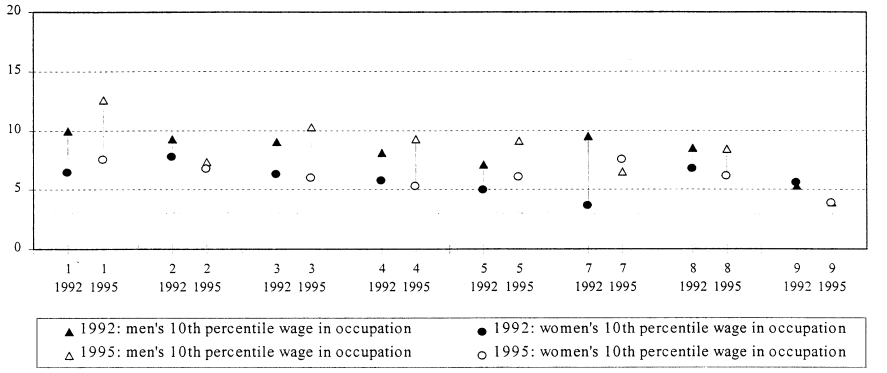
5.4.1. Inequality by occupation

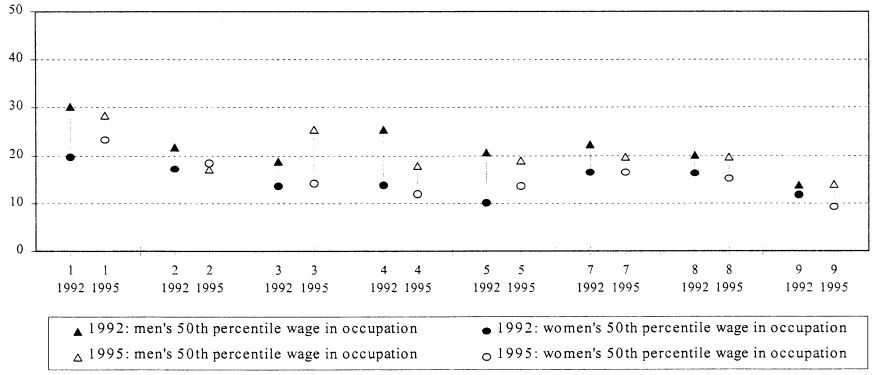
To help understand the change in occupational wages from 1992 to 1995, we examine how men's and women's wages at 10^{th}, 50^{th}, and 90^{th} percentiles changed within the "one digit occupations." (For trends in median wages within "two-digit occupation" titles see Appendix 3.) Figure 5 presents these percentiles of the wage distributions for eight one digit occupations. The top panel of Fig. 5 contains information on the 10^{th} percentile, the middle panel for median wages, and the lower panel for the 90^{th} percentile. Triangles indicate men's wages, and circles indicate women's wages. Each vertical line indicates the absolute gender gap by occupation at that percentile. For example, in occupation 7 – "Craft and related trade workers" men's 10^{th} percentile wage was 10 rubles per hour in 1992, while a women at the 10^{th} percentile in that occupation earned less than 5 rubles per hour. In 1995, however, the lowest paid women earned slightly more than the lowest paid men in this occupation.

The ratio of male 10^{th} percentile wages to female 10^{th} percentile wages dramatically fell between 1992 and 1995; it declined from 1.36 to 1.14 (Fig. 3). This overall trend was driven mostly by the decrease in earnings of low wage men in skilled blue collar jobs (occupation 7 – "Craft") and white collar jobs (occupation 2 – "Professionals"). These two occupations employed 43.6% of all men, and almost one third of all women in 1995. In the rest of the occupations, the raw wage gap stayed the same or increased slightly. The large decline in inequality at the 10^{th} percentile men's and women's wages was brought about by the decline in wages of low wage men.

The male to female ratio of median wages also declined between 1992 and 1995, but on a smaller scale: from 1.45 to 1.33. This was caused by the decline of men's median wages in all but "Technicians and associate professionals" occupations (occupation code 3). The increase in women's median wages in white collar and sales occupations was offset by the decline of women's median wages in blue collar, clerical and elementary occupations. Median wages for men and women became more equal in almost all occupations, with median wages falling in 7 out of 8 occupations for men.

Changes in the relative 90^{th} percentile wages were in the opposite direction: the ratio of men's 90th percentile wage to women's 90th percentile wage rose from 1.32 to 1.47. Men's 90^{th} percentile wages increased in all white collar occupations (managers, professionals, associate professionals, clerks), and in one blue collar occupation – "Plant and machine operators and assemblers." In the remaining occupations ("Service", "Craft" and "Elementary") men's 90^{th} percentile wages fell. (The latter three occupations employ 43.7% of all men.) The increases in the wages of high-wage earning men working in associate professionals occupation and clerical occupation was dramatic. The wage increases for high-wage women were more moderate, but more wide spread. Women's 90^{th} percentile wages increased in 5 out of 8 occupations (These five





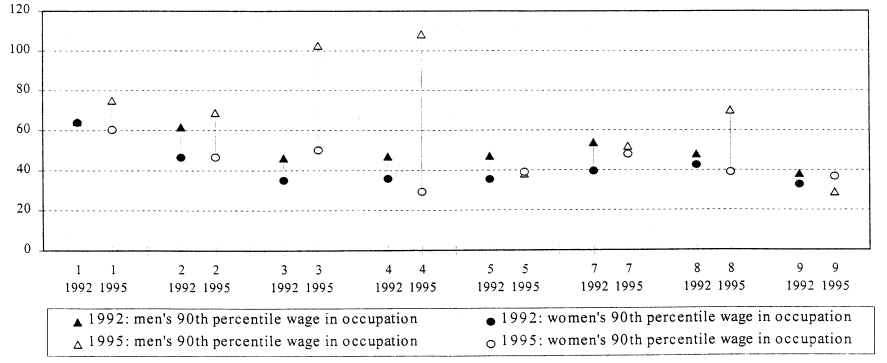


Fig. 5. Wages at selected percentiles by one digit occupation titles. Russian prime-aged urban adults. Figure A3.1 in the appendix describes the occupation codes. Occupation 6, agriculture, is excluded in this urban sample.

occupations employ 77.1% of all working women.) Female managers, clerks and assembly workers experienced a decline in high wages. Overall the increase in gender inequality at 90^{th} percentile wages was driven by the sharp increase in earnings for highly paid men.

5.4.2. Inequality by education

Figures 6, 7 and 8 present trends in the raw wage gap between the earnings of men and women by education category, for five percentiles of wage distributions and for the mean. Individuals who finished college or had more than 15 years of schooling, are in the "high" education group. Individuals with technical and vocational degrees are in the "medium" education group, and individuals who stayed at school for 10 or fewer years are in the "low education" group.

For highly educated workers, there was a compression of the absolute gender wage gap from 1992 to 1993, a widening from 1993 to 1994, and then narrowing again in 1995. Nearly all of the increase in the absolute gap between 1993 and 1995 occurred above the median. The gap for the 10^{th} percentile and the 25^{th} percentile was practically constant throughout all time periods. For individuals with secondary degrees the relative wage gap declined for all workers at or below the 75^{th} percentile. The slight increase in the mean wage gap occurred primary because of the dramatic increase in the gender wage differential above the 75^{th} percentile. The wage gap for "low-educated" workers follows the same pattern as the "medium-educated" group. The only exception is the rise of the gender differential at the 10^{th} percentile.

For all educational groups nearly all the increases in the gender wage differential occurred above the 75^{th} percentile of wage distributions. The absolute level of the raw gap in high-wages is considerably smaller for the highly educated individuals. Additionally, the wage gap at the 90^{th} percentile declined from 1994 to 1995 for the highest educated, while it increased for those in the lower two education groups.

5.4.3. Inequality by age

Figures 9 though 11 present trends in the raw gap between male and female wages by the same five percentiles and for the mean wages, by age groups. Individuals aged 44–55 were put into the "older" age group, those aged 34–43 were put into "middle" age group, and those aged 25–33 were put into the "younger" age group. For the older individuals the gender gap was roughly constant across time for the lower half of the distribution. Above the median there was a compression from 1992 to 1993, followed by a large increase from 1993 to 1994. Wages become more equal for older men and women from 1994 to 1995 at all percentiles. In 1995, wage inequality is about the same as in 1992, except at the 90^{th} percentile. Again we see that the major change in the gender gap took place at the upper tail of the wage distributions.

Similar trends appear for the middle and younger age groups. There is a tendency for increased equality at the lower tails of wage distributions. Almost all of the major changes in wage inequality for these two age groups, however, takes place at the upper tail of the wage distributions. For all age groups, high-wage women experienced an increase in their wage rates, but in each instance these are offset by a much larger increase for men in the upper tail of the wage distribution.

Trends in raw gap (men's wage at selected percentile minus women's wage at the same percentile and at the mean), in June 1992 rubles

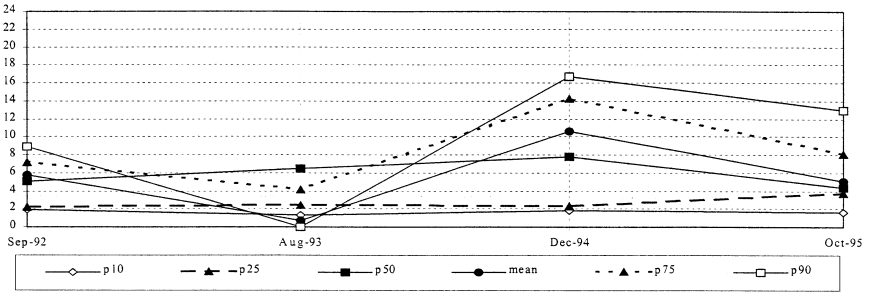


Fig. 6. "High education" group

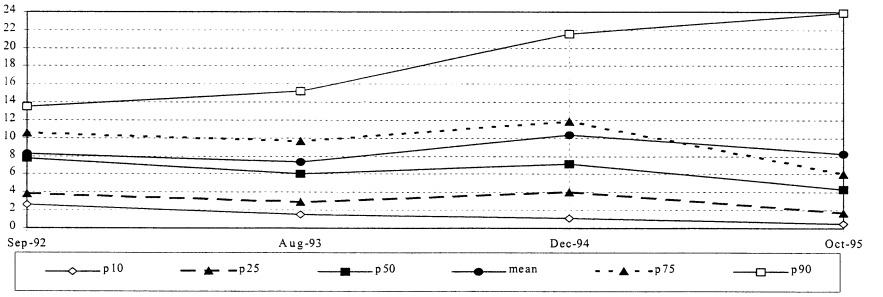


Fig. 7. "Medium education" group

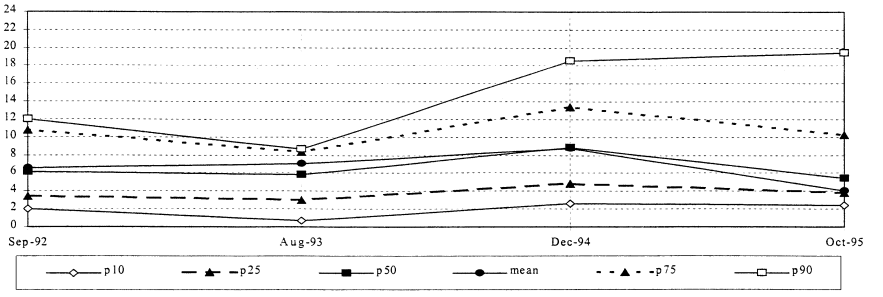


Fig. 8. "Low education" group

6. Comparing gender inequality in Russia and other countries

Overall wage inequality increased throughout the former socialist world. For the Czech Republic see R. Flanagan (1998), for Poland see J. Rutkowski (1994), for Hungary see S. Commander (1993) and for East Germany see A. Krueger and J. Pischke (1995). In most of the former socialist countries

Trends in raw gap (men's wage at selected percentile minus women's wage at the same percentile and at the mean), in June 1992 rubles

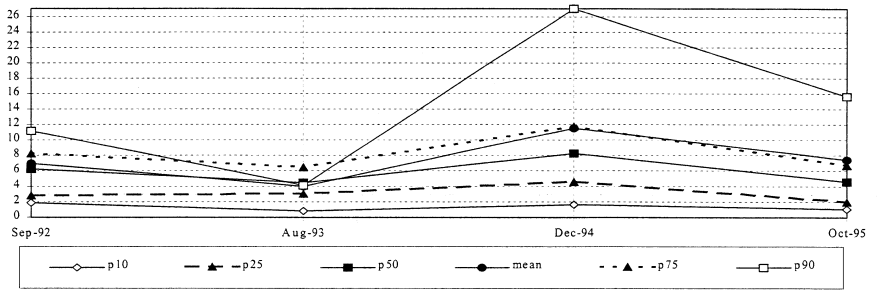


Fig. 9. "Older" age group

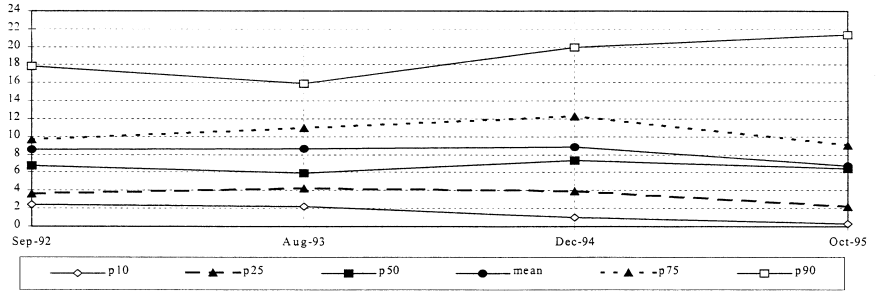


Fig. 10. "Middle" age group

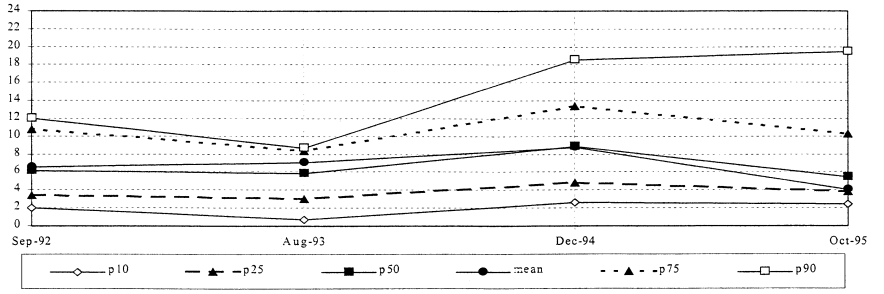


Fig. 11. "Younger" age group

wage dispersion increased both within and between groups, indicating the same trend as found here.

Orazem and Vodopivec (1995) examined changes in wage distributions in Slovenia. The pre-transition Slovenian women had high wages compared to the women in the Western countries; they earned 88% of what men had earned in 1987, on average. The median wage of Slovenian women was equal to the

wage of 35th percentile of the male distribution in 1987. The "transition-caused" increase in inequality for gender specific wages was nearly identical for men and women. During the course of Slovenian transition the position of a median female wage earner improved, moving up to the 40th percentile of male wage distribution. Between 1987 and 1991 the ratio of average female to male wages increased to 0.9. These authors suggest that superior education attainments together with the increasing prices for high educated labor generated these patterns. Additionally, those occupations with high concentration of women were relatively less affected by the transition.

The size of the wage gap in Russia in the mid 1990s is roughly comparable to the gap in the counties of the European Union and the US (OECD, ILO, USBLS). The level of gender inequality is Russia is higher than it is in the Scandinavian countries, France, Australia (women's wage is 0.8–0.9 of men's wage, on average). In practically every country the difference in observed skills of working men and women explains only a part (usually less then a half) of gender wage gap (see, for example, Oaxaca 1973 for the US).

The other important determinant of the size of the gender pay gap is the structure of the overall market prices for observed and unobserved skills. The position of women's wages in the male wage distribution is determined by gender specific factors such as the relative level of female skills and the extent of the gender discrimination. The wage penalty (payoff) for being below (above) the average is determined by the structure of skill prices. A median Russian woman earned the wage of a 32–36 percentile man. This ranking of a median Russian female is higher than the ranking of a median U.S. female in the U.S. male wage distribution (at the 29th percentile, according to Blau and Kahn 1996.) The Russian ranking of the median woman's wage is considerably higher than in most of the countries with a lower gender gap. In Norway, for example, a median female worker earns a wage of an around the 19th percentile male wage distribution. The ranking of the median Russian women's wage in the Russian male wage distribution is comparable to the ranking of the Slovenian women (35th–40th, Orazem and Vodopivec 1995.) Blau and Kahn (1996) present a detailed discussion of the gender gap and percentile ranking of women in the other countries. The nature of the gender inequality in Russia is closer to the one of the countries where women are strongly committed to the labor force and have acquired labor market skills comparable with men's skills.

7. Caveats and potential problems

We address several issues which may affect our conclusions about the trends in gender inequality in Russia. The first and the most important is the effect of non-payment of wages on gender wage gap. The extent of wage arrears is substantial. In 1994, 13% of all women and 17% of all men who worked during the 30 days prior to the RLMS interview did not receive that month's pay; 38% of all men, and 33% of all women were owed back wages. The extent and severity of wage arrears have been growing since. The major reasons for the enterprises' delays in paying workers are believed to be widespread delays of payments between the enterprises. Shortfalls in the government's revenue, due to tax-evasion, hindered the government's ability to pay workers in the State sector. In order to investigate the impact of wage arrears on gen-

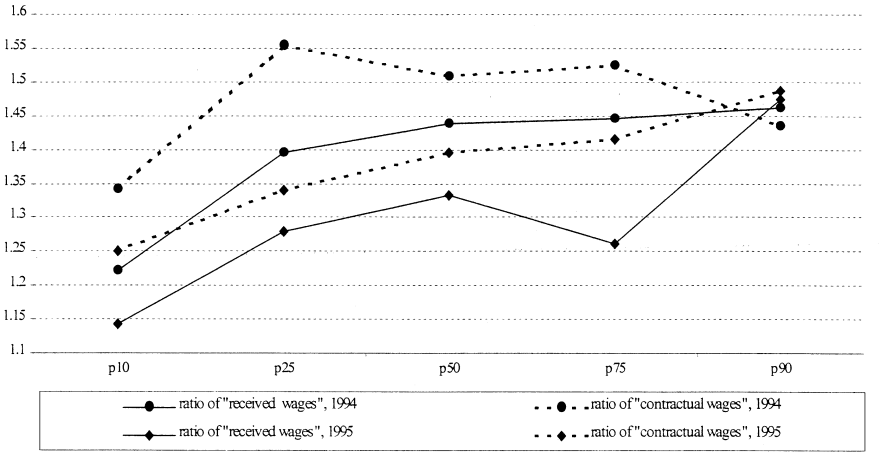


Fig. 12. Gender wage ratio (men's wage at selected percentile over women's wage at the same percentile), in "*received wage*" and "*contractual wage*".

Table 7.1. Sample statistics

	RLMS 1994		RLMS 1995	
	men	women	men	women
Seniority (in years)	7.7	9.6	7.4	9.0
Entrepreneurial responsibilities = 1 if yes	0.11	0.07	0.10	0.07
Private = 1 if yes	0.41	0.32	0.41	0.36
Personal (co)ownership = 1 if yes	0.27	0.22	0.24	0.19

der pay inequality we constructed a rough measure of "*contractual wage*" as follows:

$$\textit{Contractual wage} = \frac{\textit{Total salary received last 30 days} + \dfrac{\textit{Total amount owed}}{\textit{Number of months owed}}}{\textit{Hours worked last 30 days}}$$

Figure 12 presents ratios of male to female "*contractual wages*" at five percentiles of the wage distribution in 1994 and 1995 (only in these two surveys were the wage arrears data collected.) The same trend of a narrowing differential at all but the high percentiles of the distributions is found the for "*contractual wage*" as we found for the "*received wage*." The size of the gender gap in "*contractual wages*" at 10^{th}, 25^{th}, 50^{th} and 75^{th} percentiles had declined, while the differential in "*contractual wages*" at 90^{th} percentile increased between 1994 and 1995. There is not much evidence that women were more adversely affected by wage non-payments than men. On the contrary, at all but the highest percentiles the size of the gender differential in "*contractual*

Table 7.2. Decomposition of difference in log wages onto difference due to observable characteristics ($Z'_{\text{gender}}\Delta\beta$) and difference due to different treatments ($Z'_{\text{gender}}\Delta\beta$)

Total difference in log earnings: $\overline{\log(\text{wage}_{\text{male}})} - \overline{\log(\text{wage}_{\text{female}})}$	RLMS 1994		RLMS 1995	
	Levels	Percentages	Levels	Percentages
	0.33	100	0.25	100
Male characteristics and female reward structure				
Due to difference in rewards $Z'_{\text{male}}\Delta\beta$	0.247	74.8	0.183	74.8
Due to difference in endowments $\Delta Z'\beta_{\text{female}}$:				
Total	0.0831	25.2	0.06695	26.9
Seniority	−0.0036	−1.1	0.00395	1.6
Entrepreneurial responsibilities	0.0086	2.6	0.0178	7.1
Private	0.0023	0.7	0.0022	0.9
Personal (co)ownership	0.0097	2.9	0.0079	3.2
Sub-total	0.017	5.1	0.032	12.8
Regions	−0.0015	−0.5	−0.0024	−0.9
Occupation	0.0811	24.6	0.0549	22.0
Age	−0.0022	−0.7	−0.0041	−1.6
Education	−0.0113	−3.4	−0.0134	−5.3
Female characteristics and male reward structure				
Due to difference in rewards $Z'_{\text{female}}\Delta\beta$	0.362	109.8	0.242	96.8
Due to difference in endowments $\Delta Z'\beta_{\text{male}}$:				
Total	−0.0324	−9.8	0.0079	3.2
Seniority	−0.0015	−0.05	−0.0078	−3.1
Entrepreneurial responsibilities	0.007	2.1	−0.00072	−0.3
Private	−0.0008	−0.02	0.0058	2.3
Personal (co)ownership	0.0086	2.6	0.0031	1.3
Sub-total	0.0013	4.63	0.0004	0.2
Regions	−0.002	−0.7	−0.0014	−0.6
Occupation	−0.041	−12.4	0.0113	4.5
Age	0.0004	0.1	−0.003	−1.2
Education	−0.0029	−0.9	0.0006	0.2

wages'' is larger than the size of the differential in ''*received wages*''. High-wage men had lower wage arrears than high-wage women in 1994, but this advantage deteriorated by 1995.

Another issue concerns the omission of some important productive characteristics. It could be the case that ''unobserved'' skills are entrepreneurial factors, the rents associated with a business owner's willingness to take risks as Brainerd (1998) described them. If men and women differ in these characteristics that could explain some of the differences in gender outcomes. RLMS 1994 and RLMS 1995 collected data on tenure, entrepreneurial responsibilities, and work for private and personal (co)ownership. While not exactly being ''skills,'' these attributes of working men and women and their jobs might point out to the nature of the difference in pay. We performed the Oaxaca decomposition including these characteristics of working men and women, and table 7.2 presents the results. It appears that differences in these

four characteristics explain at most 13% of the gender gap. Differences in seniority and working for private firms do not contribute to the explanation of the gender gap in wages. Differences in characteristics of working men and women, measured by entrepreneurial responsibilities and personal (co) ownership of their enterprises, do help to explain differences in average wages of working Russian men and women. Similar to the occupation premiums, there are larger premiums attached to the having entrepreneurial responsibilities and being a (co)owner of the enterprise under the female reward structure than under the male reward structure.

Three major, additional problems could invalidate some of these findings about the gender wage differential in Russia. First, there has been a decline in the rate of formal employment for both men and women between 1992 and 1995. More women than men dropped out of formal employment between 1992 and 1995. In 1992, 89% of all men, and 82% of all women, worked at enterprises, in cooperatives, or in collectives. In 1995 the rates fell to 81% and 72%. This decrease was almost fully offset for men by their increased participation in non-formal (home based) labor activity. For women there was not a corresponding increase in the rate of informal employment. These absolute changes in "participation" rates could induce particular types of time varying selection biases, and this is not addressed in this study. It will be important to examine who stopped working in the formal sector.

Second, there are substantial differences in the cost of living across regions of the Russian Federation, yet there is only a single official cost of living index for the entire country. What we measure as high wages, for example, might be "average" real wages paid to persons in relatively high cost of living regions. What we call low wages might also be "average" real wages in low cost of living areas. It is not clear how this could impact the analysis of the gender gap in wages, although it certainly makes it difficult to interpret within group wage inequality.

Third, the sample changed in 1994. It could be the case that the new sample contains more highly paid individuals, but there is no apparent reason why this should be the case. Both samples were designed to be nationally representative for all of Russia, so they refer to the same population. Additionally, the survey instruments are nearly identical across the two longitudinal data sets and across time and between the waves in the same sample. We believe it is unlikely that changes in the samples could lead to serious problems with our analysis.

8. Conclusions and key findings

Three major trends in gender inequality prevailed in the Russian labor market between 1992 and 1995. Inequality in the lowest percentiles of the distributions declined considerably, inequality in the upper percentiles grew and inequality in the interquartile range stayed remarkably stable. These trends resulted in a relatively small change in gender inequality on average. While men's average earnings were 33% higher than women's earning in 1992, their relative advantage declined to 28% in 1995. Differences or changes in productive characteristics of men and women do little to explain wage differences at any point of time or changes in wage differential across time.

The trends in inequality in the tails of the wage distributions were largely

brought about by the changes in men's wages. The increase in inequality in the upper half of the male wage distribution come largely from a dramatic increase in prices for high skilled male labor. The rise in residual inequality in the upper half of male wage distribution was also substantial, accounting for a quarter of the total rise in male wage differential in the upper half of the wage distribution. This unexplained increase in inequality among high earnings males almost equals the entire change in women's wage inequality in the upper half of the wage distribution. Increases in residual wage inequality for men in the lower part of the wage distribution were three times larger than the corresponding increases in inequality for women.

We are left with the rather unappealing conclusion that most of the gender wage differentials and the change in these differentials from 1992 to 1995 cannot be attributed to any measurable or observed characteristics. A main conclusion from the study is that the percentile trends for male and female real wages, displayed in Figs. 1 and 2, provide nearly all the information we have about the changing gender wage differential in Russia. Indeed, the only remarkable features of the changes in male and female wages are illustrated in these figures. These are the rise in 90^{th} percentile wages for men, a persistent decline in the 10^{th} percentile wage for men, and the relative stability of the female wage distributions over the first four years of the economic reform in Russia. We examined a wide range of possible explanations for these features, but at best they are only weakly related to any of the productive characteristics we examined.

We have, however, been able to narrow the focus of where one should look to uncover the changes in gender inequality over the early years of the economic transition in Russia. Except for a few minor instances, gender wage differentials in Russia were remarkably stable from the Summer of 1992 to the end of 1995. Nearly all of the evolution of the gender differential in wages came about because of changes in the wage structure for a minority of men in the tails of the wage distribution. It is remarkable that a country undergoing such dramatic shifts in the ownership of the means of production, trading patterns and inflation experienced such small changes in gender wage inequality.

Appendix 1

Consider $\log(\text{wage}_{\text{male}}) - \log(\text{wage}_{\text{female}}) = \Delta Z\beta_{\text{female}} + Z_{\text{male}}\Delta\beta$. The difference in average log wages is invariant to any normalizations by definition. Predicted log wages $Z'_{\text{m}}\beta_{\text{female}}$ and $Z'_{\text{f}}\beta_{\text{female}}$ are invariant to any arbitrary normalizations; Therefore their difference $Z'_{\text{m}}\beta_{\text{female}} - Z'_{\text{f}}\beta_{\text{female}} = \Delta Z'\beta_{\text{female}}$ must be location invariant. So, different normalizations must leave the term $Z'\beta_{\text{male}}\Delta\beta$ unchanged as well.

Consider $Z'_{\text{male}}\Delta\beta = Z'_{\text{male}}(\beta_{\text{male}} - \beta_{\text{female}}) = (\beta_{\text{o male}} - \beta_{\text{o female}}) + Z^{*}(\beta_{\text{male}} - \beta_{\text{female}})$, where the star indicates all variables except the intercept. Different normalizations change the estimate of the constant, so if the male and female constants change differently, as would almost always be true, the part attributed to the sum of all explanatory variables must change to reflect the changes in the intercepts. Consequently, one can not expect that the impact of any set of covariates will not be affected by using a different location normalizations.

As a further empirical illustration of this point, we use RLMS 1994 data to show how dramatically the decomposition can change if one uses different reference categories in the wage regression. In Table A1.1 we present the Oaxaca type decomposition of the OLS results using different omitted categories. We specify earning functions for men and women, regressing the natural log of real hourly earnings on seven education dummy variables, age, age squared, eight occupation dummies, and controls for eight regions. In the Specification I (see Table A2.1) our omitted categories are the following: region 3 (Central and Central Black Earth region), education group 5 (13–14 years of schooling), and occupation 3 (Associate Professionals). Regional discrimination accounts for 6.9 percent of the total difference in Specification I. Occupational discrimination is 31.5%, age discrimination is negative 1.1%, and educational discrimination is 5% of the total gap in log wages. These "difference in treatments" sum up to 73.9% of the average log differential. 26.1% of the average differential is due to the difference in observable characteristics, using the female reward structure.

In Specification II we omitted region 1 (Moscow and St. Petersburg,) while keeping the rest of Specification I unchanged. The regional discrimination became a negative 41.4. By only changing the base region, the fraction of the gender gap explained by different treatment of men and women within regions changes by 50%. The overall level of observed discrimination, nor any predicted wage rate, however, does not change. Specification III is also identical to Specification I, except that the baseline occupational category is changed from "Associate Professionals" to "Plant and machine operators and assemblers." The fraction of the gender gap "explained" by the different treatments of men and women within occupations falls from explaining 31.5% of the differential to explaining negative 130% of the differential. Specification IV repeats the exercise by instead changing the baseline in education category from category "13–14 years" to education "16 and more years" of schooling. Again, the proportion of the differential "explained" by the difference in returns to education changes substantially.

These decompositions are not location invariant. Changing the base age from zero to age 40, for example, will only change the estimated intercept in the model, but this substantially impacts the calculations of how different treatments by age "explain" the gender gap.

One might try to circumvent these problems by calculating the proportion of the differential explained by each set of characteristics separately for all possible normalizations, and then average across estimated "explanations" by using the proportions of women in each category as weights. For example, one could calculate the proportion explained by the different treatments of men and women with the same education for the baseline "lowest education," then for the baseline 8–9 years of education, and so forth, and take the weighted average of these effects to uncover the true amount explained by different treatments of men and women within education groups. This exercise, however, will yield exactly the same estimates for each and every set of characteristics, namely zero. The decomposition between the difference in endowments and the difference due to the different treatments (in aggregate), however, does not rely upon arbitrary normalizations.

Table A1.1

Total difference in log earnings: $\log(\text{wage}_m) - \log(\text{wage}_f) = 0.33$	Specification I		Specification II		Specification III		Specification IV	
	Levels	Percentages	Levels	Percentages	Levels	Percentages	Levels	Percentages
Difference in coefficients								
$Z'_{\text{male}}\Delta\beta$								
regions	.02272	**6.9**	−.13677557	**−41.4**	.02271958	6.9	.002272	6.9
occupation	.10415	**31.6**	.10415449	31.6	−.42988234	**−130**	.104154	31.6
age	−.00362	−1.1	−.00361621	−1.1	−.00361621	−1.1	−.003616	−1.1
education	.01656	**5.0**	.01656108	5.0	.01656108	5.0	.1831557	**55.5**
"constant"	.10383	31.5	.26332722	79.8	.63786895	193.2	−.627620	−190
Total	.24365	73.9	.24365	73.9	.24365	73.9	.24365	73.9
Difference in endowments								
$\Delta Z'\beta_{\text{female}}$								
regions	−.001895	−0.6	−.001895	−0.6	−.001895	−0.6	−.001895	−0.6
occupation	.103443	31.3	.103443	31.3	.103443	31.3	.103443	31.3
age	−.00311	−0.9	−.00311	−0.9	−.00311	−0.9	−.00311	−0.9
education	−.01229	−3.7	−.01229	−3.7	−.01229	−3.7	−.01229	−3.7
Total	.08614	26.1	.08614	26.1	0.08614	26.1	.08614	26.1

Appendix 2

Table A2.1. Wage equation estimation results for the male sample

Dependent variable = $\log(\text{wage}_{\text{male}})$	RLMS 1992		RLMS 1994		RLMS 1995	
Variable	Coef.	St. Error	Coef.	St. Error	Coef.	St. Error
Intercept	2.962	0.065	2.939	0.092	2.928	0.108
Region 1 = 1 (Moscow and St. Petersburg)	0.118	0.063	0.482	0.082	0.516	0.094
Region 2 = 1 (North and North-Western)	0.177	0.070	0.394	0.093	0.219	0.118
Region 3 = 1 (Central and Central Black Earth)	omitted					
Region 4 = 1 (Volga-Vyatski, Volga Basin)	0.077	0.063	−0.149	0.112	0.300	0.088
Region 5 = 1 (North Caucasian)	0.143	0.060	0.067	0.163	−0.026	0.114
Region 6 = 1 (Ural)	0.340	0.059	0.204	0.097	0.011	0.087
Region 7 = 1 (Western Siberia)	0.076	0.073	0.613	0.114	0.475	0.102
Region 8 = 1 (Eastern Siberia and Far East)	0.359	0.062	0.642	0.295	0.375	0.122
Occupation 1 = 1 (Managers)	0.276	0.085	0.174	0.129	0.120	0.132
Occupation 2 = 1 (Professionals)	0.096	0.064	0.074	0.319	−0.230	0.110
Occupation 3 = 1 (Technicians and associate professionals)	0.024	0.077	0.270	0.063	0.106	0.111
Occupation 4 = 1 (Clerks)	0.134	0.170	0.034	0.120	0.027	0.197
Occupation 5 = 1 (Service workers and shop and market sales workers)	−0.080	0.097	−0.096	0.174	−0.275	0.125
Occupation 7 = 1 (Craft and related trades workers)	0.121	0.041	−0.029	0.000	−0.118	0.071
Occupation 8 = 1 (Plant and machine operators and assemblers)	omitted					
Occupation 9 (Elementary occupations)	−0.212	0.071	−0.196	0.213	−0.471	0.126
Occupation 10 (Military)	0.207	0.109	0.207	0.134	0.023	0.156
(Age – 40)	0.000	0.002	−0.002	0.093	0.000	0.003
(Age – 40) squared	0.001	0.000	0.000	0.077	0.000	0.000
Education level 1 = 1 (7 or fewer years of sc.)	−0.350	0.117	0.256	0.096	−0.392	0.226
Education level 2 = 1 (8,9 years of sc.)	−0.120	0.066	−0.022	0.107	−0.046	0.141
Education level 3 = 1 (10 years of sc.)	−0.045	0.055	−0.010	0.092	0.153	0.099
Education level 4 = 1 (11,12 years of sc.)	−0.023	0.049	0.012	0.077	0.030	0.089
Education level 5 = 1 (13,14 years of sc.)	omitted					
Education level 6 = 1 (15 years of sc.)	0.020	0.062	0.204	0.096	0.245	0.106
Education level 7 = 1 (more than 15 of sc.)	0.023	0.079	0.085	0.107	0.212	0.115
Number of observations	1992		995		866	
F	9.17		7.13		7.22	
Adj R-squared	0.090		0.129		0.171	

Table A2.2. Wage equation estimation results for the female sample

Dependent variable = $\log(\text{wage}_{\text{female}})$	RLMS 1992		RLMS 1994		RLMS 1995	
Variable	Coef.	St. Error	Coef.	St. Error	Coef.	St. Error
Intercept	2.952	0.072	2.835	0.101	2.673	0.115
Region 1 = 1 (Moscow and St. Petersburg)	0.019	0.056	0.323	0.077	0.370	0.084
Region 2 = 1 (North and North-Western)	0.039	0.066	0.637	0.096	0.358	0.107
Region 3 = 1 (Central and Central Black Earth)	omitted					
Region 4 = 1 (Volga-Vyatski, Volga Basin)	−0.187	0.061	−0.168	0.072	0.192	0.079
Region 5 = 1 (North Caucasian)	−0.258	0.057	0.034	0.092	0.086	0.114
Region 6 = 1 (Ural)	0.267	0.057	0.177	0.073	0.025	0.077
Region 7 = 1 (Western Siberia)	0.015	0.068	0.644	0.086	0.658	0.096
Region 8 = 1 (Eastern Siberia and Far East)	0.149	0.061	0.532	0.092	0.462	0.098
Occupation 1 = 1 (Managers)	0.089	0.118	−0.194	0.233	0.181	0.166
Occupation 2 = 1 (Professionals)	−0.030	0.067	−0.151	0.101	0.067	0.114
Occupation 3 = 1 (Technicians and associate professionals)	−0.226	0.063	−0.264	0.092	−0.009	0.104
Occupation 4 = 1 (Clerks)	−0.215	0.067	−0.299	0.103	−0.180	0.113
Occupation 5 = 1 (Service workers and shop and market sales workers)	−0.363	0.077	−0.214	0.104	−0.036	0.115
Occupation 7 = 1 (Craft and related trades workers)	−0.020	0.073	−0.059	0.111	0.151	0.133
Occupation 8 = 1 (Plant and machine operators and assemblers)	omitted					
Occupation 9 (Elementary occupations)	−0.301	0.071	−0.289	0.108	−0.237	0.120
Occupation 10 (Military)	−0.570	0.271	0.061	0.721	0.116	0.319
(Age – 40)	0.000	0.002	0.003	0.003	0.002	0.003
(Age – 40) squared	0.000	0.000	0.000	0.000	0.000	0.000
Education level 1 = 1 (7 or fewer years of sc.)	−0.211	0.102	−0.568	0.213	−0.994	0.341
Education level 2 = 1 (8,9 years of sc.)	−0.148	0.073	−0.374	0.123	−0.295	0.132
Education level 3 = 1 (10 years of sc.)	−0.109	0.048	−0.069	0.082	−0.012	0.082
Education level 4 = 1 (11,12 years of sc.)	−0.100	0.043	−0.010	0.060	−0.097	0.068
Education level 5 = 1 (13,14 years of sc.)	omitted					
Education level 6 = 1 (15 years of sc.)	0.071	0.051	0.252	0.075	0.051	0.078
Education level 7 = 1 (more than 15 of sc.)	0.052	0.066	0.251	0.084	0.228	0.104
Number of observations	2186		1107		970	
F	10.61		10.27		8.73	
Adj R-squared	0.096		0.168		0.175	

Appendix 3

Women's low wages are commonly linked to occupational segregation and the concentration of women into a small number of low paying jobs. We use information from the RLMS in 1992 and 1995 to help explore the link between occupations and the gender gap in wages. Figure A3.1 contains information on the occupational distribution of Russian working men and women, as well as median wages within occupations in 1992. Figure A3.2 contains the same information for 1995.

Occupations are ordered by the fraction of men in the occupation in 1992, with the female dominated occupations to the left and male dominated occupations to the right. The dark shaded bar (left hand axis) indicates the percentage of workers in the occupation who are men. This percentage is monotonically increasing from the left to the right for 1992. The lightly shaded bar indicates the fraction of the total labor force in the occupation. We see, for example, that about 6 percent of the total labor force worked as office clerks (occupation code 11), and only 8% of all office clerks were men in 1992.

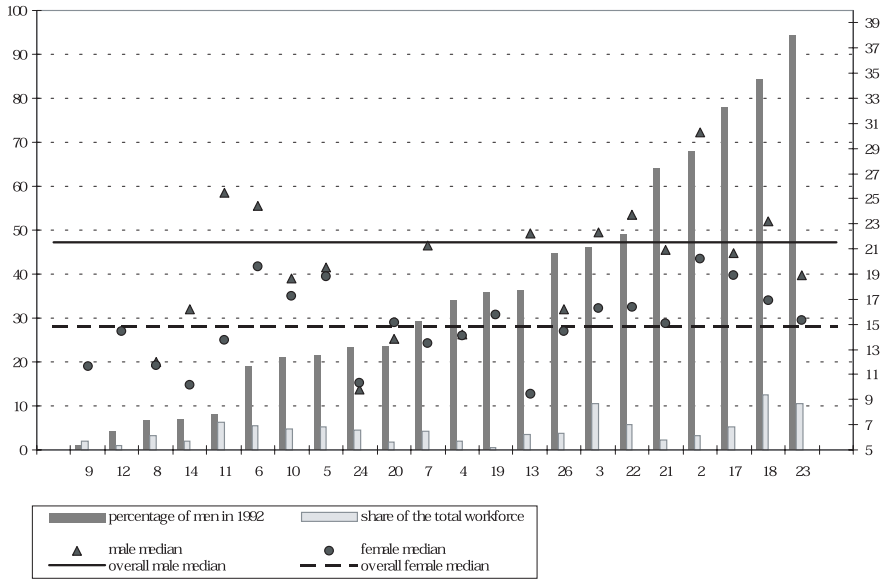
Wages are measured on the right hand scale. The two horizontal lines indicate the overall median wages for men and women. The median wage for women in each occupation is given by the circle, and the median male wage is indicated by the triangle. The median male wage among office clerks was 26 rubles per hour in 1992, while female clerks earned only 14 rubles per hour in that year.

There is substantial gender segregation in the Russian labor market, and women are spread more equally across occupations than are men. In 1992, for example, 53% of men were employed in the three most populated male "two digit" occupations ("Extraction and Building Trades Workers", "Metal Machinery and Related Trade Workers", and "Drivers and Mobile Plant Operators"). Only 28% of female workers were employed in the three most populated female occupations. (In "Teaching Professionals", "Other Associate Professionals – finance, administrative, custom tax, social workers, entertainment sport, religious", and "Office clerks".)

An additional measure of the degree of the occupational segregation is the Duncan index (D), which is calculated as $D = \sum_{i=1}^{N} |M_i - F_i|$ where M_i and F_i are gender specific proportions of all workers employed in the occupation i. In 1992 using one digit titles the D index (i.e. employing one digit ISCO occupation code) was equal to 0.49; it rose to 0.51 in 1994 and to 0.52 in 1995. For example, in Sweden the one digit D index is 0.46, in the UK 0.44, and in the USA 0.36 (Blau and Kahn 1995.) There is much more gender segregation in Russia than in these three countries, but there was little change in the index during the first four years of the economic reform.

In the occupations heavily dominated by women (those on the left hand side of Figures A3.1 and A3.2, namely occupations 9, 12, 8, 14 and 11) wages were low for both men and women in 1992 and in 1995. In these occupations, where women's share is more than eighty percent of the workforce, median workers earn substantially less than their respective overall medians. (The two exceptions are male Office Clerks in 1992 and male Models in 1995.) These occupations fall roughly into the category "Clerical and Associate white collar" jobs.

Occupations in the middle of Figs. 5 and 6 are female dominated occupa-



International Standard Classification of Occupations (ISCO-88). One and Two digits titles.

1 Legislators, senior officials and managers

1 Legislators, Senior Officials, Corporate Managers

2 General Managers

2 Professionals

3 Physical, Math and Engineering Science Professionals

4 Life Science and Health Professionals

5 Teaching Professionals

6 Other Professionals (business, legal, archivist, writers religious)

3 Technicians and associate professionals

7 Physical and Engineering Science Associates

8 Life Science and Health Associate Professionals

9 Teaching Associate Professionals

10 Other Associate Professionals (finance, administrative, custom, tax, social workers, entertainment sport, religious)

4 Clerks

11 Office clerks

12 Customer services clerks

5 Service workers and shop and market sales workers

13 Personal and Protective Service Workers

14 Models Salespersons and Demonstrators

7 Craft and related trades workers

17 Extraction and Building Trades Workers

18 Metal, Machinery and Related Trade Workers

19 Precision, Handcraft, Printing Worker

20 Other Craft and Related Trade Workers (food processing, wood treaters, textile)

8 Plant and machine operators and assemblers

21 Stationary Plant and Related Operators

22 Machine Operators and Assemblers

23 Drivers and Mobile Plant Operators

9 Elementary occupations

24 Sales and Services Elementary Occupations

26 Laborers in mining, construction, manufacturing and transport

We do not present information on agriculture related occupations. These are occupation 14 – Market oriented skilled agricultural and fishery workers, 15 – Subsistence agricultural and fishery workers (both one digit title 6-Agriculture), and 25 – Agricultural fishery and related laborers (in the one digit title 9). We also excluded armed force – occupation code 27 from the analysis.

Fig. A3.1. Median wages of Russian prime-aged urban adults, by two digit occupation titles (RLMS 1992, June 1992 rubles)

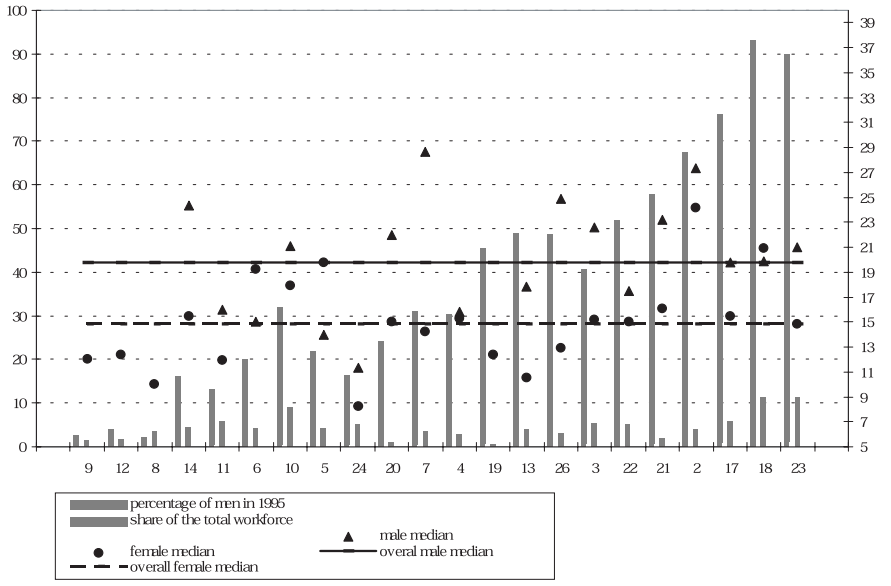


Fig. A3.2. Median wages of Russian prime-aged urban adults, by two digit occupation titles (RLMS 1995, June 1992 rubles) *In several occupations male's median wages are absent.(For example in occupation 9 – Teaching Associate Professionals.) These are occupations with very low male shares, and the number of observations does not allow us to calculate reliable statistics.*

tions. In occupations 3, 5, 6, 10, and 22 median female workers earned wages substantially above the overall median in both 1992 and 1995. Both men and women earn high wages in these occupations, which contain white collar professionals and associate professionals, as well as skilled blue collar workers.

Women working in male dominated occupations had median wages at or above the overall median women's wage (see occupations 21, 2, 17, 18, and 23 on Figs. 5 and 6.) Men earned the overall [male] median wage or above in roughly half of these male dominated occupations. These occupations contain general managers and skilled blue collar workers.

Median earnings for both men and women are low in clerical and associate white collar occupations, occupations that are heavily dominated by women. Median wages within the male dominated occupations are close to the overall median for men, but women in these occupations tend to earn well above the overall female median wage. There are substantial wage differentials across occupations. Within occupations the gender differentials can also be quite large, so occupational segregation alone cannot explain much of the gender gap in wages in Russia.

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