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Elizabeth Brainerd

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# Winners and Losers in Russia's Economic Transition

By ELIZABETH BRAINERD\*

*The transition to a market economy has produced a substantial and rapid change in the wage structure in Russia. Household surveys taken before and after the transition indicate that overall wage inequality nearly doubled from 1991 to 1994 and has reached a level higher than that in the United States. Returns to both measured skills (education, occupation) and unmeasured skills within groups have increased considerably. Skill premiums across experience groups, however, have become more compressed and relative wages of older workers have declined. In addition, female wages have declined relative to male wages across all percentiles of the wage distribution. (JEL J31, P24)*

Russia is in many ways unrecognizable from the country it was just a few years ago. Since market reforms began in 1992, the country has experienced price liberalization, near-hyperinflation, and a collapse in aggregate demand; the reforms have also fostered the development of a successful class of entrepreneurs and the mass privatization of state-owned enterprises. Russian citizens have lived through a period of upheaval that—while beneficial in many ways—few would envy.

Have Russian workers benefited from these changes? While recent literature has explored the macroeconomics of the transition as well as the country's privatization program, little is known about the shifts in the wage structure

that have also occurred. Who are the winners and losers of the transition? Is increased wage inequality in Russia "real" or is it only a change in compensation from nonwage benefits to wages? Does it simply reflect high inflation and imperfect wage indexation, and thus may be a transitory feature of the labor market?

This paper attempts to answer these questions using a unique data set of cross-section household surveys conducted before and after the transition. The most striking result is the considerable widening of the overall wage distribution. For both men and women, for example, overall wage inequality nearly doubled within two years of the liberalization of wages and prices. By the measure of dispersion used in this paper, wage inequality in Russia appears to have reached a level higher than that in the United States. Returns to education and occupation have increased, and within-group inequality has grown substantially. In addition, women's wages have declined relative to men's wages, and older workers have suffered sharp relative wage declines.

Before turning to these results, a brief survey of related literature discusses the wage distribution under the Soviet system as well as changes in the wage structure in other transition economies. Section II outlines the economic reforms in Russia through 1994. Section III describes the data sets, and the remainder of the paper discusses the empirical results and examines some of the underlying reasons for the changes.

\* Department of Economics, Williams College, Williamstown, MA 01267. This paper has benefited from extensive comments provided by Lawrence Katz, as well as from comments provided by David Cutler, Richard Freeman, Claudia Goldin, Caroline Minter Hoxby, Simon Johnson, Katarina Katz, Jeffrey Sachs, and participants in the Harvard University Labor/Public Finance Lunch and the Harvard/MIT Labor Economics Seminar. Some of the research for this paper was completed while the author was a research associate at the Institute for Economic Analysis, Moscow. The views expressed here are the author's own and do not reflect the views of the Institute. Data were provided by the All-Russian Center for Public Opinion Research and the Interdisciplinary Academic Centre of the Social Sciences (InterCentre), Moscow. I thank Alexander Artamonov and Tatyana Zaslavskaya of InterCentre and Vladimir Kosmarsky of the Institute for Economic Analysis for their assistance with the data.

### I. Previous Literature

The study of Soviet wages dates back to the pioneering work of Abram Bergson (1944), with subsequent contributions including those of Leonard J. Kirsch (1972), Frederic L. Pryor (1973), Janet G. Chapman (1979), Alastair McAuley (1979), and Bergson (1984). Evidence on the wage distribution in the USSR through the 1980's is discussed in Anthony B. Atkinson and John Micklewright (1992). Most studies concluded that Soviet wages were relatively unequal for a country ostensibly committed to equality of pay, and that wage inequality in the Soviet Union was within the range experienced by many West European countries. All of these studies were hampered, however, by a lack of micro-level data. Although the Soviet statistical agency conducted a large household survey for many years, its results were only available in aggregate form.<sup>1</sup> The only known micro-level study (aside from émigré surveys) is Katarina Katz (1994), which uses a household survey conducted in one city in 1989 to study gender wage differentials.

In a related line of research, a number of recent studies have investigated changes in the wage structure in Eastern Europe before and after the introduction of market reforms. As would be expected following the demise of centralized wage-setting, virtually all studies of these countries report an increase in wage inequality before and after transition. Individual characteristics such as educational attainment and work experience are revalued as well, but in different ways across countries. In Poland, for example, returns to education increased after the transition to a market economy while the experience premium fell (Jan Rutkowski, 1996); similar patterns occurred in the Czech Republic (Robert J. Flanagan, 1995; Jiří Večerník, 1995). In contrast, returns to both education and experience rose after the transition in Slovenia (Peter F. Orazem and Milan Vodopivec, 1995), although the latter is attributed to pension policies unique to Slovenia that reduced the labor supply of expe-

rienced workers. Alan B. Krueger and Jörn-Steffen Pischke (1995) find that returns to both education and experience fell slightly in eastern Germany after unification.

Two studies have analyzed recent changes in gender wage differentials in Russia using the Russian Longitudinal Monitoring Survey (Elena Glinskaya and Thomas A. Mroz, 1996; Andrew Newell and Barry Reilly, 1996). Since this survey began in July 1992, however, it cannot be used to investigate changes in the wage structure before and after the transition period.

### II. Economic Reforms in Russia, 1991–1994

The basic features of the Soviet economy under central planning are well known: the state owned nearly all productive assets in the economy; politicians' preferences rather than consumers' preferences guided market outcomes; and wages and prices were set administratively by central authorities. While the system at first proved effective at fostering growth, it later became clear that the system as implemented in the Soviet Union created significant economic inefficiencies. This realization motivated the partial reforms introduced by Mikhail Gorbachev in the mid-1980's, which proved to be insufficient to correct the growing macroeconomic imbalances in the economy. The Soviet Union collapsed in late 1991 and the transition to a market economy began soon thereafter. Wages and most prices were freed on January 2, 1992, and the country's mass privatization program was implemented beginning in the fall of that year.

The subsequent Russian reform program has been erratic, dominated by the continuing power struggle between the legislative and executive branches, and reflecting the mixed signals of the government regarding its intentions to stabilize. The result is perhaps best described as a partial stabilization combined with some surprising successes. On the negative side, GDP fell an average of 12 percent per year between 1992 and 1994—although the decline is overstated due to the difficulty of measuring private-sector growth—and inflation has been high, measuring 2,509 percent, 840 percent, and 215 percent in 1992, 1993,

<sup>1</sup> This survey is also believed to be unrepresentative; see I. I. Dmitrichev (1992) for a description.

and 1994, respectively.<sup>2</sup> Unemployment remains low compared with other transition economies (7.5 percent in 1994), but this is partly due to the extensive use of unpaid administrative leave and shortened working hours which affected about 6 percent of the labor force in 1994. The macroeconomic collapse has been paralleled by an unprecedented demographic crisis, reflected in sharp increases in mortality rates and declining birth rates.<sup>3</sup> On the positive side, shops have been filled with consumer goods, there is a growing class of successful entrepreneurs, and, perhaps most remarkably, by late 1994 nearly 70 percent of industrial workers were working in private or privatized firms.<sup>4</sup>

At the same time, wage-setting in Russia has been decentralized. Under the previous system planners assigned wages by establishing occupational wage scales by industry. The wage of the lowest-grade occupation was the base wage, and the wage of each higher-grade occupation was some multiple of the base. Although managers were given increased latitude in wage-setting in the mid-1980's, wage differentials between and within groups remained relatively compressed.

Wages are now primarily set through informal plant-level bargaining with little union influence (Organization for Economic Cooperation and Development, 1995). Given this shift, the structure of wages is likely to change substantially: between- and within-group skill differentials will increase in the short run, possibly by a great deal, and overall wage dispersion will grow. If skill is defined along observable attributes, this implies that returns to education and occupation will increase during the transition. In the long run, rising wage inequality may be offset by relative supply responses, as higher skill differentials induce unskilled workers to acquire more skills, or by government responses to high inequality. For the most part these are the changes docu-

mented in the following pages for Russia's experience in the years after wage and price liberalization, although it is early yet to observe longer-run responses to increased inequality.

### III. Data

The primary source of data for this study is a series of monthly cross-section household surveys conducted by the All-Russian Center for Public Opinion Research (or VTsIOM, its Russian acronym) in 1991, 1993, and 1994.<sup>5</sup> The sampling frame is the adult population of Russia aged 16 and over; each monthly survey comprises 3,000–4,000 randomly selected individuals across the country. The areas covered by the survey represent roughly one-third of Russia's 88 regions. The surveys used here were conducted in May 1991 ( $N = 2,964$ ); in April, May, and June 1993 ( $N = 11,829$ ); and in April, May, and June 1994 ( $N = 8,868$ ).<sup>6</sup>

The wage data in these surveys have several drawbacks. First, the wages reported are monthly wages unadjusted for hours worked. Since average hours worked have likely changed across groups during the transition—in particular low-paid workers are probably working fewer hours and highly paid workers are working more hours—the use of monthly rather than hourly wages may overstate the rise in wage inequality. In addition, some individuals declined to provide information on wages (wages are not topcoded). Since the nonresponse rates are relatively low (4.5 percent, 4.1 percent, and 5.9 percent in 1991, 1993, and 1994, respectively) the respondents with missing wage observations are simply dropped. The upper tail of the wage distribu-

<sup>5</sup> Clearly a pre-1991 data set would be preferred since some economic liberalization had already begun by 1991, and because the value of wages in 1991 is difficult to interpret due to the scarcity of consumer goods in that year. This is the earliest year for which data are available, however.

<sup>6</sup> The sample selection procedure is described in VTsIOM (1993 pp. 9–10). The empirical work aggregates the regions into the 11 standard "macro" regions used for statistical reporting in Russia, plus Moscow city. These regions are: North, Northwest, Central, Volga-Vyatsky, Central Chernozem, Povolzhsky, North Caucasus, Urals, West Siberia, East Siberia, and the Far East.

<sup>2</sup> Figures in this section are from *Russian Economic Trends*, 1994, 1996.

<sup>3</sup> Judith Shapiro (1995) analyzes the causes of the mortality crisis.

<sup>4</sup> The Russian privatization program is described in Maxim Boycko et al. (1995).

tion is probably biased downward slightly because of these missing wage observations.

Another potential problem is the high inflation experienced in Russia during the reform period. If wages were imperfectly indexed at the time of these surveys, differing indexation mechanisms across industries and occupations could lead to large transitory differentials in the monthly data. A test of the inflation hypothesis (discussed below), however, suggests that the effects of inflation on the wage distribution are relatively small.

Turning to the education variables in the data sets, education is coded by level of education completed rather than by years of schooling.<sup>7</sup> Schooling in Russia is compulsory through "incomplete secondary" education (8th grade, or 7th before 1963) which is roughly equivalent to junior high school in the United States. General secondary education requires ten years of education. Those who obtain a vocational degree spend one to two years in school after secondary education, or three years if they entered vocational school with an incomplete secondary education. Specialized secondary schools require two additional years of schooling after secondary education, and provide training in semiprofessional occupations such as nursing and elementary education. These institutions are similar to junior colleges in the United States, although the training tends to be highly specialized. The highest share of the population (about 30 percent) has a specialized secondary degree. People completing higher education spend an additional four to six years in school after secondary school. Higher education is free and most students receive modest state stipends, although a number of tuition-based private schools have opened in recent years.

Since individuals with the same years of schooling may have different educational attainment (e.g., vocational and specialized secondary education), most of the analysis of wages by educational attainment uses the level rather than years of education. A continuous

years of schooling variable is also constructed in order to compute a potential experience variable and to have a summary measure for the return to an additional year of education.<sup>8</sup>

While the gender and age structure of the respondents in these surveys is similar to that of the population, highly educated people are overrepresented in the surveys (see Table A1 in Appendix A, which compares the characteristics of the survey respondents with those of the population). While weights are provided with the surveys, unweighted data are used in the empirical work because the weighting methodology for 1991 is not described in the available documentation.<sup>9</sup> Since unweighted data are used and the survey respondents are more educated than the population as a whole, the results are not nationally representative. They may be more representative of the country's urban, European population which is more highly educated.

#### IV. Empirical Evidence

The empirical analysis is restricted to employed, working-age civilians, which in Russia comprises men aged 18 to 59 and women aged 18 to 54. The sample is also restricted to workers who earned at least one-half the real minimum wage in May 1991; this restriction eliminates wage observations that appear to be coding errors.<sup>10</sup>

Summary statistics for these surveys are given in Table 1. As would be expected given

<sup>8</sup> Years of education were assigned as: primary or less—6 years; incomplete secondary—7 if aged 15 or over in 1963, 8 if younger than 15 in 1963; general secondary—10; vocational plus incomplete secondary—9 if aged 15 or over in 1963, 10 if younger than 15 in 1963; vocational plus general secondary—12; specialized secondary—12; incomplete higher—13.5; higher—15. Potential labor-market experience was calculated as age - years of education - 7 (children entered school at age 7 until 1984 when the age was lowered to 6).

<sup>9</sup> The sensitivity of the results to these and other restrictions is discussed in Chapter 1 of Brainerd (1996), an earlier version of this paper. Using weights generally increases the inequality measures reported here.

<sup>10</sup> The empirical work uses wages from the primary job only and includes agricultural workers and self-employed individuals. Military workers are excluded due to missing wages.

<sup>7</sup> This description of the Russian education system is based on Joseph I. Zajda (1980), W. Ward Kingkade (1990), and E. Popovych and B. Levin-Stankevich (1992).

TABLE 1—SUMMARY STATISTICS FROM HOUSEHOLD SURVEYS

	1991	1993	1994
Panel A			
Percent in sector			
Industry, construction, transport, communications	46.5	43.7	39.3
Agriculture, forestry	14.6	11.0	14.4
Trade, public catering, housing services	11.8	15.4	13.4
Education, health, culture, arts	19.2	21.7	23.0
Public administration, financial, insurance	3.5	3.8	4.7
Army, military, security	2.9	3.3	3.8
Other	1.5	1.1	1.4
Percent in state sector			
Men	83.8	58.6	49.6
Women	90.1	69.7	62.2
Percent with two jobs <sup>a</sup>			
Men	8.7	12.3	14.2
Women	10.7	13.5	17.8
Women	7.8	11.3	11.5
Average weekly hours <sup>b</sup>			
Men	41.9	40.2	40.1
Women	43.5	40.0	na
Women	40.2	40.4	na
State sector	41.3	na	na
Private sector	45.9	na	na
Sample size	1,719	6,686	4,916
Panel B			
	(May)	(May)	(May)
Mean nominal wage, rubles/month			
Men	318.5	31,849	147,119
Women	352.9	41,015	185,009
Women	280.6	24,744	117,464
Female/male	0.795	0.603	0.635
Median nominal wage, rubles/month			
Men	300.0	20,000	100,000
Men	300.0	25,000	150,000
Women	250.0	18,000	90,000
Female/male	0.833	0.720	0.600
State- and private-sector mean wages			
State	314.6	25,851	134,589
Private	343.9	43,671	164,033
State/private	0.915	0.592	0.820
Men:			
State	348.0	31,872	168,330
Private	378.4	55,562	201,293
State/private	0.920	0.574	0.836
Women:			
State	280.4	21,766	114,123
Private	281.9	31,746	123,337
State/private	0.995	0.686	0.925
State-sector mean wages, female/male	0.805	0.683	0.678
Private-sector mean wages, female/male	0.745	0.571	0.613
Sample size	1,719	2,148	1,706

Notes: Data are for the employed population aged 18–59 (men) and 18–54 (women).

<sup>a</sup> 1991 data are from an October 1991 VTsIOM survey ( $N = 2,229$ ); the May 1991 survey has no information on second jobs.

<sup>b</sup> 1991 data are from the May VTsIOM survey; 1993 and 1994 data are summary statistics from an enterprise survey conducted by Goskomstat (1994b, 1995b). Average hours worked in each sector are weighted by employment.

the skewed industrial structure that Russia inherited from its predecessor, employment in industry declined over the sample period while employment in services increased. Employment in the state sector fell from 87 percent to 57 percent, reflecting the acceleration of Russia's mass privatization program. Women are disproportionately employed in the state sector.

The bottom panel of Table 1 summarizes the development of nominal wages in the sample. In 1991 women fared relatively well; median female earnings were 83 percent of those of men (unadjusted for hours).<sup>11</sup> This compares favorably with other developed countries; in the United States, for example, the median gender wage ratio for weekly earnings was 74 percent in 1991 (Francine D. Blau and Lawrence M. Kahn, 1997). By 1994, however, the median gender wage ratio had fallen to only 60 percent. The gender wage differential in 1991 was partly due to shorter average work hours for women (40.2 hours per week for women versus 43.5 for men), but in 1993 shorter hours appear to explain little of the gap. As in many countries the gender wage differential is significantly smaller in the state sector than in the private sector.

The average wage in the private sector is higher than in the state sector, particularly in 1993. In 1991 state-sector workers earned 92 percent of private-sector wages; this fell to only 59 percent in 1993 before recovering to 82 percent in 1994. Some of this gap is due to higher average hours of private-sector workers: the 1991 sample indicates that private-sector hours were 11 percent higher than state-sector hours. Other explanations for the pay gap include differences in industrial struc-

ture (state enterprises may be concentrated in lower-paying industries) and differing provision of nonwage benefits between the two sectors.<sup>12</sup>

*Changes in Overall Wage Inequality.*—This section examines the change in skill differentials defined along various dimensions of skill. Skill is first defined generally, so that the wage itself and the worker's position in the wage distribution is taken to be a measure of skill. The 90th percentile of the wage distribution, for example, represents highly skilled workers while the 10th percentile represents the least-skilled workers. Skill is then defined by the observable characteristics of education level and occupational status; experience differentials and the gender gap are examined as well. Finally, skill differentials within these narrowly defined groups are analyzed. This discussion will show that skill differentials have increased along nearly all dimensions of skill in Russia.

Looking first at changes in the overall wage distribution, wage dispersion has grown markedly since 1991. The first piece of evidence is shown in Table 2, Panel A. From May 1991 to May 1994, the 90–10 log wage differential<sup>13</sup> for men nearly doubled, increasing from 1.06 log points to 1.95 log points. The 90–10 differential increased by nearly as much for women. For men the top half of the wage distribution widened considerably (0.24 log points), but by much less than the increase in the bottom half (0.64 log points). For women the changes in the distribution were more equal, but the bottom half also widened more than the top half.<sup>14</sup>

The large increase in dispersion in the bottom half of these wage distributions may reflect, in

<sup>11</sup> Relatively high female wages in 1991 could be anomalous because the officially reported mean and median female/male monthly wage ratios in Russia were only 69.1 percent and 70.9 percent, respectively, in 1989 (Atkinson and Micklewright, 1992). If high female wages are anomalous, the decline in female relative wages is overstated. However, in another VTsIOM survey conducted in October 1991 ( $N = 2,229$ ) the mean and median gender wage ratios are nearly identical to those reported here. Relative improvements in female wages may have been due to Gorbachev's wage reforms which, among other things, increased wages in female-dominated industries and occupations (see Chapman, 1991).

<sup>12</sup> The term "private sector" reflects a continuum of ownership forms ranging from state enterprises that have been converted into joint stock companies to privately owned firms. Although of interest, it is beyond the scope of this paper to investigate the state-sector/private-sector wage differential in detail.

<sup>13</sup> The difference in log wages at the 90<sup>th</sup> and 10<sup>th</sup> percentiles of the wage distribution.

<sup>14</sup> The government's measure of income inequality shows a similar increase: the Gini coefficient increased from 0.26 in 1991 to 0.40 in late 1994 (*Russian Economic Trends*, 1994).

TABLE 2—SUMMARY MEASURES OF THE LOG WAGE DISTRIBUTION

	1991 (May)	1993 (May)	1993 <sup>a</sup> (May)	1994 (May)	Change 1991–1994
Panel A					
Men					
90–10	1.063	1.946	1.871	1.946	0.883
90–50	0.606	1.030	0.955	0.847	0.241
50–10	0.457	0.916	0.916	1.099	0.642
Variance	0.184	0.649	0.631	0.606	
Women					
90–10	1.012	1.818	1.833	1.810	0.799
90–50	0.565	0.949	0.916	0.894	0.329
50–10	0.446	0.869	0.916	0.916	0.470
Variance	0.168	0.535	0.525	0.514	
All					
90–10	1.079	1.928	1.875	2.015	0.936
90–50	0.511	1.012	0.916	1.099	0.588
50–10	0.568	0.916	0.959	0.916	0.348
Variance	0.189	0.623	0.612	0.592	
Panel B					
		1979		1990	Change
Men (log hourly wages)					
90–10					
U.S.		1.23		1.40	0.17
U.K.		0.88		1.16	0.28
90–50					
U.S.		0.56		0.69	0.13
U.K.		0.51		0.67	0.16
50–10					
U.S.		0.67		0.71	0.04
U.K.		0.37		0.49	0.12
Women (log hourly wages)					
90–10					
U.S.		0.96		1.27	0.31
U.K.		0.84		1.11	0.27
90–50					
U.S.		0.55		0.67	0.12
U.K.		0.50		0.64	0.14
50–10					
U.S.		0.41		0.61	0.20
U.K.		0.34		0.47	0.13

Notes: The 90–10 log wage differential is the difference in log monthly wages at the 90<sup>th</sup> and 10<sup>th</sup> percentiles of the wage distribution. Source of U.S. and U.K. data: Lawrence F. Katz et al. (1995 p. 58).

<sup>a</sup> Wages in this column have been inflated by regional consumer price indices for both March and April 1993, applied to wages of individuals reporting that they had not received wage increases in the two months prior to the survey.

part, the erosion of the real minimum wage over the course of the reform period.<sup>15</sup> As indicated

<sup>15</sup> The minimum wage is a monthly minimum and covers all full-time workers.

in Figure 1, the minimum wage has fallen from about 30 percent of the average wage in the late 1980's to under 9 percent of the average wage in 1994. While this decline undoubtedly hurts less-skilled workers, it probably also increases

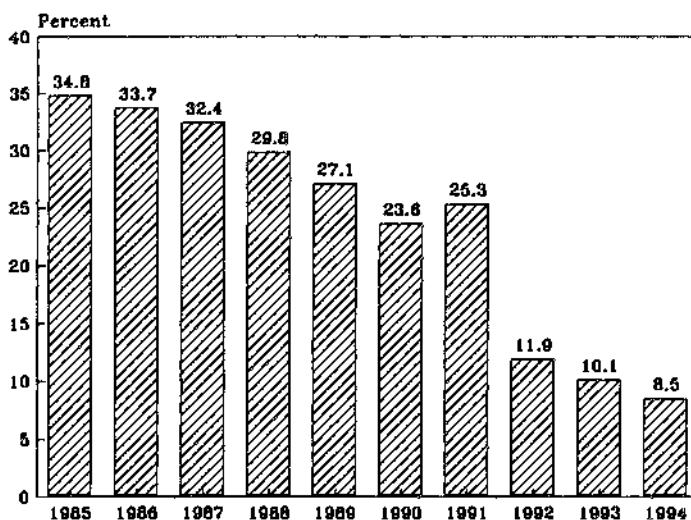


FIGURE 1. MINIMUM WAGE AS A PERCENTAGE OF THE AVERAGE WAGE, 1985–1994

Sources: *Narodnoye Khozyastvo RSFSR v 1989 Gody* [National Economy of the RSFSR in 1989] (Goskomstat, 1990 p. 135); *Russian Economic Trends* (1994 p. 47); *Tseny v Rossiiskoi Federatsii* [Prices in the Russian Federation] (Goskomstat, 1994e pp. 90–91).

the relative employment of the less skilled, and may in part explain Russia's low unemployment rate. The widening of the distribution in both tails also reflects the lack of formal wage-bargaining structures in Russia.

While the decentralization of wage-setting should eliminate the labor-market distortions characteristic of the old system, a new institution—the excess wages tax—distorted the wage structure in new ways. Until 1996, when the excess wages tax was repealed, enterprises paid a tax on the excess of the average wage of the enterprise over some minimum, which was four times the minimum wage before January 1994 and six times the minimum wage after that.<sup>16</sup> Since the minimum wage had eroded to extremely low levels, the tax created an incentive for employers to compensate highly skilled workers with nonmonetary benefits or unreported cash payments, and to retain unproductive workers at low wages in order to depress the average wage in the en-

terprise. Innovative schemes to evade the tax (for example, by paying employees “life insurance payments” rather than wages) were widely reported. This suggests that wages in the upper tail of the distribution were underreported and that the widening of this tail was understated, especially for men. The excess wages tax also depressed wages in the lower tail of the distribution, by rewarding firms for retaining low-paid workers on their payroll.

To put these figures in perspective, Panel B of Table 2 compares the changes in the Russian wage distribution with those of the United States and Britain in the 1980's. As is well known, during this period wage inequality increased markedly in both countries, and numerous scholars have documented and analyzed these changes.<sup>17</sup> While substantial, the changes in these countries are small relative to those that have occurred in Russia.<sup>18</sup>

<sup>17</sup> See, for example, Katz and Kevin M. Murphy (1992), Murphy and Finis Welch (1992), and Chinhui Juhn et al. (1993).

<sup>18</sup> Note, however, that the figures in Panel B are not directly comparable with those of Panel A since the former measure hourly rather than monthly wages.

<sup>16</sup> The tax has varied from 32 percent in 1993 to 12–25 percent in 1994 (Organization for Economic Cooperation and Development, 1995).

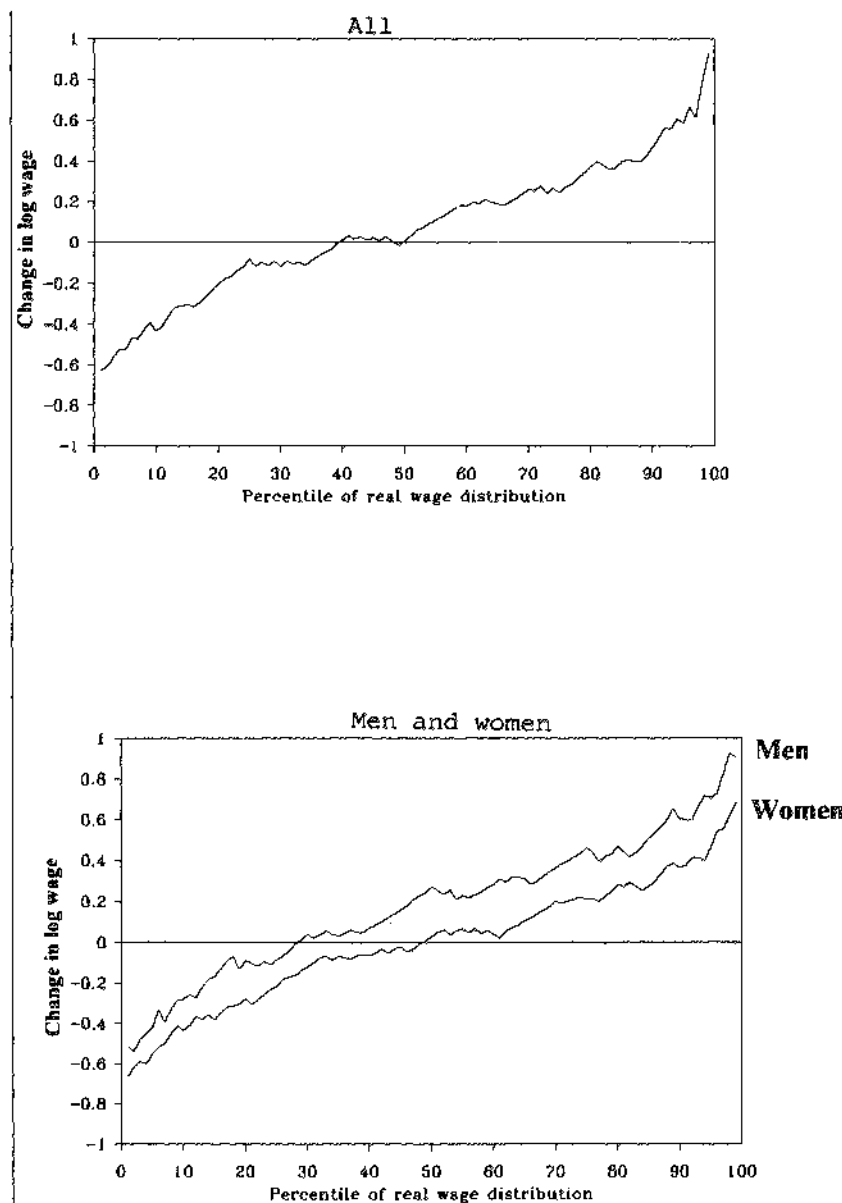


FIGURE 2. CHANGE IN LOG REAL WAGE BY PERCENTILE, 1991-1994 (1991 RUBLES)

Note: Wages for 1994 were deflated into 1991 rubles using the wage deflation procedure described in Appendix B.

The widening of the wage distribution is pervasive across all percentiles of the wage distribution for both men and women. This is

illustrated in Figure 2 (top panel), which shows the log change in real wages from 1991 to 1994 by percentile of the wage distribution.

While the median real wage appears unchanged,<sup>19</sup> increased wage inequality is nearly a linear function of the percentile of the wage distribution. Less-skilled workers have lost substantially in real terms while highly skilled workers have reaped considerable gains. A similar pattern is evident for men and women separately (bottom panel), but women have lost relative to men consistently at all skill levels.

Is this tremendous increase in wage inequality real or does it simply reflect high inflation rates (averaging 19 percent per month in the 1993 sample and 7 percent in the 1994 sample) and imperfect wage indexation? If wages are adjusted more frequently for skilled workers than for unskilled workers, the monthly wages used here may overstate wage inequality.

Simply studying the changes in Table 2 can shed some light on this issue. Since the inflation rate decreased significantly from 1993 to 1994, if increased inequality in 1993 were due mainly to high inflation these measures should decline in 1994. But the 90–10 log wage differentials are essentially unchanged between these two years. Moreover, explicitly adjusting for differing wage indexation across workers affects the 90–10 differential only slightly. The 1993 surveys asked respondents whether they had received a wage increase in the past two months; an average of 72.3 percent had received increases but fewer in the bottom end of the wage distribution had received an increase (63 percent in the 1–10 percentiles) compared with those in the top end (86 percent in the 91–99 percentiles). This information is used to calculate a lower bound for the 1993 log wage differentials: the wages of all individuals who received no indexation are inflated by the relevant regional consumer price indices for the two months prior to the surveys. The results of this exercise are shown in the

italicized column of Table 2. While male and overall wage inequality do decline somewhat relative to the unadjusted wages (particularly in the upper part of the distribution), the order of magnitude of the inequality is similar in the two measures. Thus, even after adjusting for differing wage indexation across workers, wage inequality still increased sharply in 1993. Moreover, inflationary distortions were probably smaller in 1994 than in 1993, because inflation was lower and more efficient wage indexation mechanisms were likely in place in 1994.

It is also possible that the new inequality in Russia simply reflects a change in the form of compensation rather than a real increase in inequality. It is well known that Soviet enterprises provided generous non-wage benefits to employees in the form of housing, day care, medical facilities, and access to subsidized food and goods. If these benefits were distributed unequally across workers, the Soviet wage distribution may have been highly unequal, with the inequality created through differing access to benefits rather than through direct monetary compensation. In response to the reforms, firms may have simply converted the benefits into cash wages, thus substantially increasing reported wage inequality.

Evidence on this issue is limited but suggests that the increase in inequality is real rather than a change in the form of compensation. In particular, firms have been slow to shed benefits provided to workers during the transition. A 1993 survey of 340 state and private industrial firms in three regions reported that most enterprises continue to provide both managers and workers with a wide range of benefits (Guy Standing, 1994). One-third of the enterprises had actually added benefits in 1992 and 1993, while less than 25 percent had discontinued any benefits.<sup>20</sup> If enterprises are continuing to offer the same or even more benefits to workers,

<sup>19</sup> The real wage changes shown here conflict with official data that show a nearly 40 percent decline in real wages between 1991 and 1994. The discrepancy may be due to the inconsistent deflator used here (described in Appendix B) or due to enterprise underreporting of wages to avoid taxes. Real wages have probably declined more than is indicated, but the bias is unlikely to affect the relative changes across percentiles of the wage distribution.

<sup>20</sup> This may be a reaction to the excess wages tax described above; it could also reflect that managers of privatized enterprises have an incentive to maintain or add benefits in order to gain worker support.

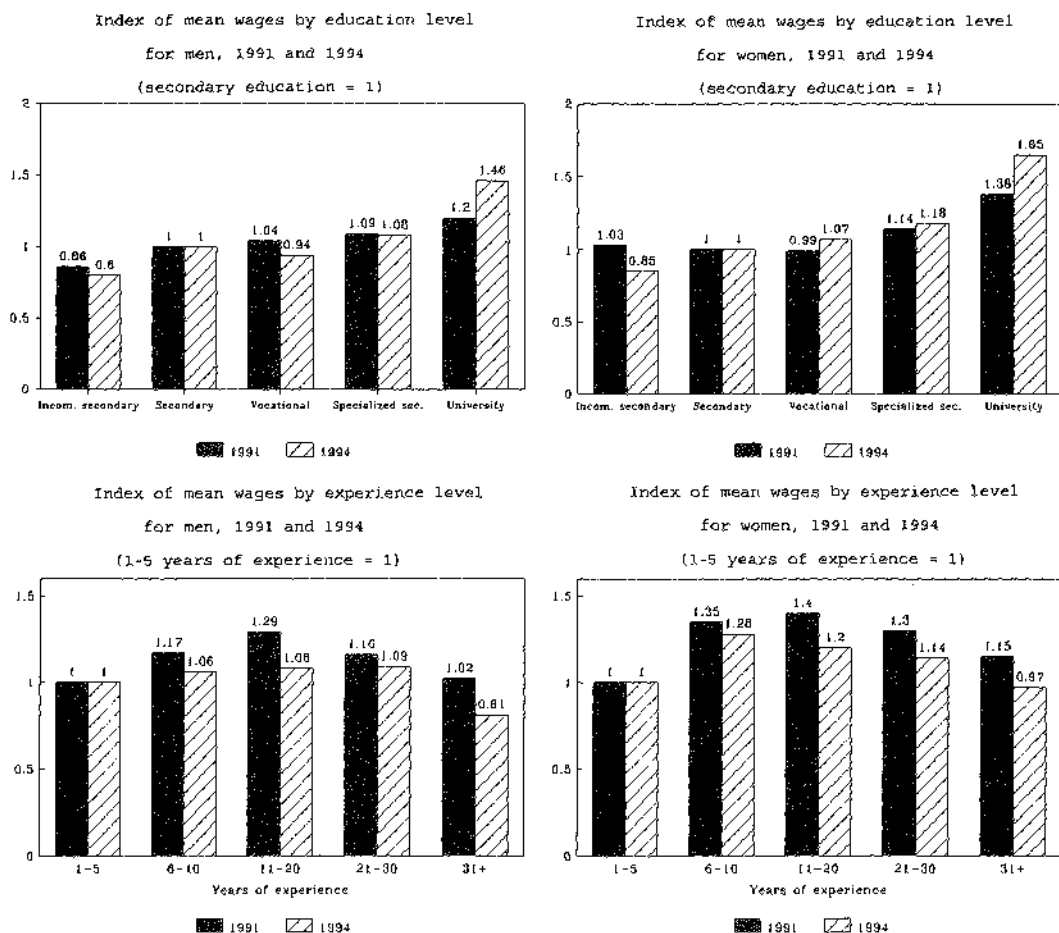


FIGURE 3. EDUCATION AND EXPERIENCE MEAN WAGE DIFFERENTIALS, 1991 AND 1994

Note: May and June 1994 wages have been deflated into April 1994 wages using the relevant regional consumer price indices for those months.

replacing benefits with cash wages has not led to rising wage inequality.

To summarize, the increase in wage dispersion is not a transitory illusion created by high inflation or by a shift in the form of compensation from nonwage benefits to cash wages. The magnitude of the increase in inequality is striking, and the new level of inequality in Russia is higher than that in the United States. Since the skill composition of the labor force is unlikely to have changed substantively in three years, the increase in wage dispersion almost surely reflects an increase in market returns to measured and unmeasured skills.

*Changes in Returns to Measured Skills.*— First looking at returns to education, Figure 3 (top panels) shows an index of wages by education level for men and women in 1991 and 1994. For men, wage differentials by education are modest and have increased slightly since 1991. For example, the wage premium for higher education over secondary is only 46 percent, compared with about 70 percent for men in the United States in the late 1980's. The story is much the same for women, except that an already higher wage premium for a university education (38 percent in 1991) increased to 65 percent in 1994.

Occupational premiums show a similar pattern of increasing relative wages for more-skilled workers.<sup>21</sup> For example, the ratio of the wage of top managers to the average wage increased from 1.28 in 1991 to 1.81 in 1994. In contrast the ratio of unskilled blue-collar urban wages to the average wage fell from 0.75 in 1991 to 0.56 in 1994.

Increases in returns to education are also evident when one controls for other demographic and work attributes. This is shown in Tables 3A and 3B, which summarize the results of OLS regressions of log monthly wages on a vector of demographic and work characteristics for 1991, 1993, and 1994.<sup>22</sup> The first two columns for each year show pure human capital earnings functions, in which log wages are regressed on categorical education variables (or a continuous years of schooling variable), potential experience and its square, and 11 dummy variables for region. Returns to education in this specification include the effect of education in allocating workers into low- or high-paying occupations or industries. The regression in the third column adds dummy variables for marital status and state-sector employment, six industry dummies, and nine occupation dummies.<sup>23</sup> For 1993 and 1994 the three months of data are pooled, and month dummies and month times region interaction terms are included to control for the effects of inflation over the three months.

Like the simple wage ratios of Figure 3, returns to education increased for both men and women over the course of the transition. For men the return to an additional year of education increased from 3.1 percent in 1991 to 6.7 percent in 1994 (Table 3A). Using categorical education variables, the return to hav-

ing a university degree over a specialized secondary degree increased monotonically over the period, from 8.3 percent in 1991 to 16.1 percent and 21.6 percent in 1993 and 1994, respectively. The same regressions for women (Table 3B) also show an increase in returns to education, from 5.4 percent in 1991 to 9.6 percent in 1994. University-educated women earn 30 percent more than women with specialized secondary education, compared with 21 percent more in 1991 (using the human capital specification).

In contrast to widening education and occupation differentials, wage differentials across experience groups became more compressed during the transition. This is illustrated in Figure 3 (bottom panels), which also shows the flat experience-earnings profile characteristic of the Soviet Union in earlier periods. A striking feature of men's experience premiums is that in 1994 men who would be at the peak earning age in most other countries (i.e., the 45–55 age-group) earned little more on average than did new entrants to the labor market. For women, less-experienced workers also gained on more-experienced workers across all experience groups, but the compression is less dramatic than it is for men.

Similarly, the return to the first year of experience in a log wage equation—already low by western standards in 1991—fell sharply for men from 2.5 percent in 1991 to just 0.8 percent in 1993, before increasing to 1.5 percent in 1994 (using the full specification). Returns to experience fell for women as well, from 3.5 percent in 1991 to 2.1 percent and 1.7 percent in 1993 and 1994, respectively.

Why have younger workers gained relative to older workers? The compression of experience differentials likely reflects a relative demand shift against older cohorts. The human capital embodied in the most experienced workers reflects skills acquired under the "old" system which rewarded different skills than does the "new" system. For example, successful Soviet managers were highly skilled in supply procurement, negotiating government subsidies, and maximizing output. Experience in developing these skills is unlikely to be rewarded in the new Russia, in which the most sought-after managers are trained in management, finance, and

<sup>21</sup> Because the occupation codes labels are missing from the 1991 data set, an October 1991 data set ( $N = 2,229$ ) is used to calculate these wage ratios.

<sup>22</sup> The standard errors from these equations were also estimated using White's formula to allow for heteroskedasticity. Since these are nearly identical to the OLS estimates, the latter are presented here.

<sup>23</sup> Eighteen occupation dummies were used for the 1991 data set due to the missing occupation code labels for the 1991 data set. Brainerd (1996) reports the coefficients on the occupation, industry, and region dummy variables for these regressions.

TABLE 3A—LOG WAGE EQUATIONS: MEN

Dependent variable: Log of monthly wages	May 1991			April–June 1993			April–June 1994		
	Human capital	Human capital	Full	Human capital	Human capital	Full	Human capital	Human capital	Full
Education levels: <sup>a</sup>									
Primary		-0.071 (-0.71)	-0.016 (-0.16)		-0.352 (-3.41)	-0.161 (-1.67)		-0.373 (-2.75)	-0.086 (-0.69)
Incomplete secondary		-0.173 (-2.99)	-0.122 (-2.09)		-0.321 (-4.85)	-0.075 (-1.18)		-0.270 (-3.72)	-0.038 (-0.56)
Secondary		-0.104 (-2.48)	-0.097 (-2.30)		-0.150 (-3.50)	-0.058 (-1.40)		-0.102 (-2.15)	-0.035 (0.78)
Vocational		-0.078 (-1.83)	-0.043 (-0.98)		-0.194 (-4.63)	-0.075 (-1.84)		-0.130 (-2.85)	-0.039 (0.88)
Some university		-0.221 (-2.58)	-0.233 (-2.75)		0.158 (1.83)	0.116 (1.46)		0.124 (1.36)	0.123 (1.48)
University		0.083 (1.95)	0.060 (1.31)		0.161 (3.98)	0.081 (1.96)		0.216 (4.85)	0.060 (1.31)
Years of education	0.031 (5.11)			0.066 (10.4)			0.067 (9.28)		
Experience	0.026 (5.97)	0.026 (5.87)	0.025 (5.40)	0.007 (1.43)	0.009 (1.80)	0.008 (1.73)	0.013 (2.59)	0.015 (2.78)	0.015 (3.00)
Experience <sup>2</sup> /100	-0.060 (-5.86)	-0.062 (-6.02)	-0.057 (-5.41)	-0.028 (-2.54)	-0.035 (-3.04)	-0.031 (-2.87)	-0.036 (-2.92)	-0.041 (-3.22)	-0.040 (-3.38)
Married			0.057 (1.60)			0.035 (1.04)			0.056 (1.54)
State sector			-0.113 (-2.95)			-0.236 (-8.38)			-0.110 (-3.49)
Constant	5.13 (61.1)	5.54 (97.6)	5.66 (81.2)	8.84 (81.7)	9.67 (121.7)	9.75 (103.5)	3.88 (32.4)	4.68 (50.1)	4.89 (52.9)
Occupation dummies	no	no	yes	no	no	yes	no	no	yes
Industry dummies	no	no	yes	no	no	yes	no	no	yes
Region dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes
Month dummies	no	no	no	yes	yes	yes	yes	yes	yes
Region*month dummies	no	no	no	yes	yes	yes	yes	yes	yes
R <sup>2</sup>	0.129	0.137	0.202	0.172	0.175	0.318	0.165	0.182	0.316
SE of regression	0.397	0.398	0.374	0.741	0.739	0.670	0.712	0.712	0.641
Sample size	900	900	900	2,984	2,984	2,984	2,198	2,198	2,198

Notes: *t*-statistics are reported in parentheses.

<sup>a</sup> Omitted variable is specialized secondary education.

TABLE 3B—LOG WAGE EQUATIONS: WOMEN

Dependent variable: Log of monthly wages	May 1991			April–June 1993			April–June 1994		
	Human capital	Human capital	Full	Human capital	Human capital	Full	Human capital	Human capital	Full
Education levels: <sup>a</sup>									
Primary		-0.141 (-0.93)	-0.042 (-0.28)		-0.196 (-1.77)	0.025 (0.23)		-0.305 (-2.15)	-0.075 (-0.55)
Incomplete secondary		-0.076 (-1.33)	-0.0004 (-0.01)		-0.311 (-5.01)	-0.116 (-1.82)		-0.387 (-5.75)	-0.220 (-3.28)
Secondary		-0.129 (-3.51)	-0.101 (-2.61)		-0.152 (-4.58)	-0.038 (-1.06)		-0.229 (-6.38)	-0.119 (-3.20)
Vocational		-0.080 (-1.87)	-0.045 (-1.00)		-0.037 (-0.98)	-0.016 (-0.39)		-0.094 (-2.22)	-0.022 (-0.52)
Some university		0.038 (0.42)	0.006 (0.07)		0.197 (2.50)	0.194 (2.57)		0.211 (2.53)	0.119 (1.50)
University		0.206 (5.87)	0.144 (3.73)		0.254 (9.10)	0.205 (7.24)		0.301 (9.67)	0.248 (7.89)
Years of education	0.054 (8.74)			0.074 (13.2)			0.096 (15.3)		
Experience	0.031 (6.92)	0.035 (7.56)	0.035 (7.31)	0.022 (5.04)	0.025 (5.52)	0.021 (4.80)	0.013 (2.74)	0.016 (3.46)	0.017 (3.67)
Experience <sup>2</sup> /100	-0.067 (-5.64)	-0.082 (-6.62)	-0.081 (-6.45)	-0.046 (-3.90)	-0.055 (-4.51)	-0.048 (-4.01)	-0.017 (-1.36)	-0.029 (-2.25)	-0.032 (-2.54)
Married			-0.017 (-0.59)			-0.022 (-0.94)			-0.048 (-1.87)
State sector			-0.057 (-1.14)			-0.134 (-5.18)			-0.084 (-3.03)
Constant	4.55 (53.4)	5.18 (105.5)	5.26 (67.3)	8.19 (88.8)	9.09 (150.5)	9.03 (126.9)	2.96 (28.6)	4.10 (53.5)	4.24 (54.0)
Occupation dummies	no	no	yes	no	no	yes	no	no	yes
Industry dummies	no	no	yes	no	no	yes	no	no	yes
Region dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes
Month dummies	no	no	no	yes	yes	yes	yes	yes	yes
Region*month dummies	no	no	no	yes	yes	yes	yes	yes	yes
R <sup>2</sup>	0.199	0.205	0.230	0.186	0.188	0.256	0.190	0.192	0.276
SE of regression	0.364	0.367	0.351	0.668	0.667	0.637	0.628	0.627	0.592
Sample size	819	819	819	3,702	3,702	3,702	2,718	2,718	2,718

Notes: *t*-statistics are reported in parentheses.

<sup>a</sup> Omitted variable is specialized secondary education.

marketing. The new human capital embodied in young cohorts is now apparently more valuable than the old human capital embodied in older cohorts.

This cohort effect is also compounded by the realities of discounting. Since the incentive to invest in human capital depends not only on the returns to human capital but also on the length of the individual's time horizon over which investments can be recouped through higher earnings (Gary S. Becker, 1964; Jacob Mincer, 1974), older workers with short time horizons may not find it worthwhile to invest in learning the new skills necessary to be successful in the new economy. The same argument applies to employers who find it more profitable to invest in retraining younger workers. Thus shorter time horizons and irrelevant skills may explain some of the relative wage declines of older workers.

It is puzzling that returns to experience are higher for women than for men, in contrast to the standard outcome in most countries of higher returns to experience for men. Differing time horizons may explain this as well.<sup>24</sup> During the transition male life expectancy at birth has fallen tremendously, from 63.8 years in 1990 to only 57.7 years in 1994 (recall that the retirement age for men is age 60). In other words male workers with 30-plus years of experience have relatively short time horizons and thus little incentive to acquire new skills.<sup>25</sup> While female life expectancy has also fallen (from 74.3 years in 1990 to 71.3 in 1994), a 50- or 55-year-old woman still has stronger incentives to acquire new skills than does her male counterpart, and employers have stronger incentives to provide training in these skills.

*Female-Male Wage Differentials.*—While older men have fared poorly relative to other

groups, all women have fared poorly relative to men. The mean female/male wage ratio fell dramatically from 1991 to 1994 (see Table 1), and this is observed even when one controls for differences in education and work characteristics. The coefficient on a dummy variable for gender (female = 1) declines in human capital earnings regressions in which men and women are pooled,<sup>26</sup> from  $-0.248$  in 1991 to  $-0.464$  and  $-0.446$  in 1993 and 1994, respectively. Including occupation, industry, and state-sector dummy variables and state times female interactions has little effect on this result: the coefficient on the female dummy variable (including interaction effects) is  $-0.203$  in 1991 and still falls to  $-0.348$  and  $-0.389$  in 1993 and 1994. Thus little of the female-male wage gap appears to be due to occupational and industrial shifts that have adversely affected women.

Why have women's wages declined so sharply relative to men's wages?<sup>27</sup> Since female work hours appear similar to male hours (Table 1), relative changes in work hours are unlikely to explain the change. One might suspect that gender-specific factors have played a role; for example the breakdown of state control over enterprises may have enabled employers to discriminate against women more openly.

The most important factor in the growing gender gap, however, is the shift in the overall wage structure in the economy. Since women are disproportionately among the low-wage

<sup>24</sup> Higher female experience premiums are not an artifact of using a younger female sample; the same result holds when the 18–65 age-group for both sexes is studied (see Brainerd, 1996). Newell and Reilly (1996) also find higher returns to age for women in Russia using a 1992 data set.

<sup>25</sup> Conditional on reaching the 45 to 49 age-group, for example, remaining life expectancy for men in 1994 was only 20.7 years compared with 30.1 years for women (Goskomstat, 1995a).

<sup>26</sup> The human capital specification regresses log wages on categorical education variables, potential experience and its square, region dummies, and month and month\*region dummies in the 1993 and 1994 regressions. Female dummy variables are significant at less than the 1-percent level in these regressions. The "full" specification includes these variables as well as dummy variables for state-sector employment and marital status, female\*state-sector and female\*marital status interaction terms, 18 or 9 occupation dummies, and 6 industry dummies. The coefficient on the female dummy variable is significant at less than the 1-percent level in all three years in this regression. Female\*state interactions are insignificant in 1991 but are significant at the 1-percent and 5.5-percent levels in 1993 and 1994, respectively.

<sup>27</sup> As noted in footnote 11, relatively high female wages in 1991 may have been anomalous, so the decline in female wages relative to male wages may be overstated.

workers, the increase in wage dispersion has penalized female wages relative to male wages. The best evidence of this is provided by the position of the median female in the male wage distribution.<sup>28</sup> A decline in the median female percentile over time indicates that observable skills have declined, or that discrimination has increased (i.e., the median female is considered to have skills comparable to a male in a lower percentile of the male wage distribution). The position of the median female in the male wage distribution remained nearly unchanged, however, at the 30.2 percentile in 1991 and the 30.4 and 33.0 percentiles in 1993 and 1994, respectively. Remarkably, this suggests that the increase in the gender gap is due almost entirely to the increase in overall wage inequality; gender-specific factors appear to explain little of the poor labor-market outcomes of women in Russia's transition.<sup>29</sup>

*Within-Group Inequality.*—While most dimensions of between-group inequality have increased, the changes are too modest to have alone accounted for the substantial increase in overall wage inequality documented here. Increases in inequality within narrowly defined demographic groups have contributed at least as much, and likely more, than between-group inequality to the rise in overall inequality.

One indicator of within-group inequality is the dispersion of residuals from a log wage equation, which reflects inequality within nar-

rowly defined groups. Using the human capital specification of Table 3 (with categorical education variables), the 90–10 differential for the residual distribution for men increased from 0.98 to 1.78 from 1991 to 1994 and from 0.86 to 1.56 for women over the same period. In other words, the most skilled within narrowly defined groups have gained roughly 75 percent relative to the least skilled. Residual inequality falls slightly when industry, occupation, and state-sector variables are included in the regression, but for both men and women those at the 90th percentile within groups gain nearly 65 percent relative to those at the 10th percentile. In both specifications and for both men and women the increases in the lower half of the residual distribution are larger than those in the upper half.

The contribution of growing within-group inequality to rising overall wage inequality can be examined using a technique developed by Juhn et al. (1993) which decomposes the change in the entire wage distribution into changes due to changes in observable prices and quantities, and to unobservable components. This decomposition was carried out using both the human capital and “full” specifications and using 1991 and 1994 as the base year. Selected results are shown in Table 4.

This exercise indicates that changes in both observable skill prices and in unobservables have contributed to the rise in inequality, with the latter playing the leading role. Changes in the residuals explain more of the widening of the bottom half of the wage distribution, while changes in observable skill prices also explain the changes in the top half of the distribution. Quantities play a negligible role, as would be expected given the short time period under study.<sup>30</sup> Thus both the increases in observable skill premiums across education and occupation groups documented above, and the increased market returns to unobservable skills within groups, have contributed to the rise in wage inequality in Russia.

<sup>28</sup> Blau and Kahn (1995, 1997) use this statistic to study international differences in the gender gap and changes in the gender gap in the United States. It is calculated by assigning each woman a percentile ranking in the male wage distribution, and finding the ranking of the median female.

<sup>29</sup> Female labor-force participation rates have also declined over this period. Long one of the highest rates in the world, the female participation rate fell from 84.2 percent in 1989 to 78.6 percent in 1994. This decline, however, was matched by a decline in the male labor-force participation rate from 87.5 percent to 80.8 percent. [Participation rates are from the 1989 Census (Goskomstat, 1991) and the 1994 Labor Force Survey (Goskomstat, 1994d).] Note that the 1989 rates may be overstated due to state pressure on citizens to report themselves as employed.

<sup>30</sup> The offsetting effect of quantities on the 90–50 male differential may be anomalous; changes in quantities have a negligible effect on the 90–50 differential if 1994 is used as the base year. Results are otherwise similar using 1994 as the base year as well as using the human capital specification.

TABLE 4—DECOMPOSITION OF CHANGES IN THE WAGE DISTRIBUTION,  
MAY 1991–MAY 1994

	Total change in differential:		Change due to changes in:		
			Quantities	Prices	Residuals
Men:	90–10	0.883	-0.184	0.484	0.583
	90–50	0.241	-0.196	0.215	0.222
	50–10	0.642	0.013	0.268	0.361
Women:	90–10	0.799	-0.008	0.328	0.478
	90–50	0.329	-0.050	0.181	0.198
	50–10	0.470	0.043	0.147	0.241

*Notes:* The decomposition is based on the "full" regression specification of Tables 3A and 3B except that the regressions exclude occupation dummies. The decomposition is calculated by first computing the relevant summary measures of the wage distributions (e.g., the change in the 90–10 differential). If 1991 is the base year, as it is here, a synthetic wage distribution for 1991 is then created using the 1994 distribution of quantities but holding skill prices and the residual distribution constant at their 1991 levels. The changes in the summary statistics between this synthetic wage distribution and the original wage distribution are attributed to changes in quantities. A second synthetic wage distribution is then created which uses the 1994 skill prices and quantities, again holding the residual distribution constant. Changes in the summary statistics from the first synthetic distribution are attributed to changes in observable skill prices. Finally, any unexplained changes in the summary statistics that remain are attributed to changes in the residual distribution, i.e., to changes in unobservable prices and quantities. The decomposition using 1994 as the base year would be computed in a similar manner. See Juhn et al. (1993) for a complete description of this technique.

The evidence given in the preceding sections raises a number of questions regarding the change in the wage structure in Russia. For example, what is driving these increasing market returns to unobserved skills—is it simply the inability to control for other characteristics that affect labor-market outcomes? Moreover, why has the change in the wage structure been so extreme, apparently more so than in the reforming East European countries?

Given limited data, one can only speculate on the answers to these questions. Regarding the first question, a potentially important omitted variable is entrepreneurial skill or willingness to take risks, a characteristic which enables some individuals to thrive in the new environment regardless of other attributes. Unobservable "skills" could also simply reflect the pure luck of being in the right place at the right time in an environment of extreme disequilibrium. In some senses the Russian economy is like a lottery, with large rents accruing to those well positioned to take advantage of opportunities—but also with substantial losses for those who draw a losing

number. Large rents may be available because enterprises in some industries continue to exercise a substantial degree of market power, and managers may have an incentive to share rents with workers because Russia's privatization strategy resulted in insider ownership for the majority of privatized enterprises. While rents are likely to be arbitrated away over time, the process may be slowed by the limited mobility of the population and the huge physical area of the country (Russia spans 11 time zones).

*Is the Change in Russia's Wage Structure Important?*—The changes in Russia's wage structure have had significant implications for the distribution of economic well-being across groups. Beyond concerns about equity, however, the distributional changes of the reform period may be linked to the voting behavior of workers, and thus may have political ramifications as well. In particular, the "losers" of the transition may be more likely to vote, and more likely to support candidates representing nationalist or communist parties.

TABLE 5—PROBIT RESULTS: VOTING BEHAVIOR OF THE EMPLOYED POPULATION, DECEMBER 1993 PARLIAMENTARY ELECTION

Dependent variable:	Probability of voting in the election				Probability of voting for far-right parties, <sup>a</sup> conditional on voting			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Predicted loss in wages <sup>b</sup>	-0.269 (-5.86)		0.186 (1.04)	-0.184 (-2.42)	-0.061 (-1.19)		-0.144 (-0.69)	0.164 (1.94)
Years of education		0.013 (3.15)	0.022 (2.27)			-0.11 (-2.41)	-0.017 (-1.59)	
Age		0.009 (13.1)	0.009 (13.1)	0.009 (13.0)		0.003 (4.03)	0.003 (4.03)	0.003 (4.11)
Female (yes = 1)		-0.036 (-2.28)	-0.075 (-1.83)	0.002 (0.10)		-0.078 (-4.42)	-0.047 (-0.97)	-0.113 (-4.30)
Married (yes = 1)		0.049 (3.14)	0.049 (3.13)	0.050 (3.18)		0.045 (2.42)	0.045 (2.43)	0.044 (2.40)
State (yes = 1)		-0.014 (-0.88)	-0.014 (-0.89)	-0.014 (-0.88)		0.002 (0.10)	0.002 (0.08)	0.002 (0.10)
Occupation, industry and region dummies	no	yes	yes	yes	no	yes	yes	yes
Log-likelihood	-3,521	-3,320	-3,319	-3,322	-1,706	-1,587	-1,587	-1,588
Sample size	5,203	5,203	5,203	5,203	3,051	3,051	3,051	3,051

Notes: The sample is for the employed population aged 18 and over. The table reports the change in probability for a small change in each independent variable. z-statistics are given in parentheses.

<sup>a</sup> Liberal Democratic Party of Russia, Agrarian Party, or Communist Party.

<sup>b</sup> Calculated as  $-(\hat{y}_{94} - \hat{y}_{91})$ , where  $\hat{y}_{94}$  and  $\hat{y}_{91}$  are the predicted wages from a regression of log wages on categorical education variables and a dummy variable for gender. Wages for 1994 were deflated into 1991 rubles using the wage deflation procedure described in Appendix B.

The 1994 surveys included questions about voting behavior in the December 1993 parliamentary elections. Reformers (the "Yabloko" and "Russia's Choice" parties) unexpectedly lost this election to far-right parties (the Agrarian and Communist Parties, and the Liberal Democrats—a misnomer for a pro-communist party). The voting information was used to estimate two probit regressions, one testing the characteristics associated with voting in the election, and the other testing the characteristics associated with voting for the Liberal Democrats, the Communist Party, or the Agrarian Party. These regressions include a variable for the individual's predicted loss in

wages between 1991 and 1994.<sup>31</sup> If increased wage inequality has affected voting behavior, one would expect the coefficient on this variable to have a positive and significant sign: individuals experiencing a greater "loss" over the period would be more likely to vote, and more likely to vote for the far-right parties which promise to slow or reverse the economic reforms. These regressions were

<sup>31</sup> This variable is calculated as  $-(\hat{y}_{94} - \hat{y}_{91})$ , where  $\hat{y}_{94}$  and  $\hat{y}_{91}$  are the predicted wages from a regression of log wages on categorical education variables and a dummy variable for gender in the respective years.

estimated both including and excluding this variable; the sample is the employed population aged 18 and over, and thus includes working pensioners.

Results of these regressions are summarized in Table 5. Individuals who are older, more educated, and married were more likely to vote, and men were more likely to vote than women [column (2)]. While column (1) indicates that those who have "lost" more over the period are actually less likely to vote, this effect becomes statistically insignificant once one controls for demographic characteristics [column (3)]. This is likely due to the strong correlation between the "loss" variable and years of education (correlation =  $-0.67$ ). Omitting the latter variable as in column (4), the results suggest that the "losers" are indeed less likely to vote. However, it is clearly impossible to distinguish this effect from the effect of education on voting behavior.

As might be expected, less-educated workers and older individuals were more likely to support the far-right parties, and men were more likely than women to vote for these parties [column (6)]. The predicted loss in wages appears to have little impact on an individual's support for nationalist or communist parties [columns (5) and (7)], although the variable has a positive and statistically significant sign when the education variable is omitted [column (8)]. Again, however, one cannot draw firm conclusions based on this specification.

Thus, individuals who have fared poorly in the labor market appear (if anything) less likely to participate in elections; and the evidence that the "losers" express their dissatisfaction at the polls by voting for far-right parties is inconclusive.

## V. Conclusion

While rising inequality is clearly evident on the streets of Moscow and is widely noted in the press, few would have guessed at the remarkable and rapid increase in wage inequality that has occurred in Russia in the last few years. The "winners" from this transformation—at least in the short period under study here—are young well-educated men whose skills have enabled them to exploit new profit-making opportunities in the private sector of the economy. The losers are older workers, men in particular, whose human capital has been devalued and who have few incentives to acquire new skills relevant to the emerging economy. Women also appear to be among the biggest losers from the transition. Since profit-making opportunities and large rents will be arbitrated away over time and individuals will acquire new skills, an eventual decrease in wage inequality in Russia should be expected. But—barring government interventions—this will happen much more slowly than did the rise in inequality.

## APPENDIX A: REPRESENTATIVENESS OF SURVEY DATA

TABLE A1—REPRESENTATIVENESS OF SURVEY DATA

	1991		1993		1994		1993 Labor Force Survey <sup>a</sup>
	Unweighted	Weighted	Unweighted	Weighted	Unweighted	Weighted	
Sample size	2,964		11,829		8,868		580,000
Sex, percent							
Male	45.5	45.2	39.4	40.7	39.8	44.3	45.7
Female	54.5	54.8	60.6	59.3	60.2	55.7	54.3
Ages 16–72, percent							
16–19	7.6	7.3	5.3	5.0	6.1	7.4	8.0
20–24	10.1	9.2	10.1	9.9	9.6	9.1	7.6
25–29	10.9	11.1	9.7	9.6	9.8	9.5	7.5
30–49	38.8	35.9	45.6	47.0	46.0	42.9	39.8

TABLE A1—Continued.

	1991		1993		1994		1993 Labor Force Survey <sup>a</sup>
	Unweighted	Weighted	Unweighted	Weighted	Unweighted	Weighted	
Ages 16–72, percent							
50–54	9.1	8.9	6.7	6.7	6.3	6.1	7.8
55–59	8.0	9.6	8.1	7.6	7.9	8.2	9.3
60–72	15.4	18.3	14.6	14.2	14.4	16.8	20.0
Education, employed population, percent							
Ages 16–72							
Primary or less	2.1	4.2	2.5	2.6	1.6	2.9	3.1
Incomplete secondary	10.3	18.4	5.7	5.9	5.7	11.3	14.6
General secondary	21.5	19.4	17.2	18.0	17.7	20.1	31.5
Vocational	17.1	18.7	15.5	17.1	15.3	19.8	
Specialized secondary	23.6	22.6	30.2	31.5	31.5	31.1	32.0
Incomplete higher	2.5	1.7	2.3	2.0	2.8	1.8	1.6
Higher	22.9	14.9	26.5	22.9	25.5	13.1	17.2
Region, all population, percent							Actual <sup>b</sup> (Jan. 1994)
North	5.1	4.4	3.4	3.5	4.7	4.8	4.1
Northwest	5.9	4.4	9.4	9.6	5.8	5.6	5.5
Central <sup>c</sup>	21.5	18.2	13.1	13.0	14.1	15.8	14.4
Volga-Vyatsky	4.5	5.1	5.1	5.8	5.8	5.6	5.7
Central Chernozem	0.0	0.0	4.8	5.2	5.3	5.6	5.3
Povolzhsky	13.4	13.8	9.9	9.1	11.3	11.9	11.3
North Caucuses	9.2	9.6	10.2	10.5	11.3	10.3	11.8
Urals	13.7	16.6	11.0	11.5	14.6	13.6	13.8
Western Siberia	11.0	10.2	8.9	10.3	10.1	10.1	10.2
Eastern Siberia	5.9	7.0	6.1	6.6	5.8	5.9	6.2
Far East	3.4	4.7	4.6	4.8	5.0	5.4	5.2
Moscow city	6.3	6.1	13.6	10.2	6.3	5.6	5.9

<sup>a</sup> Population aged 15–72. Source: Goskomstat, *Statisticheskoye Obozreniye No. 1 [Statistical Survey]*, September 1994d pp. 62–64.

<sup>b</sup> *Chislennost' Naseleniya Rossiiskoi Federatsii [Population of the Russian Federation]* (Goskomstat, 1994a pp. 3–5).

<sup>c</sup> Excluding Moscow.

## APPENDIX B: WAGE DEFLATION PROCEDURE

The real 1994 wages used to create Figure 2 were deflated using a series of chained regional price indices. Regional rather than national-level price indices were used because inflation rates vary significantly across regions.

The following price indices were chained in order to deflate wages:

May 1991–May 1992: an annual retail price index for this period.

June–December 1992: monthly retail price indices.

January 1993–May 1994: monthly consumer price indices.

The retail price index tracked the prices of 1,000 consumer goods and 300 services and

was calculated as a Paasche index; thus changes in the index reflect both changes in prices and changes in the weights of goods in the basket. When the structure of consumption is changing—as would be expected during price liberalization—the weights will vary monthly and the monthly retail price indices should not be chained. If they are chained, as they are here, actual price movements will be distorted. The direction of the bias is indeterminate because it depends on income and substitution effects. The consumer price index is based on a basket of 262 goods and is calculated as a Laspeyres index, reflecting only price changes with fixed weights. (Note: A few regions were missing price index information in one or months; in these cases an

average of the price indices in the surrounding regions was used as an approximation.)

While chaining all of these indices clearly creates an inconsistent deflator, these are the only regional price indices currently available for this time period. Given the numerous problems with these price indices, the changes in real wages discussed here should be taken as indicative of relative changes rather than fact. The methodology of and problems with Russian price indices are discussed in detail in Vincent Koen and Steven Phillips (1993) and Brigitte Granville and Judith Shapiro (1994).

The sources of the regional price indices are Goskomstat (State Statistical Committee, the government agency responsible for collecting and disseminating statistics in Russia), 1992, 1993, 1994c.

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