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Wage Inequality in Russia (1994–2003)

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The paper documents the changes in the size of the wage distribution in Russia over the period 1994–2003. Developments in wage inequality varied a lot by sub-periods: overall wage inequality stayed stable in 1994–1996, then it jumped following the 1998 crisis and remained at higher levels for three years. In 2002 the trend reversed again and in the course of a single year wage inequality fell back to the level of the mid-1990s. We find that evolution wage inequality was largely driven by changes in the upper end of the wage distribution. Decomposition of wage inequality by population sub-groups shows that inequality has been higher for men, younger and low-educated workers, and rural inhabitants. The structure of inequality did not change much over the period from 1994 to 2003. Demographic variables (mainly gender and region) explain the largest proportion of wage dispersion (over 40% of the explained variation and 15% of total variation). Nearly equivalent is the contribution of firm characteristics with industry affiliation of employer playing the leading role. Our results show that returns to education continued to rise at all percentiles of the wage distribution converging at the level of about 8–9% of wage increase for an additional year of schooling.

Keywords. Russia, wage inequality, decomposition, quantile regression.

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CONTENTS

NON-TECHNICAL SUMMARY

The project investigates changes in wage inequality in Russia (1994–2003). Most of existing studies consider wage inequality in the context of overall income inequality treating it as one of the sources of income inequality, but not as a separate phenomenon of the labor market. However, often it is the context that predetermines policy recommendations. If the problem of wage inequality is studied in the context of income inequality, policy recommendations are usually confined to the suggestions to compensate for income disparities that emerge from market sources (wages, profits, rents) by social transfers. In other words, policy recommendations imply income redistribution that leads to efficiency losses and distortion of work incentives. Putting the problem of wage inequality in the context of labor markets will allow designing less distorting tools of income policy.

Our results suggest that wage inequality is not a temporary phenomenon. Differences in individual earnings are persistent — they are not smoothed over the life cycle, returns to experience are negligibly low. Persistence of high pay differentials has important policy implications. High wage inequality and existence of the low pay trap may lead to political instability, growth of informal economy, emergence of under-class and lower long-run rates of economic growth as a result of under-investment into human capital. Since low pay is a not transitory experience in the beginning of working career, measures aimed to reduce labour market poverty should be brought to the top policy agenda.

Our findings show that inter-industry wage differentials are the most significant contributor to wage differentiation with the lowest (conditional) wages in agriculture and budget-funded industries. Low-paid workers tend to be employed in the sectors that are traditionally closed from competition. Therefore, remedies should be twofold: introduction of more competition and pay reform in the budget sector.

Wage-setting procedures in the Russian public sector are obsolete and have hardly changed since the socialist era. In market economies public sector wages are set either through collective bargaining or through special monitoring procedures. The aim of both procedures is to tie public sector wages to the wages of "comparable" private sector workers. In Russia wage-setting in the public sector is largely a politically driven exercise – the Parliament adopts the minimum wage level and the Government sets a progression scale. In real life wages in the Russian public sector depend on generosity of local budgets, specific positions of heads of budget organizations in local elites and access to non-budget funds. This leads to substantial underpay of many workers in this sector and to high variation of wages within the public sector. Pay reform in the public sector should not come to mere wage increase (exactly what is currently done — private sector wages rapidly restore the gap). It should involve certain deregulation of labor protection legislation to allow employment reductions in the public sector and measures to increase the efficiency of public services provision.

Decomposition of wage inequality indicates that — other things being equal — demographic variables (mainly gender and region) explain large proportion of wage dispersion (over 40% of the ex-

plained variation and 15% of total variation). These findings suggest that there might be some scope for policies targeted on these attributes. Previous research has shown that gender wage gap can be mainly attributed to high professional and occupational segregation. This warrants special measures that would ensure equal opportunities for men and women at the labour market, equal access to jobs in the private sector and equal rights for promotion.

Regional pay differentials demand for measures aimed on levelling living conditions and lowering migration barriers. Housing reform and enhancing availability of mortgages are the key steps of such policy.

1. INTRODUCTION

In the early 1990s at the dawn of radical reforms the transition to a market economy was predicted to lead to an increase in wage inequality as wages were freed from administrative control. All explanations were related to the need for economic restructuring and rapid resource reallocation. Wage differentials were expected to increase in order to stimulate labour reallocation from less to more productive sectors. The extent of anticipated inequality growth was related to the scale of initial distortions that needed to be surmounted. The greater were the distortions under socialist regime, the greater labour mobility they required and so the greater degree of wage inequality was necessary to encourage this mobility. In the beginning of restructuring wage differentials were predicted to be determined by industry- and firm-specific factors, *i.e*. more profitable firms were likely to pay higher wages to attract better workers. Over time, however, pay differentials should go down to reflect mostly the differences in workers' human capital.

Actual trends in wage inequality during the earliest period of Russian transition are now well known and documented in literature.[1] Many researchers using various sources of data (mainly RLMS, VTsIOM, ISITO and other household surveys) have reported sharp increase of earnings dispersion soon after the beginning of transition. Basic changes in the Russian wage structure in 1990–1996 can be summarized as follows:

1. Wage inequality increased considerably for both men and women during the 1990s. Using aggregate official data, Flemming and Micklewright (1999) report a dramatic jump in all inequality measures: the Gini coefficient for wages rose from 0.22 in the beginning of the transition period to 0.5 in 1996, the 90/10 decile ratio increased from 3.3 in the late 1980s to 10 in 1995. Sharp growth of wage differentiation was observed in the early stage of transition (1992–1994), since 1994 earnings inequality has remained remarkably stable. These changes in the wage structure were complemented with rapid drop of real wages.
2. Though inequality widened in both tails of the wage distribution, the bottom half of the distribution expanded more than the top half (Brainerd, 1998). Differences in earnings of low-paid workers spread out stronger than those of high-paid workers.
3. Returns to measured skills (education, occupation) have increased substantially, as well as within-group inequality. Brainerd (1998) shows that, from 1991 to 1994, the return to a year of education rose from 3.1% to 6.7% for men and from 5.4% to 9.6% for women. In contrast to education premium, experience differentials became more compressed, reflecting relative demand shift in favour of younger cohorts with more relevant human capital.
4. Wages of women declined relative to men's earnings in all percentiles of distribution (Brainerd, 1998).

[1] The list of most important contributions includes Brainerd (1998), Flemming and Micklewright (1999), Lehmann and Wadsworth (2001).

5. Average wages in the private sector grew faster than in the public sector. Industry and regional wage differentiation also amplified during transition, but structurally remained very similar to the 1980s (Clarke, 2000).

Trends in the later period are less accurately documented. Fig. 1 depicts the Goskomstat estimates of wage inequality in Russia.[2] Gini coefficient and the coefficient of funds (CF)[3] demonstrated very similar developments in 1994–2002. According to the Goskomstat, inequality remained stable in 1994–1997 with Gini around 0.45. Between 1997 and 1999 the CF jumped by 28% comparing to the 1997 level. Gini raised by 8% over the same period. Growth of inequality persisted in 2000–2001 reaching its maximum (Gini = 0.508 and CF = 39.6) in 2001, which was the turning point in the evolution of Russian wage distribution. Goskomstat estimates are not strictly comparable between the two periods because of considerable changes in the sampling scheme in 1999 (Goskomstat, 2003). Therefore, they should be treated with caution. Changes in the survey design could give rise to spurious increase in inequality. Moreover, the relevant survey is very restrictive in coverage. It covers only large- and medium-size firms and excludes workers at small-size firms, self-employed, household and family workers who in 2003 summed up to 40% of total workforce.

Lehmann and Wadsworth (2001) — denoted L&W (2001) hereafter — use the RLMS data to study the effects of wage arrears on the earnings distribution in 1994–1998. Their results are represented graphically in Fig. 2. Different lines in Fig. 2 show various techniques used to eliminate the effect of wage arrears. In particular, they report that Gini for actually received wages increased from 0.532 in 1994 to 0.617 in 1996 and then slightly declined in 1998 to 0.605. Using several imputation methods to adjust initial measures for wage arrears, they conclude that in the absence of wage arrears Gini estimates would have clustered around 0.42 in 1994, 0.41 in 1996, and 0.44 in 1998. Note that adjusted values of Gini coefficients in L&W (2001) are close to the Goskomstat estimates.

In contradiction with other authors, Kislitsyna (2003) reports a significant decline in wage inequality after 1996. The peculiarity of her findings may be explained that different from other researchers she uses the data on household labour incomes, but not the data on individual wages. Her treatment of wage arrears is also not common in the literature.

Transition to market economy had considerable consequences for wage structures and earnings distribution in all CEE and CIS countries. Introduction of market reforms led to rise in wage inequality

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[2] Goskomstat estimates of wage inequality in Russia are based on the Wage Distribution survey which covers all full-time and part-time workers who have primary job with a firm and had no sick leaves or unpaid administrative leaves during the reference month. Wages are the sum of monetary and cash value of in-kind benefits due according to accounting books *regardless* of whether they were actually paid or not. Wages used in the survey do not include annual bonuses, irregular incentive payments, premiums for the launching of new production capacities and food subsidies (Goskomstat, 2003b).

[3] The **coefficient of funds (CF)** is the ratio of the average wage of 10% workers with the highest wages to the average wage of 10% workers with the lowest wages. Note that this definition is different from that of the decile ratio (p90/p10), which is the ratio of wages at the 90th percentile of the wage distribution over wages at the 10th percentile. By construction the coefficient of funds is greater than the p90/p10 ratio.

and revaluation of returns to education, gender and work experience. Table 1 summarizes some empirical estimates of earnings distribution in transition countries. The existing evidence suggests that in the CEE countries (except for Hungary and Romania) transition led to relatively modest expansion of inequality. In most of the CEE countries, the Gini coefficient was in the range between 0.25 and 0.30 in the early 2000s. Only in Hungary and Romania it exceeded 0.35. On the contrary, in the CIS-area most countries experienced tremendous rise in wage inequality. Russia along with Kyrgyzstan, Georgia, and Azerbaijan had the largest increases in wage dispersion. The Gini coefficient climbed up to 0.50 in these countries. Baltic countries make up an intermediate case between CEE and CIS countries.

In all transition countries growth of wage inequality largely occurred in the early period of transition and was followed by stabilisation in the later transition period, *i.e*. with the start of economic growth. Returns to education generally rose but those to experience generally fell. Few studies could identify an effect of ownership on wages but there is some evidence that wages started to vary by firm performance (with implications to rent-sharing).

Even accounting for greater output decline, sharp growth of earnings dispersion in Russia, which now by far exceeds the level observed in advanced western countries and in other Central European countries undergoing transition, still remains a big puzzle.

Several alternative hypotheses (not mutually exclusive) have been offered to explain changes in the Russian wage structure. The first explanation attributes the growth of earnings inequality to high compression of wages and, thus, low levels of inequality under socialism, when a large proportion of wages was determined centrally in accordance with the Uniform Wage Grid. Soviet pay structure favoured manual workers, especially employed in mining, heavy industry, and military production, and gave much lower reward to activities with high education requirements. Liberalization of wage-setting regulations moved away administrative distortions and resulted in increasing returns to observed skills (education, occupation) up to their market levels.

The second explanation stresses the role of monetary factors, *i.e*. liberalization of prices in 1992 and successive burst of inflation which rates varied greatly both across regions and by product groups. Moreover, the government failed to index in time wages of workers employed in the budget sector leading to the widening of the private-public sector gap.

The third hypothesis focuses on the growth of the private sector in which wage setting is more competitive and, hence, more sensitive to demand-supply factors. Existing models of wage distribution in transition (Milanovic, 1999; Aghion and Commander, 1999) predict that overall wage inequality should rise for two reasons: (1) workers move from less unequal state sector to more unequal private sector; (2) due to greater productivity average wages in the private sector are higher than in the state sector.

The fourth hypothesis concerns possible change in the form of compensation (Brainerd, 1998). Firms could choose to convert fringe benefits (housing, medical care, kindergartens, *etc.*) into cash wages. This reflected in growing regional differentials because workers in the northern areas used to have more extended 'social packages' under socialism.

The fifth explanation relates initial rise in wage inequality to institutional factors (legal and organisational structure of the enterprise, access to subsidies, ownership) which affect managerial willingness to share profits apart from any productivity considerations. Sabirianova Peter (2003) compared the relative importance of institutional and market determinants of wage dispersion. She concluded that during the early transition period (1992–1998) changes in the wage differentials were mainly explained by institutional factors. During the late transition period (since 1999) wage differentials tended to adjust for productivity differences and became more sensitive to skill-biased technological change and technology-enhancing FDI. Institutional factors explain why earnings inequality may continue to rise even in the lack of intensive restructuring while growth of inequality in the later period of transition should be attributed to the acceleration of restructuring and labour reallocation.

The sixth explanation assigns stabilization of wage inequality after 1994 to a widespread practice of wage arrears. L&W (2001) estimate that conventional measures of earnings dispersion would be 20–30 per cent lower in the absence of arrears.

Additionally, earnings inequality in transition countries was obviously affected by the forces, which are believed to drive wage structure in advanced western countries, namely, by skill-biased technological changes and international trade.

While some work has been done evaluating each of the above explanations, such work has usually focused on assessing each of them in isolation. The purpose of this paper is to evaluate comprehensively the explanatory power of most popular explanations: rise in returns to skills, growth of the private sector, and changes in industry composition.

2. DATA DESCRIPTION AND MEASUREMENT PROBLEMS

2.1. Sample selection

The data used in this project come from the 1994–2003 waves of the Russian Longitudinal Monitoring Survey (RLMS) based on the national probability sample. The sample is restricted to individuals of working age and thus excludes workers younger than 16 and older than statutory retirement age (55 for women, 60 for men). Among the working age population we included only respondents who reported employment as their major activity. This restriction excludes self-employed, working students and pensioners, women on maternity leave, unemployed and non-employed with casual labour incomes, *etc.* Only primary jobs are considered, incomes from moonlighting and casual work are ignored. Then we further restricted the sample to individuals who provided any kind of wage-related information including overdue wages and value of in-kind payments. Samples for all years eliminate workers with monthly wages less than 17600 roubles or greater than 17600×200 roubles in November 1994 roubles (17600 roubles was the mandatory wage minimum in November 1994). These observations are treated as outliers.

2.2. Problem of inflation and regional differences in purchasing power

Choosing a deflator for time series data is an important issue. It is not a trivial task for a country with high inflation, disequilibrium price system, continuous price shocks and vast regional disparities in the costs of living. Surprisingly, high inflation seems to be the easiest problem to handle. It can be solved by applying monthly rather than annual price indices. To obtain real values of various monetary indicators most of researchers who study wages employ the consumer price indices (CPI) as a deflator. We use the CPI as well because better option is not available. The usage of the CPI is a potential source of different biases: commodity substitution bias (when some prices increases consumers switch to cheaper goods), new goods bias, quality bias and outlet bias (shifts in shopping patterns to lower priced stores) (Hausman, 2002). Existing empirical evidence suggests that biases in the Russian CPI are substantial. Bessonov (1998) reported that over the 1992–1996 period due to commodity substitution bias alone the official CPI overstated the rise in prices in Russia by 35%. Estimates of the contributions of other sources of biases are difficult to isolate. Instead, Gibson *et al*. (2004) attempted to estimate the overall bias in the CPI. With the data from the RLMS, they found that on average the CPI overstated inflation by about two percentage points per month during 1992–1993 and by about one percentage point per month in 1994–2003. In application to wages, exaggeration of inflation means that the rise of real wages is likely to be underestimated.[4]

Huge differences in costs of living are another problem. If Russian markets were integrated, prices of the same goods would vary only because of transportation costs. Gluschenko (2003) showed that regional fragmentation of the Russian market increased sharply during the early transition period, but this trend reversed in about the end of 1994. Russian markets are still weakly integrated by the standards of advanced market economies and there are differences across regions in the speed of integration. For example, in 1998 the average value of the consumer basket of 25 basic food products varied from the low of 208 roubles in Ulyanovsk to the high of 1008 roubles in Chukotka with the average of 298 roubles for 81 regions. As far as we know, the problem of regional differences in living standards has not been adequately handled in empirical studies of wage structures.

In this study order to correct the data for differences in regional costs of living and inflation we employ the following two-stage procedure. First, we divided wages by the ratio of regional costs of living to the value of the same indicator at the national level. Adjustment is based on the on the value of subsistence minimum level for 1994–1998 and on the value of fixed set of consumer goods and services for 2000–2003. Second, we deflated regionally adjusted wages using the aggregate monthly CPI (November 1994 = 100) quoted by the Goskomstat. Effects of regional price indices developments on inequality measures are discussed in more detail the next section.

The modification of the adjustment procedure was not a voluntary choice, but was forced by the changes in the Goskomstat methodology. Until 1999 the subsistence minimum level was calculated

[4] BEA (2002) employs two alternative methods to calculate real wages: the final consumption deflator (FCD) based on the National Accounts statistics and the retail turnover deflator (RTD) based on trade statistics. Both methods give much lower estimates of fall in real wages in the 1990s. For example, in 1999 real wages were equal to 39%, 59% and 64% of the 1990 level for the CPI, FCD and RTD, respectively.

on the basis of methodological recommendations of the Ministry of Labour and Social Security of Russia from November 10, 1992 according to the Presidential Decree from March 2, 1992, No 210 "On the system of minimal consumer budgets". The subsistence minimum is a value estimate of a consumer basket with a minimum set of food and non-food goods and services as well as compulsory payments and dues. In particular, in the mid-1990s contribution of food expenditures was equal to 68.3%; expenditures for non-food goods and services (including housing) comprised 19.1% and 7.4% of the minimal consumer basket, respectively. The remaining 5.2% of minimal expenditures was spent on taxes and other compulsory payments (Ovcharova, 2001). Since 2000 the composition of the minimal consumer basket is determined at the regional level according to local legislation and procedures are no longer comparable between the regions. The Goskomstat started to calculate the value of so-called fixed set of consumer goods and services tailored specifically for using in inter-regional comparisons. It consists of 30 food products, 41 non-food products and 12 kinds of services.

Table 2 shows summary statistics for all observations containing wage-related information.

2.3. Measurement issues

Estimates of wage inequality are sensitive to the sample inclusion restrictions (*e.g.*, full-time vs. all workers), earnings concept used (hourly vs. monthly), deflator (national vs. regional), handling of wage arrears and in-kind payments. Figs 3 and 4 illustrate the dynamics of the Gini coefficient and 90/10 wage differential under different definitions of earnings.

All possible earnings definitions can be classified into four groups:

- *Average wages*. Average wage is after-tax monthly wage averaged over last 12 months regardless of whether wages were paid on time or not. This question was first included into the RLMS adult questionnaire in 1998. Thus, time series are available only for 1998–2003, which limits their use in analysis. Information about average duration of working week allows computing both monthly and hourly rates. From the theoretical point of view, average wages are the best measure to use in analysis since they are free from seasonality and are less volatile than actual last-month wages. Measures of inequality based on other definitions of earnings are clearly biased upwards. Figs. 3 and 4 show that trends of inequality in hourly and monthly average wages are nearly identical except that hourly wages demonstrate lower inequality.
- *Actual wages*. These are after-tax wages actually received by respondents during last 30 days. Because of wage arrears, series of actual wages contain many missing and zero observations impeding the calculation of conventional inequality measures. Analysis of actual wages makes sense only for those not in arrears. However, even for those not in arrears one cannot distinguish between contractual wages, bonuses and possible repayments of back wages if these respondents have just got away of wage arrears. Restriction the sample to those not in arrears can only be justified if wage arrears are confined to a relatively small proportion of workers and, what is more important, if incidence of wage arrears has a random pattern. The existing evidence contradicts both of these conditions. Moreover, sub-sample of those not in arrears is not

likely to represent well the population; proportion of those in wage arrears in our sample amounted to 39% in 1994, 40% in 1995, 59% in 1996, 62% in 1998, 26% in 2000, 22% in 2001, 20% in 2002 and 16% in 2003. So in the peak of non-payment crisis more than a half of the workforce suffered from wage arrears. Excluding the subjected employees would reduce the sample size to the useless level. Moreover, wage arrears were not allocated evenly and randomly across workers, firms and regions. They are systematically related to gender, job tenure, occupation, wage levels, location, industry affiliation, ownership type, age of the firm and situation at the local labour market (Earle and Sabirianova, 2002). Therefore, the sample restricted to workers not in wage arrears is not representative for the underlying population and actual wages are a poor candidate for use in our analysis, especially for the early period of transition.

- *Contractual wages*. The RLMS does not contain direct information about contractual wages. In this paper, following Earle and Sabirianova (2002), contractual wages are constructed as the cumulative debt of firm to the worker divided by the duration of the debt (in number of full months). For those not in wage arrears contractual wages coincide with actual wages. In other words, contractual wages are the estimates of what wages would be if everyone were paid in full and on time.

  L&W (2001) draws attention to three implicit assumptions which lie behind such imputation techniques. The first assumption is that workers would not loose their jobs if employers were to pay in full. This assumption seems implausible since Russian trade unions are very weak and inexperienced in bargaining and workers have virtually no other channels to influence the management. Since there are no any estimates of elasticity of employment with respect to wage arrears we can only speculate about the potential differences between the 'true' wage distribution and the distribution of contractual wages. On the one hand, the use of contractual wages underestimates the degree of inequality in comparison with measures based on actual wages. The reason is that one imputes higher wages to all workers who are in wage arrears. On the other hand, if workers affected by wage arrears are crowded in the low end of the wage distribution and they are in risk to loose job if their employers were forced to pay wages in full, then the use of contractual wages widens the distribution which would be more compressed in the absence of wage arrears. These two effects partly offset each other leading to the estimates, which are close to the 'true' parameters of the underlying earnings distribution. Second, imputation assumes that wages are not withheld permanently, rather owed wages will be paid eventually and their value will not change much in real terms. Third, contractual wages approach rules out welfare consequences of uncertainty about future payments. Owed wages that may be paid or not are treated at equal grounds with actually paid money.

- *Total compensation*. Apart from wage arrears, many workers suffered from in-kind wage payments being (often involuntarily) paid with goods produced by their or other firms. Profile of in-kind payments is close to the pattern of wage arrears with a peak in 1998. Proportion of those affected by in-kind payments was equal to 9% in 1994 and 1995, 14% in 1996, 17% in 1998, 10% in 2000, 8% in 2001, 7% in 2002 and 5% in 2003. In the late 1990s for 40–45% of them

in-kind payments was the only form of received wages; in 1996 at the bottom of barter and non-payment crisis 54% of them were only paid in-kind. For those who received monetary wages and in-kind payments, in-kind payments constituted about 40% of total compensation. Not surprisingly, workers affected by wage arrears were more likely to be paid with goods produced by their or other firms and received higher proportion of their wages in-kind.

Thus, an appropriate definition of earnings should be adjusted for wage arrears and account for the fact that in-kind payments have been important part of workers' compensation in Russia during transition. Summarizing relative advantages and weaknesses of various wage definitions, we constructed our measure of earnings as total compensation equal to the sum of monthly contractual wages and the money equivalent of goods paid in-kind. This indicator is the best to reflect potential monetary resources available to an individual. In other words, we treat wage arrears as temporarily withheld wages that will be eventually paid back to workers. So workers can borrow money against future payments of the owed wages and/or sell products received instead of wage payments.

Figs 3 and 4 show that total compensation closely followed contractual wages during the period under consideration. Hereafter, for the sake of simplicity we call total compensation "wages".

Concerning the time frame, general trend in literature is to use monthly wages. The reasons for favouring of monthly wages are both theoretical and practical. We begin with the practical arguments. First of all, most of Russian employees are either salaried or are paid on a piece-rate basis, pay-per-hour contracts are not common in Russia. Hourly wage rates can be only obtained by dividing monthly earnings by hours worked. Second, most of Russian workers are employed full-time.[5] Third, the RLMS contains a substantial proportion of non-responses and erroneous answers to the question about hours worked. Thus, errors in measuring hours worked may aggravate the errors in measuring wages.

Using monthly wages is not an error-free alternative as well. Many previous studies have showed that Russian enterprises responded to transitional output shock not by employment reduction, but rather by a combination of real wage decrease and reduction of hours worked. Workforce underutilisation varied considerably across firms, regions and industries. Reduction of working week and incidence of administrative leaves was not evenly distributed among workers. Therefore, the use of monthly wages may mask variation in hours worked and cause biases in the estimates. In particular, low-wage employees are more likely to work fewer hours while high wage employees are likely to work longer hours.

From the theoretical perspective, the choice between hourly and monthly wages is also somewhat arbitrary. The use of hourly wages is based on the implicit assumption that hours of work are freely chosen, so that workers can flexibly substitute work for leisure to enhance their welfare. If this is true, then hourly wages would be a better measure of worker's earnings potential. It can also be that hourly wages and working hours are "tied" to each other so that wage rates are not independent of

[5] For example, in 1995–1998 only about 6.2% of employees worked less than 30 hours per week, including 2.7% working less than 20 hours (Goskomstat, 2001).

working hours and decision is made jointly on hours of work and wages. The third possible case is that hours of work are exogenously constrained and labour incomes are not proportional to hours of work. In the both of latter cases using monthly wages is an advantages.

The next choice is between wages of all workers and wages of full-time workers only (defined as those who worked at least 140 hours in the previous calendar month). Both trends in Figs 3 and 4 are nearly parallel. Inequality is higher when measured for the sample of all workers indicating that some variation in earnings is due to differences in hours worked. However, we restricted the sample to those individuals who reported employment as their primary occupation. Thus, employment is likely to be the major source of personal income for both working full- and part-time. Descriptive analysis of part-time workers showed that they tend to be female, younger and are more likely to have higher education. Such demographic profile suggests that they may be supplementary wage earners in the family and/or part-time working schedule may be their voluntary choice resulting from rational time allocation decision. Therefore, part-time workers were included into analysis.

3. MEASURING OVERALL WAGE INEQUALITY

3.1. Cross-sectional wage inequality

We begin with descriptive statistics and simple decompositions in order to document the changes that occurred in 1994–2003 and uncover the stylized facts about the structure of wages in Russian economy.

A brief methodological remark is in order. The coefficients based on the RLMS data sets are likely to underestimate the level of inequality for two reasons: uneven panel attrition and undersampling of high-paid workers. Uneven panel attrition reflects the fact that higher paid workers have higher propensity to hide their incomes, more frequently refuse to participate in the survey and thus drop from the sample. The problem of undersampling is more subtle. The RLMS sample largely relies on the house stock that existed in 1994 and does not account for newly built dwellings. The survey tries to follow the individuals if they move to new dwellings but many of those who change addresses actually have left the sample. Since those are mostly high-paid individuals who buy new flats and houses original probability sample becomes distorted over time. The table below presents the probabilities to drop from the sample by deciles of the wage distribution.[6]

Except for 1995, probabilities to drop from the sample are significantly higher for upper deciles.

Table 3 summarizes changes in inequality for various groups defined by sex, age, education, location (rural-urban), and type of employment (part-time or full-time). In spite of dramatic changes in real wages, overall wage inequality stayed stable in 1994–1996, then it jumped in the aftermath of the 1998 crisis and remained at higher levels for several years. In 2002 the trend reversed again and in the course of a single year wage inequality fell back to the level of the mid-1990s.

[6] In this specific table the underlying sample is not restricted by age in order to exclude the life-cycle wage effects.

Decile position in the wage distribution in a previous round	1995	1996	1998	2000	2001	2002	2003	Average 1995–2003
1	0.07	0.12	0.14	0.15	0.10	0.07	0.11	0.11
2	0.08	0.13	0.15	0.14	0.07	0.10	0.08	0.11
3	0.07	0.17	0.17	0.17	0.10	0.09	0.10	0.12
4	0.06	0.13	0.16	0.14	0.09	0.11	0.10	0.11
5	0.08	0.17	0.19	0.14	0.11	0.14	0.13	0.14
6	0.08	0.15	0.19	0.18	0.13	0.11	0.15	0.14
7	0.06	0.19	0.21	0.19	0.14	0.15	0.09	0.15
8	0.09	0.20	0.24	0.19	0.10	0.13	0.15	0.16
9	0.11	0.21	0.24	0.18	0.17	0.14	0.12	0.17
10	0.08	0.26	0.28	0.24	0.21	0.20	0.19	0.21
Average	0.08	0.17	0.20	0.17	0.12	0.12	0.12	0.14

Our results are generally consistent with arrears-adjusted estimates in L&W (2001) for 1994–1998 (see Fig. 2). At the same time our inequality estimates are a bit lower than in the official publications (see Fig. 1). However, the trends are very similar except that according to Goskomstat the maximum was observed in 2001 while in our sample inequality peaked in 2000.

Evolution of overall inequality was largely driven by changes in the upper end of the wage distribution. This is evident from the indicator GE(2) which responds most strongly to changes in the top of the distribution.[7] It increased by 49%, from 0.373 in 1994 to 0.558 in 2000. For comparison, GE(0) which gives more weight to distances between incomes in the lower tail rose by 16% over the same period. Similarly, in 2000–2003 GE(2) declined by 36% while GE(0) — by 18%. The p90/p10 ratio was more volatile than p50/p10. The Gini coefficient, which is sensitive to the changes at the mean of the distribution, increased only by 10% in 1994–2000 (from 0.417 to 0.457) and then dropped by 11% in 2000–2003. Thus, changes in relative wages around the mean were relatively minor comparing to those among low- and high-paid workers. Focusing on Gini and ignoring other inequality

[7] Members of the Generalised Enthropy (GE) class of measures have the general formula as follows:

$$GE(\alpha) = \frac{1}{\alpha^2 - \alpha}\left[\frac{1}{n}\sum_{i=1}^{n}\left(\frac{y_i}{\bar{y}}\right)^{\alpha} - 1\right],$$

where n is the number of individuals in the sample, y_i is the income of individual i, and $\bar{y}$ is the mean income. The value of GE ranges from 0 to ∞, with zero representing an equal distribution and higher values representing higher levels of inequality. The parameter α in the GE class represents the weight given to distances between incomes at different parts of the income distribution, and can take any real value. The commonest values of α used are 0,1 and 2. With $\alpha = 2$ the GE measure becomes 1/2 the squared coefficient of variation.

measures may lead to a deceptive conclusion about stability of the wage distribution over the period under consideration.

Analysis of evolution inequality by sub-periods proves that high-paid workers were the major contributor to reshaping of the distribution. Over the period from 1994 to 1996 GE(2) grew by 6% while GE(0) and Gini had virtually no change. This result means that the structure of relative wages remained roughly unchanged at the low end of the distribution and widened a bit at the top. Examining the changes over the period from 1996 to 1998 allows assessing the distribution consequences of the 1998 crisis. In particular, over this period GE(2), GE(0) and Gini increased by 29%, 4% and 3%, respectively. The crisis had dramatic effects for the relative position of high-paid workers expanding the upper part of the distribution. At the low end of the distribution the burden of the crisis was distributed more evenly. More precisely, the upper middle part of the distribution suffered most sizeable losses while high paid workers at the top of the distribution passed through the crisis relatively well comparing even with low paid workers. In 1998–2000 GE(2) rose by 13%, other GE-class measures also increased by about 10%, increase in Gini was 5%. In 2000–2003 the upper part of the distribution was narrowing faster than the low end. However this growth was not enough to fully compensate larger fall in wages in 1998.

These developments resemble trends observed in other CEE transition countries, for example, in Poland where economic growth was accompanied with compressing of earning inequality (Newell, 2001; Keane and Prasad, 2002). Note that economic growth and resulting rise in real wages had more profound effects of the wage distribution than financial crisis. Moreover, results of economic growth affected, albeit unevenly, all percentiles of the distribution, while effects of the financial crisis were concentrated on higher paid workers.

Fig. 5 presents the Lorenz curves for 1994 and 2002 (the years of the lowest inequality in the sample) and 2000 (the year of the highest inequality in the sample). They graphically illustrate the growth of inequality. The Lorenz curve for 2000 lies strictly below the curves for 1994 and 2002; the distance between the curves is larger in the upper part of the distribution.

Percentile differentials are reported in Table 3 and depicted in Fig. 6. Several conclusions can be drawn from the inspection of these alternative inequality measures. First, in all surveys the p50/p10 ratio was larger than the p90/p50 ratio implying greater wage dispersion among lower paid workers. Second, the p50/p10 ratio hardly changed in 1995–2001 after sizeable decline in 1995, while the p75/p25 and the p90/p10 has been very volatile implying unstable relative position of workers at the upper half of the wage distribution.

Finally, Fig. 7 graphs the median and the 10^{th}, 25^{th}, 75^{th} and 90^{th} percentiles of wage distribution and helps to understand the changes in the percentile differentials (Fig. 6). For ease of comparison wages are indexed to 100 in 1994 for all five series. Before the crisis of 1998 wages of workers in all three groups moved close to each other, trends begin to deviate perceptibly only in 2002. Real wages declined slightly for the upper part of the distribution in 1995, increased rapidly in all ranges in 1996, fell sharply in 1998 and rose steadily afterwards. Growth of real wages in all ranges considerably accelerated in 2001–2002. In 2002 growth was greater for wages below the

median, but in 2003 it considerably slowed down for this group while for high paid workers the growth rates remained the same as in 2001–2002. By 2003 real wages at all points of the distribution reached the levels observed before the crisis in 1996. These findings support the recent conclusion of the World Bank experts that Russian economic growth since 1998 has been pro-poor (World Bank, 2005).

However, we are cautious to conclude that high paid workers became relatively worse off in the course of the transition period because the sample under consideration is restricted to employed workers. It may be that the least paid workers were crowded out from jobs to unemployment and inactivity by their better qualified counterparts while the best of high paid workers could transit to self-employment. Moreover, since wage arrears have been mainly allocated among low paid workers their wages are more likely to be imputed wages while in higher deciles wages are most probably those that were actually received in cash.

In sum, basic pattern of changes in the wage distribution is robust across all inequality measures. Over the whole period the lower half of the distribution has been constantly, albeit slowly, shrinking. In the upper half inequality expanded in 1994–2000 and then started to decline. Note that studies of wage inequality in the first years of transition (see Brainerd, 1998) have found the opposite tendency: the bottom end of the distribution widened more than the top end. Brainerd (1998) has attributed an increase in earnings dispersion among low paid workers to the erosion of minimum real wage during reforms and to the lack of formal wage bargaining in Russia. Expansion of the upper tail of the distribution may reflect sharing the benefits of successful restructuring and/or real productivity growth due to whatever reasons (SBTC, trade, favourable supply-demand shifts at the labour market, *etc.*) or may be due to the cancellation of the progressive scale of individual income tax. Second, economic growth favoured the lower part of the wage distribution. Third, after the burst in 1998–2001 inequality came back to the level of 1994–1996. We cannot exclude the possibility that increase in inequality in 1998–2001 was generated by monetary factors — regional differences in adaptation of prices and wages to the shock.

3.2. "Permanent" inequality

An increase in cross-sectional inequality can indicate either a rise in the permanent (long-run) wage inequality or increase in its transitory component. It may be that differences in individual earnings observed at a point in time are smoothed out over the life-cycle. The length of the RLMS panel does not allow disentangling the earnings properly into the permanent and transitory wage components. Detailed analysis of earnings mobility is beyond the scope of this study; here we only estimate — very roughly, using simple and restrictive methods — how important the problem may be. Future studies employing more sophisticated empirical techniques are needed to enhance and deepen our tentative conclusions as well as to trace the changes in the permanent and transitory components over time.

Our methodology of decomposition is inspired by Gottshalk and Moffitt (1994). First, in order to adjust wages for life-cycle earnings growth and eliminate possible year effects, we run — with a

pooled data set — a regression of log wages on age, age squared and year dummies (but without a constant).[8] The further calculations are based on the residuals of this regression. Then we create an unbalanced panel restricting it to individuals who had at least 3 wage observations over the 9-year period (1994–2003, 8 surveys). Next for each individual we computed the mean of his/her log wages over the 9-year period (permanent earnings) and the deviation of his/her earnings from the mean in each year (transitory earnings). The variance of permanent log wages is the variance of these means across individuals. The variance of transitory log wages is the variance of transitory components that was computed separately for each individual and then averaged across individuals.

Applying this methodology we got permanent variance of log wages equal to 0.502 and transitory variance equal to 0.313. The ratio of permanent to transitory variance is equal to 1.6 while in the quoted paper by Gottshalk and Moffitt based on US data for 1970–1987 this ratio was reported to be around 1.9 implying that transitory component of wages is more significant in Russia.

Greater relative importance of transitory component is not surprising taking into account economic instability and uncertainty of the late 1990s (even after we have controlled for much of it by putting time dummies into the regression). On the other hand, higher transitory variance may have positive consequences on individual wage prospects suggesting higher opportunities for earnings mobility. In Russian high transitory wages are more likely to reflect earnings instability rather than upward mobility. Earnings might have been volatile going up and down from year to year. This explanation is also consistent with some institutional features of Russian wage-setting mechanism. Base wages make up a relatively small fraction of total compensation while the rest of the wage consists of bonuses and other payments conditional on firm's performance and other circumstances.[9] Such a mechanism ensures flexibility of real wages and their extreme sensitivity to external shocks (Kapelyushnikov, 2003).

Additionally, we estimated conventional inequality measures based on permanent and transitory earnings (Table 4). Inequality of permanent wages is still considerable — Gini for permanent wages is equal to 0.36. By all presented measures and for all years of the period dispersion of permanent wages is higher than that of transitory wages. Inequality in the transitory component was decreasing over the 1994–2003 period.

3.3. Effects of changes in regional purchasing power

In the previous section we mentioned the problem of inter-regional differences in living standards and their instability over time. Recall that to control for the differences in regional purchasing power in 1994–1998 we adjusted raw wages using the ratio of the value of regional minimum basket over the its national average separately for each year. Extremely limited number of products in

[8] Gottshalk and Moffitt (1994) control for an experience profile.

[9] According to official estimates, in 2002 base wage (wages paid for piece-rate work and basic salaries) were equal to only 45% of total compensation. This fraction varied from the low of 19% in gas industry to the high of 78% in public catering (Goskomstat, 2003a).

the minimum consumer basket inadequately represents the structure of consumption especially in the upper tail of the distribution. For 2000–2003 we use so-called fixed set of goods and services, which is extended in comparison with the subsistence minimum basket and has variable weights that depend on actual proportions of consumption.

To estimate the effects of changes in the regional costs of living on wage inequality a very straightforward approach was employed. We fixed the differences as they were observed in 1994 and then compared actual and fixed-weights' values of inequality measures. The results are shown in Table 5.

Differences presented in the lower panel of Table 5 suggest that idiosyncratic regional price developments had only minor impact on wage dispersion. Changes in regional purchasing power had tiny disequalising effect in 1995–1996. In 1998 the trend altered and since that time convergence of regional price structures had compressing influence on interregional wage structure. Another conclusion is that switching to another indicator in the living-costs adjustment procedure does not affect much the estimates of inequality measures

4. DECOMPOSING WAGE INEQUALITY

Inequality decomposition has now become a standard technique of evaluating the wage structure. Economists often want to assess the contributions to overall inequality of inequality within and between different sub-groups of population. Decomposition of wage inequality can give clues to the influence of particular characteristics and help to formulate policy measures. Decomposition analysis can also be crucial if inequality is stable over time. Stability in inequality may potentially mask changes in the wage structure, for example, if rise in wage dispersion within each sub-group of the population is compensated by a decline in inequality between sub-groups.

Lower panels of Table 3 show that over the whole period wage inequality was higher for men, younger and low-educated workers, and rural inhabitants. Figs 8.1–8.5 plot the changes in log real wages by percentiles for various group-specific distributions.

4.1. Changes in real wages by population groups

Gender. For all years, average (unconditional) wages of men were about 52% higher than those of women, but inequality was also higher among males. Moreover, inequality increased greater for men in 1994–2001 and then declined faster in 2002–2003. The explanation is that there are more workers from the top of the overall wage distribution among men than among women.

Fig. 8.1 displays important differences in the evolution of male and female distributions. Over the whole period the female distribution remained stable; the male distribution somewhat squeezed. The p90/p10, Gini and p90/p50 for men were constantly rising in 1995–2000. The trend reversed in 2001. Intensive widening in the first period occurred only at the tails; the shape of the rest of the distribution stayed untouched. After 2000 there was markedly more widening at the low end of the male distribution than at the top.

Up to 2000 inequality among women grew because of the expansion of the upper half of distribution that was only partially offset by the narrowing of the lower half. For women, year 2000 was the turning point when inequality started to fall. Since 2000 inequality in the upper half has been declining, but the lower half stopped to shrink.

For the entire period from 1994 to 2003 real wage gains were more evenly distributed across women than across men. Women got approx. 20–25% of real wage growth at all percentiles. Low paid men gained relative increase comparable to that of women while high paid male workers had were virtually no gains. Thus, women gained sizeably over men in the top quartile. The greatest decline in the gender gap occurred in 1994–1996. In 1996–2000 the gap slightly widened. After 1998 there was little change in the relative position of women, the gap widened only for the top end of the distribution.

Age. Fig. 8.2 shows the evolution of real wages by age group. For the entire period from 1994 to 2003 essentially in all parts of the distribution older workers (elder than 45) gained less than their younger colleagues. Gains of prime-aged workers are close to 20% in all percentiles up to the 90th percentile. Younger workers experienced faster wage growth in the bottom quintile, but suffered greater losses in the upper tail of the distribution. In terms of relative gains the period of output contraction (1994–1998) was mostly unsuccessful for younger workers. Real wages of younger workers on average declined at higher rates during the crisis. Finally, older workers appeared to be less competitive in the period of economic growth (1998–2003).

Education. Fig. 8.3. plots the changes in real wages by major education groups. For the entire period university graduates gained more. Differences in gains are particularly striking at the low end of the distributions. The changes in educational wage differentials differ considerably across subperiods. Both lower-paid and higher-paid university graduates had much slower real wage losses in 1994–1998 than less skilled workers especially in low deciles. However, during the 1998 crisis university graduates lost substantially less than other educational groups. Gains of technical college graduates were on average less than those of secondary school graduates for the entire period and in all sub-periods except the most recent years.

Location. Fig. 8.4 shows the evolution of real wages for rural and urban residents. Average (unconditional) wages of rural workers were at about 55–60% of the urban wage level. Nonetheless, for the entire period the patterns of changes in real wages were very similar for both groups except the lowest and the highest deciles. However, there were significant differences in real wage growth across the sub-periods. In 1994–1996 rural workers gained substantially over urban workers in the upper two thirds of the distribution while relative gains of urban residents were concentrated in the lowest percentiles. The 1998 crisis affected higher-paid rural workers stronger than their lower-paid colleagues and urban workers. For urban residents misfortunes of the crisis were distributed more evenly across percentiles. Since 1998, urban workers have outperformed rural workers in the low end and in the middle of distribution while at the tails changes have been of the same magnitude.

Sector. Fig. 8.5 compares changes in real wages in the state and private sectors.[10] In 1994 average (unconditional) earnings in the private sector were 33% higher than in the private sector. By 2000 this gap increased to 50%. Fig. 8.5*a* shows private sector employees gained on state sector employees throughout entire wage distribution with the largest deviations in the upper half. State workers experienced slower growth of real wages in all percentiles.

We find important changes in trends from one sub-period to another. In 1994–1998 growth of real wages was slower in the private sector, state sector wages were intensively catching up wages in the private sector, especially in the middle of the distribution. Economic growth brought considerably higher gains for the private sector workers throughout the distribution, though real wages increased in the state sector as well.

Surprisingly, wage inequality has not been much higher in the private sector; neither was it growing more rapidly in the private sector than in the state sector. In fact, fro some years in the early transition period inequality was slightly higher in the state sector, except for the lowest end of the distribution (see Table 3). In 1994–2000 both sectors had similar patterns of changes in real wages with narrowing dispersion in the bottom and increasing inequality in the middle and at the top of the distribution. Therefore, high-paid and presumably high-skilled workers in the state sector had growing incentives to change jobs for the private sector. For lower-paid and presumably low-skilled workers there was essentially no change in the sector wage gap. Since 2002 inequality continued to rise in the state sector while in the private sector most measures show the narrowing of the distribution due to intensive growth of wages in its lower half.

4.2. Gini decomposition

Now we turn to more formal techniques of decomposition. Unfortunately, not all measures of inequality presented in Table 3 satisfy a decomposability property. Some measures such as variance and measures from the GE-class are easily decomposed into components of within-group inequality and between-group inequality: $I_{total} = I_{within} + I_{between}$. Gini coefficient is only decomposable if the sub-groups do not overlap in income ranges. If they do overlap then total inequality can only be decomposed into three components: $I_{total} = I_{within} + I_{between} + I_{overlap}$. Lambert and Aronson (1993) show that the overlapping term in Gini decomposition is due to intersections of the Lorenz curves. This term is the higher the closer together are sub-group means and the larger are the coefficients of variation of resulting sub-distributions. Intersections of sub-group Lorenz curves obscure the analysis of inequality between groups: inequalities maybe higher in a certain range of the distribution, but lower in some other range.

Accounting for the popularity of Gini coefficient as an inequality measure we present its decomposition in our empirical analysis. Decomposition of Gini coefficient follows Pyatt (1976).

Table 6 presents the results of Gini decomposition. Population sub-groups were defined with respect to sex, age, education, occupation, location, region, sector and industry of employment. The

[10] Firms are labeled as state if there are *NO* individuals or private establishments (Russian or foreign) among their owners.

structure of inequality did not change much over the 1994–2003 period. The results of Gini decomposition suggest that within-group inequality dominates for location, ownership and gender divisions. The contribution of between-group inequality is high for industry affiliation. For age, education and region the unexplained over-lapping component is large.

The only substantial change in the structure of inequality over the period from 1994 to 2003 is the growth of between-group component in the decomposition by type of ownership. Note that increase in the contribution of the regional between-group inequality in 2000–2001 may be spurious and caused by the change in methodology of adjustment for the differences in the regional costs of living.

4.3. Variance decomposition

The shortcoming of a reliance only on the Gini coefficient is that Gini is especially sensitive to the changes in the middle of the wage distribution. To balance this disadvantage we present an alternative decomposition based on the variance that is more responsive to changes in the tails of the distribution. Given the importance of private sector growth and intensive labour reallocation across industries we concentrate on how changes in employment composition affected overall inequality.

Changes in the total variance can be decomposed into components attributable to changes in the composition of employment across sectors or industries versus changes in inequality within sectors or industries as follows (Juhn *et al.*, 1993):

$$\sigma_t^2 = \sum_j s_{jt}\sigma_{jt}^2 + \sum_j s_{jt}(w_{jt} - \bar{w}_t)^2 , \qquad (1)$$

where t indexes time, σ_t^2 is the cross-sectional variance of log real wages, s_{jt} is the employment share of industry/sector j, σ_{jt}^2 is the within sector the within-sector variance of wages, w_{jt} is the mean wage of sector-j workers, $\bar{w}_t$ is the overall mean wage.[11] Using formula (1), the change in variance over time can be decomposed into shifts in within- and between-sector wage differences, as well as composition effects. Composition effects rise the variance to the extent that employment shifts toward sectors with high/low within-sector variance or toward industries with average wages which are different from the overall mean wage. Between-sector component reflects changes in the wage differentials between sectors.

In the 1990s Russia experienced tremendous changes in the industrial structure of employment that resulted in substantial decline of relative employment in mining and manufacturing and rapid rise of the service employment share. Large shifts in industry employment shares may have contributed to the rise in wage inequality. Our estimates using (1) suggest that between-industry inequality ac-

[11] Note that there are two ways to decompose the change in variance, depending on whether one calculates the within sector component of the change in variance using the base period or terminal period sectoral employment shares. We use the base period employment shares as weights.

counts for 17–18% of total inequality. Table 7 presents the results of decomposition of total change in variance into four components for the period 1994–2000 as a whole and for three sub-periods. Decomposition used the 24-industry classification based on the OKONKh. For the full period changes in relative mean wages across industries are the main driving force of rising inequality. 70% of overall increase in variance is due to increase in the industry wage differentials, 48% is attributable to increase in variance within industries. Composition effect for within-inequality is negligibly small. Thus, there were no significant shifts in employment towards industries with lower within-industry variance. Composition effect for between-industry inequality is negative implying that employment shifted toward the industries with average wages closer to the mean. It seems plausible that high wage industries have been more effective in combating labour hoarding and attracting high-productivity workers. Increasing wages in turn lowered demand for labour in such industries.

Table 8 presents the decomposition of variance for 1994–2003 based on the distinction between the state and private sectors. For the full period such decomposition shows that 186% of overall fall in inequality is due to declining variance within the sectors. This was offset by the rising gap in mean wages between the sectors. Within-group composition effect is not large, but positive implying that reallocation of workers from the state sector to the private sector (with larger variance and larger mean wages), while being of some importance, was not the main factor of rising wage inequality in Russia.

5. REGRESSION ANALYSIS OF THE STRUCTURE OF EARNINGS

5.1. Fields decomposition

An important drawback of the decomposition presented above is that partitioning the population in different ways does not help us to isolate the contribution of each characteristic while fixing the others. An alternative approach proposed by Fields (2002) is based on a model that considers simultaneously the impact of several given characteristics on earnings. Therefore, it allows us to distinguish the contributions of each characteristic.

The starting point is an ordinary wage equation in which log wages are regressed on a set of explanatory variables. The estimated coefficients will capture the impact of various individual characteristics on wages. The measured dispersion of earnings can be presented in terms of variances and covariances of explanatory variables. The contribution of each characteristic is given by:

$$S_k = \frac{Cov(\beta_k X_k, Y)}{\sigma^2(Y)} = \frac{\beta_k \sigma(X_k) Corr(X_k, Y)}{\sigma(Y)}, \quad (2)$$

where S_k is the proportion of inequality which is due to the *k*-th explanatory variable, β_k is the estimated coefficient of the *k*-th explanatory variable.

We estimated a separate model for each survey dataset using the following regressors: education (measured both as the highest education level attained — 5 categories — and as years of schooling),

occupation, potential labour market experience (defined as age-years of schooling-6), experience squared, gender, a dummy for full-time employment, size of location, a dummy for employer ownership, a dummy for being in wage arrears, firm size, region (at oblast level) and industry dummies (for 1994–2000). The results of Fields decomposition are provided in Table 9. They are consistent with the results of previous decompositions. Since the wage equation itself explains about 40% of variance in earnings, the largest contribution is that of the residual term, *i.e*. of within-group inequality. The joint explanatory power of regressors has been increasing since 1996 implying the decline of within-group inequality. We classified all the independent variables into four groups: demographic, human capital, job and firm characteristics. Note that there is an interruption in the series. We do not have the data on industry affiliation for the period after 2000. The results should be only considered by sub-periods because part of industry effects can be explained in regressions for the later period by regional, gender, education and firm variables which are correlated with industry affiliation.[12]

Among explanatory variables the largest proportion of wage dispersion (about 15–20%) is explained by demographic variables (gender, marital status, size of location and region). Gender gap and regional characteristics are the most important determinants of wage inequality among demographic characteristics. Size of location was included into equation as a proxy for the diversity of options at the local labour market. The joint effect of the location size and regional dummies is around 10–15% suggesting high regional polarization in Russia.

Nearly equivalent is the contribution of firm characteristics with industry affiliation of employer playing the leading role. Ownership type is marginally important, but its influence has been steadily growing since 1996. Differentiation of firm size for most of the period explained less than 1% of inequality. Well renowned from the Soviet times advantages of employment at large-size enterprises have been blurred out in the course of transition. Theoretically, several sources of the industry and sector wage differentials are possible: unequal incidence of rent sharing between managers and workers across industries and sectors; increased productivity due to restructuring; self-selection of workers into certain industries and private firms. The evidence on these issues is limited and we do not have firm characteristics in the data set. The RLMS also does not allow distinguishing clearly between pure private and privatized firms.

Human capital characteristics (education, occupation, experience) explain about 6–10% of wage variation and their contribution increased sharply after the crisis. Education has been less important in explaining inequality than occupation. The impact of education is driven by changes in the higher education premium. Experience has been of minor importance but rose a little after 1998.

Job characteristics (wage arrears and working time) explain about 4–6% of wage dispersion. Contribution of wage arrears is greater in the periods when smaller number of workers were affected

[12] To qualify our results for the period before 2001 we estimated regressions for 1994–2000 without industry dummies. As expected it led to a considerable increase of within-group inequality (by 6 percentage points on average). Contributions of region, gender and ownership increased as well (by 1–2 percentage points, respectively).

by the problem. When the problem became common and covered majority of workers its effect faded.

5.2. Quantile regression

In the OLS regression used in the Fields decomposition as much as nearly two-thirds of earnings inequality could not be explained by the independent variables. Large error term comes from two sources: (1) unobservable characteristics; (2) returns to observable characteristics may differ at different points of the distribution. The unobserved determinants of earnings are clearly important and deserve investigation. Quantile regression analysis might be able to provide some answers: it can be used to compare the earnings function at different points in the conditional wage distribution (Buchinsky, 1994). Quantiles are defined in terms of the conditional wage distribution, where $0<q<1$ is the quantile (percentage from the bottom) of interest. The regression is obtained by minimizing the sum of the absolute deviations of the equation residuals weighted according to q. This requires the proportion q of error terms are negative and $(1–q)$ are positive. The error term represents measurement error, or chance, or unobserved individual characteristics, or unobserved firm or location characteristics that affect the wage. Quantile differences in coefficients on an explanatory variable may therefore reveal a relationship between it and unobserved characteristics. Technically quantile regressions are also advantageous because they are less sensitive to outliers than the OLS regressions.

Quantile regressions are estimated for $q = 0.1, 0.25, 0.5, 0.75, 0.9$. The model estimated is of Mincer type liner in education. The explanatory variables included are: education (measured in years), potential labour market experience, experience squared, gender, a dummy for full-time employment, a dummy for being rural resident, a dummy for employer ownership, a dummy for being in wage arrears, and region dummies. Each quantile regression is estimated for each sample year from 1994 to 2003.

Returns to education. The estimated returns to a year of education at the five quantiles are depicted in Fig. 9.1. The most striking result is that returns to education at each quantile changes in a very similar manner. They demonstrated nearly linear growth until 1998 and flattened later on. Furthermore, the returns to education tended to converge at the level of about 8–9% of wage increase for additional year of education. It can be interpreted that unobserved personal characteristics have no association with education and different employers place the same value on education. It seems to contradict the normal expectation that the coefficient on education should be greater at higher quantiles, *i.e.* more able workers have more schooling. However, the contradiction is solved if look at the changes over time. Returns tended to increase somewhat faster at higher quantiles. This trend can reflect a growing importance of schooling for employers as a mechanism signalling about individual's abilities.

Year-to-year fluctuations are higher at the extreme quantiles and smaller at the middle quantiles. This can be attributed to sampling variation.

Figs 9.2 and 9.3 depict evolution of schooling premium in the private and state sector. Returns to schooling are very similar in both sectors. At the same time we see that there has been much less variation in rates of returns across quantiles of the private sector distribution since 2001. Employers in the private sector price skills acquired through education more equally along the wage distribution. In the state sector returns are higher at lower quantiles. State sector pay systems continue favouring low-skilled workers.

Returns to experience. Returns to experience — the derivative of the conditional quantile of log wages — are given by $\beta_2 + 2\times\beta_3\times Exp$, where β_2 and β_3 are the coefficients of experience and experience squared, respectively. Because of non-linearity, returns to experience need to be evaluated at some specified levels of experience. Three points were chosen: 5 years of experience, representing new entrants to the labour market; 15 years of experience, representing prime-age workers, and 25 years of experience, representing experienced workers. The results are graphed in Figs 10.1–10.3.

A comparison of Figs 10.1–10.3 shows very different returns to the three experience groups. The returns are the highest in all years for the new entrants and the smallest — for the most experienced workers. For the experienced workers returns have turned to negative since 2000 probably reflecting depreciation of their human capital or employer discrimination towards elder workers. Moreover, over time at each quantile the returns are smoother for more experienced workers than for new entrants. Convergence trends for each experience groups are even more pronounced than in the case with returns to education.

There is no any particular ordering of quantile lines for any experience group. For new entrants and prime-age workers returns tended to fell up to 1996, then increased in 1998–2000 to start a new period of decline in 2001. For experienced workers returns stayed relatively stable in 1995–1998 and dropped sharply in 2000. Financial crisis and economic growth brought greater benefits to the new entrants and prime-age workers in the upper part of the wage distribution.

State-private sector differential. Fig. 11 presents the results of quantile regression estimates of the state-private sector wage differentials.[13] As it is drawn sector wage differential is a penalty for working in the state sector.

At the start of the privatization campaign in 1994 sector wage differentials were remarkably similar across quantiles of the wage distribution and equal to about 20%. For later years premiums for taking jobs in the private sector demonstrated joint and nearly monotonic increase across the quantiles until 2000. The private-state gap increased by further 10 percentage points over this period. In 2001–2002 the gap slightly narrowed but these movements do not appear to constitute a sustained trend.

[13] Since at the left-hand side of our equation we have log wages, differentials for dummy variables (such as sector) were computed as $(e^D-1)\times 100\%$ where D is the coefficient of the dummy variable (Halvorsen and Palmquist, 1980).

These results are generally consistent with findings reported in Brainerd (2002). She estimated private sector wage differentials by the deciles of the wage distribution in Russia for 1993–1998 and reported increasing returns to private sector employment along the wage distribution. Applying her hypotheses about the causes of the private sector wage differentials, our results may have the following interpretation. Constant wage premiums in 1994–1998 are in line with the rent-sharing explanation reflecting the well-established fact that wage-setting behaviour in privatised firms hardly changed after privatisation. Rising wage premium in 2000 may reflect the start of restructuring and the growth of managers' concern about attracting more productive workers by relating wages closer to firm and individual performance.

6. CONCLUSIONS

The paper documents the changes in the size of the wage distribution in Russia over the period 1994–2003. This period does not include the first two years of transition to a market economy, but it covers few years of transformational recession (1994–1998), financial crisis in 1998 and the first years of economic recovery (2000–2003). In our opinion it is particularly important to analyse what happened in Russia because this country is known to have the largest increase in wage inequality in the aftermath of the 'big-bang' reforms.

We do not find any single trend in the evolution of wage inequality over the whole period. Developments varied a lot by sub-periods. More specifically, overall wage inequality stayed stable in 1994–1996, then it jumped following the 1998 crisis and remained at higher levels for three years. In 2002 the trend reversed again and in the course of a single year wage inequality fell back to the level of the mid-1990s.

We find that evolution wage inequality was largely driven by changes in the upper end of the wage distribution. Over the whole period the lower half of the distribution has been constantly, albeit slowly, shrinking. In the upper half inequality expanded in 1994–2000 and then started to decline. Economic growth favoured the lower part of the wage distribution narrowing the distance between the extremes of the distribution.

We also conducted a detailed examination of the sources of changes in wage inequality. Decomposition of wage inequality by population sub-groups shows that inequality has been higher for men, younger and low-educated workers, and rural inhabitants. The structure of inequality did not change much over the period from 1994 to 2003. Demographic variables (mainly gender and region) explain the largest proportion of wage dispersion (over 40% of the explained variation and 15% of total variation). Nearly equivalent is the contribution of firm characteristics with industry affiliation of employer playing the leading role. Employer ownership is only marginally important, but its effect has been steadily growing due to increase in the state-private sector gap. Differentiation of firm size for most of the period explained less than 1% of inequality. Well renowned from the Soviet times advantages of employment at large-size enterprises have been blurred out in the course of transition. Human capital characteristics (education, occupation) explain about 8% of total variation

(about 20% of explained variation) and their contribution tended to rise in the aftermath of the 1998 crisis.

Transition to a market economy triggered substantial shifts in industrial composition of employment and industrial wage structure. For the 1994–2000 period changes in relative mean wages across industries were the main driving force of rising inequality. 70% of overall increase in variance is due to increase in the industry wage differentials, 48% is attributable to increase in variance within industries. Employment shifted toward the industries with average wages closer to the mean. It indicates that high-wage industries were more effective in combating labour hoarding and attracting high-productivity workers. Increasing wages in turn lowered demand for labour in such industries.

Contrary to the initial expectations wage inequality in the state sector was different from that in the private sector: both were of a similar level and followed similar patterns of changes. For the 1994–2003 period within inequality substantially declined in both sectors. This was offset by the rising gap in mean wages between the sectors. State workers experienced slower growth of real wages in all percentiles. Within-group composition effect is not large, but positive implying that reallocation of workers from the state sector to the private sector (with larger variance and larger mean wages), while being of some importance, was not the major driving force of wage inequality in Russia. Similarities in changes in wage inequality within sectors may be an indication of problems in the Russian private sector. Privatization has not generated active restructuring or changes in wage-setting behaviour at privatized firms.

Our results show that returns to education continued to rise at all percentiles of the wage distribution converging at the level of about 8–9% of wage increase for an additional year of schooling. This leads to growing importance of schooling in determining wages in the state and the private sector. Employers in the private sector price skills acquired through education more equally along the wage distribution. In the state sector returns are higher at lower quantiles. State sector pay systems continue favouring low-skilled workers.

Our results show that in spite of macroeconomic instability differences in wages were permanent rather than temporary — differences in individual earnings are not smoothed over the life cycle. Persistence of high pay differentials has important policy implications. Since low pay is a not transitory experience in the beginning of working career rather individuals are trapped in a low pay from one period to the next, measures aimed to reduce labour market poverty should be brought to the top policy agenda.

APPENDICES

A1. Tables

Table 1. Changes in wage inequality in transition countries: Gini coefficient

Country	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
CEE countries														
Czech Republic	0.204		0.212	0.214	0.258	0.260	0.282	0.254	0.259	0.258	0.257	0.270	0.272	0.273
Hungary	0.268	0.293		0.305	0.320	0.324			0.350				0.386	
Poland	0.207		0.239	0.247	0.256	0.281	0.290	0.302	0.300	0.294	0.305			
Slovenia	0.219	0.232	0.273	0.260	0.276	0.275	0.358	0.298	0.307	0.306	0.305	0.306	0.310	0.307
Bulgaria		0.212	0.262		0.251			0.291						
Romania	0.155		0.204		0.226	0.277	0.287	0.305	0.352	0.358	0.372	0.406	0.388	0.391
FYR Macedonia		0.223	0.267	0.235	0.272	0.253	0.270	0.250	0.259	0.271	0.277	0.277	0.286	0.282
Baltic countries														
Estonia	0.253								0.336	0.384	0.401	0.376	0.388	
Latvia	0.244		0.247	0.333	0.283	0.325	0.346	0.349	0.336	0.332	0.333	0.337	0.322	0.328
Lithuania	0.260			0.372		0.390	0.374	0.350	0.345	0.357	0.368		0.382	0.390
CIS countries														
Belarus	0.234			0.341	0.399		0.373	0.356	0.354	0.351	0.337	0.337	0.343	0.342
Moldova	0.250			0.411	0.437	0.379	0.390	0.414		0.426	0.441	0.392	0.391	0.426
Russia	0.271	0.269	0.324	0.371	0.461	0.446	0.471	0.483					0.521	0.491
Ukraine	0.244			0.251	0.364			0.413	0.406	0.391	0.427	0.462	0.452	0.418
Armenia	0.258		0.296	0.355	0.366	0.321	0.381					0.486		
Azerbaijan	0.275			0.361		0.428	0.459	0.458	0.462	0.462		0.506	0.501	0.508
Georgia	0.301			0.369	0.400				0.498					
Kyrgyzstan	0.260			0.300	0.445	0.443	0.395	0.428	0.431	0.429	0.466	0.470	0.512	0.490
Turkmenistan	0.255								0.249	0.209	0.265			

Source: TransMONEE — 2004 Database.

Table 2. Summary statistics for all waves of the RLMS

	1994	1995	1996	1998	2000	2001	2002	2003
Average age	37.9	37.8	37.8	38.0	37.7	37.5	37.5	37.5
Sex (% of females)	49.4	48.2	50.3	51.8	51.5	52.1	51.9	51.7
Location (% of rural)	20.9	19.8	20.6	20.1	22.0	20.6	21.6	21.5
Incidence of wage arrears (%)	38.5	39.9	58.5	61.5	25.9	21.7	20.2	16.2
Aver. contractual wage, Nov.1994 rbls/1000	209.3	207.3	236.2	158.2	175.0	219.6	238.6	261.0
Aver. actual wage, Nov.1994 rbls/1000	227.9	220.8	257.7	170.4	187.0	229.3	248.6	269.4
Aver. total compensation, Nov.1994 rbls/1000	212.2	210.4	241.0	161.3	177.4	219.3	239.0	261.2
Average hours worked	161.1	167.5	168.5	164.2	172.6	170.1	170.2	170.7
Full-time workers (%)	72.8	74.4	72.5	71.8	75.5	77.2	78.3	76.6
Education								
Primary	1.0	0.7	0.7	0.5	0.4	0.3	0.3	0.4
Incomplete secondary	13.8	12.8	11.7	10.5	10.2	10.1	9.4	9.9
Complete secondary	37.2	39.2	39.3	38.8	40.4	40.7	40.4	40.3
Technical college	26.2	26.1	26.6	28.3	27.5	26.1	26.9	25.9
University	21.8	21.2	21.7	21.8	21.5	23.0	23.0	23.5
Region								
Moscow and St-Petersburg	11.0	9.9	9.8	7.8	5.4	13.7	15.7	14.9
Northern & North-Western	7.7	7.9	7.6	7.9	7.4	7.2	6.6	6.8
Central & Central-Black Earth	18.1	18.2	18.9	20.0	20.4	18.5	18.3	18.2
Volga	17.7	17.4	16.9	18.5	18.5	17.4	18.4	17.8
Ural	11.8	11.4	11.7	10.3	10.5	9.7	9.7	9.9
North Caucasian	15.6	16.5	16.4	17.1	17.4	15.6	14.9	16.2
Western Siberia	9.5	9.2	9.7	8.9	10.0	8.4	7.6	6.7
Eastern Siberia & Far East	8.7	9.5	8.9	9.6	10.5	9.5	8.8	9.6
Number of obs.	3478	3166	3045	2982	3251	3675	3952	3984

Table 3. Wage distribution in the sample (total compensation, 1994–2003)

	Average wage	90/10	90/50	50/10	75/25	GE(–1)	GE(0)	GE(1)	GE(2)	Gini	N
All workers											
1994	212.2	8.6	2.7	3.2	3.1	0.469	0.315	0.294	0.373	0.417	3478
1995	210.4	8.0	2.6	3.1	3.0	0.445	0.313	0.309	0.432	0.420	3167
1996	241.0	8.1	2.6	3.1	3.1	0.470	0.315	0.299	0.395	0.418	3048
1998	161.3	8.3	2.7	3.1	2.9	0.458	0.327	0.331	0.511	0.430	2982
2000	177.4	8.6	2.9	3.0	3.3	0.509	0.365	0.372	0.558	0.457	3255
2001	219.3	8.3	2.8	3.0	3.0	0.496	0.356	0.371	0.578	0.450	3680
2002	239.0	6.9	2.4	2.8	2.7	0.408	0.287	0.281	0.375	0.402	3952
2003	261.2	7.6	2.5	3.0	2.9	0.443	0.300	0.283	0.358	0.408	3984
Sex: Males											
1994	256.5	8.5	2.5	3.4	3.2	0.481	0.309	0.279	0.344	0.408	1759
1995	252.3	7.8	2.4	3.2	2.9	0.447	0.305	0.293	0.391	0.411	1640
1996	290.2	8.5	2.4	3.6	3.0	0.491	0.312	0.287	0.371	0.409	1514
1998	196.6	8.6	2.5	3.5	2.9	0.510	0.339	0.335	0.518	0.430	1438
2000	217.0	9.2	2.7	3.4	3.3	0.543	0.366	0.363	0.530	0.451	1579
2001	271.3	8.9	2.7	3.3	2.9	0.564	0.371	0.374	0.564	0.453	1765
2002	288.4	7.2	2.4	3.0	2.7	0.420	0.283	0.271	0.354	0.395	1903
2003	312.8	7.1	2.3	3.1	2.8	0.436	0.280	0.256	0.311	0.389	1926
Sex: Females											
1994	167.0	7.1	2.3	3.0	2.8	0.390	0.274	0.258	0.318	0.392	1719
1995	165.5	7.2	2.5	2.9	2.7	0.374	0.277	0.278	0.402	0.397	1527
1996	192.4	7.1	2.5	2.9	2.8	0.390	0.276	0.264	0.334	0.395	1534
1998	128.5	6.9	2.5	2.7	2.7	0.359	0.272	0.271	0.357	0.398	1544
2000	140.2	7.5	2.9	2.6	2.9	0.413	0.318	0.328	0.467	0.432	1676
2001	171.4	6.6	2.5	2.7	2.8	0.376	0.290	0.302	0.435	0.412	1915
2002	193.2	6.2	2.4	2.6	2.5	0.343	0.253	0.247	0.316	0.380	2049
2003	212.8	6.9	2.5	2.8	2.7	0.391	0.282	0.276	0.363	0.400	2058

	Average wage	90/10	90/50	50/10	75/25	GE(–1)	GE(0)	GE(1)	GE(2)	Gini	N
Education: Primary and incomplete secondary											
1994	184.7	9.1	3.0	3.0	3.0	0.475	0.345	0.359	0.589	0.443	499
1995	183.3	8.0	2.8	2.9	3.3	0.481	0.360	0.381	0.612	0.456	414
1996	199.7	8.1	2.8	2.9	3.0	0.508	0.349	0.344	0.486	0.443	365
1998	123.5	8.1	2.7	3.0	3.5	0.461	0.341	0.353	0.571	0.440	305
2000	131.9	9.2	3.1	2.9	3.4	0.506	0.383	0.418	0.747	0.471	316
2001	157.1	7.7	2.5	3.0	3.4	0.443	0.319	0.309	0.404	0.425	346
2002	184.2	7.8	2.4	3.2	2.9	0.429	0.295	0.278	0.356	0.403	381
2003	195.6	8.3	2.6	3.2	3.4	0.406	0.286	0.262	0.305	0.400	408
Education: Secondary											
1994	200.3	9.3	2.7	3.4	3.2	0.485	0.328	0.309	0.401	0.426	1303
1995	196.1	8.2	2.6	3.2	3.0	0.453	0.314	0.304	0.410	0.419	1251
1996	228.7	8.3	2.6	3.2	3.0	0.474	0.325	0.318	0.465	0.425	1199
1998	145.8	8.8	2.7	3.2	3.2	0.461	0.317	0.294	0.359	0.420	1168
2000	173.8	9.4	3.1	3.0	3.4	0.549	0.391	0.403	0.625	0.473	1327
2001	208.6	8.6	2.8	3.1	3.2	0.523	0.375	0.398	0.658	0.462	1497
2002	217.6	6.9	2.4	2.8	2.8	0.392	0.279	0.267	0.338	0.397	1594
2003	238.8	8.0	2.5	3.2	3.1	0.451	0.302	0.275	0.324	0.408	1607
Education: Technical college											
1994	200.1	7.3	2.5	2.9	2.9	0.401	0.272	0.247	0.283	0.389	911
1995	206.7	6.9	2.7	2.6	2.8	0.414	0.300	0.307	0.456	0.414	828
1996	234.6	7.3	2.5	2.9	2.8	0.384	0.276	0.264	0.324	0.397	815
1998	161.1	7.0	2.7	2.6	2.6	0.406	0.318	0.354	0.634	0.431	852
2000	160.8	7.5	2.8	2.7	3.0	0.429	0.324	0.337	0.509	0.434	905
2001	200.5	7.0	2.7	2.6	2.7	0.415	0.309	0.318	0.454	0.423	977
2002	222.2	6.5	2.5	2.6	2.5	0.347	0.250	0.237	0.285	0.377	1061
2003	250.0	6.7	2.4	2.8	2.8	0.402	0.285	0.280	0.378	0.401	1031

	Average wage	90/10	90/50	50/10	75/25	GE(–1)	GE(0)	GE(1)	GE(2)	Gini	N
Education: University											
1994	265.5	7.4	2.5	3.0	2.9	0.454	0.288	0.257	0.296	0.394	754
1995	258.0	6.4	2.3	2.7	2.7	0.370	0.267	0.260	0.339	0.390	670
1996	294.3	8.2	2.4	3.4	2.7	0.485	0.293	0.261	0.308	0.394	666
1998	207.4	6.5	2.5	2.6	2.7	0.395	0.291	0.301	0.461	0.408	654
2000	225.8	7.5	2.6	2.9	2.9	0.414	0.304	0.304	0.410	0.419	707
2001	283.9	7.0	2.6	2.7	2.8	0.440	0.325	0.343	0.513	0.434	853
2002	318.8	6.2	2.6	2.4	2.5	0.373	0.275	0.280	0.384	0.398	909
2003	340.3	6.1	2.4	2.5	2.5	0.358	0.256	0.249	0.316	0.381	938
Age: 16–30											
1994	207.1	9.9	2.8	3.5	3.2	0.511	0.342	0.320	0.403	0.436	868
1995	199.6	8.6	2.8	3.1	2.9	0.465	0.333	0.338	0.497	0.435	813
1996	235.3	8.5	2.8	3.1	3.4	0.491	0.331	0.317	0.425	0.429	785
1998	148.1	8.4	2.8	3.0	3.2	0.438	0.320	0.318	0.442	0.429	795
2000	159.3	7.7	2.8	2.8	3.3	0.478	0.359	0.382	0.614	0.456	956
2001	209.8	8.8	2.9	3.0	2.9	0.500	0.359	0.370	0.552	0.453	1109
2002	226.9	6.5	2.4	2.7	2.5	0.393	0.280	0.277	0.370	0.398	1233
2003	248.6	7.2	2.3	3.1	2.9	0.412	0.278	0.255	0.303	0.391	1232
Age: 30–45											
1994	216.6	8.6	2.7	3.2	3.3	0.481	0.319	0.298	0.386	0.419	1759
1995	212.7	7.8	2.6	3.0	3.0	0.446	0.306	0.293	0.382	0.413	1576
1996	242.0	8.3	2.6	3.2	3.0	0.474	0.319	0.305	0.417	0.420	1532
1998	165.2	8.6	2.7	3.2	3.0	0.475	0.336	0.347	0.580	0.434	1442
2000	190.7	8.7	2.9	3.0	3.4	0.538	0.378	0.379	0.556	0.464	1453
2001	231.3	8.3	2.7	3.0	3.1	0.524	0.370	0.385	0.611	0.458	1606
2002	251.6	7.4	2.5	3.0	2.8	0.432	0.299	0.289	0.383	0.409	1655
2003	270.5	7.9	2.6	3.0	3.1	0.460	0.312	0.296	0.382	0.417	1664

	Average wage	90/10	90/50	50/10	75/25	GE(–1)	GE(0)	GE(1)	GE(2)	Gini	N
Age: 45+											
1994	208.3	7.6	2.5	3.1	2.9	0.401	0.276	0.257	0.313	0.392	851
1995	217.0	7.4	2.6	2.9	2.9	0.416	0.305	0.313	0.469	0.416	778
1996	244.9	7.2	2.5	2.9	3.0	0.437	0.289	0.266	0.319	0.399	731
1998	168.0	7.9	2.6	3.1	2.6	0.437	0.311	0.310	0.428	0.419	745
2000	175.1	8.5	2.7	3.2	3.1	0.479	0.339	0.338	0.486	0.437	846
2001	210.3	7.4	2.6	2.9	2.8	0.442	0.324	0.339	0.532	0.430	965
2002	233.5	6.7	2.4	2.8	2.6	0.384	0.274	0.269	0.359	0.393	1064
2003	261.2	7.3	2.4	3.1	2.8	0.448	0.303	0.289	0.372	0.410	1088
Location: Urban											
1994	233.6	7.7	2.5	3.0	2.8	0.432	0.287	0.267	0.334	0.397	2750
1995	227.7	6.6	2.4	2.7	2.7	0.402	0.289	0.289	0.403	0.405	2541
1996	262.7	7.2	2.4	3.0	2.8	0.417	0.286	0.275	0.362	0.400	2418
1998	177.4	7.5	2.5	3.0	2.8	0.423	0.304	0.309	0.472	0.415	2383
2000	193.3	7.8	2.7	2.9	3.1	0.452	0.328	0.332	0.483	0.433	2538
2001	242.3	7.3	2.6	2.8	2.8	0.450	0.328	0.344	0.527	0.433	2922
2002	262.5	6.3	2.3	2.7	2.5	0.359	0.260	0.259	0.344	0.385	3098
2003	287.0	6.7	2.4	2.8	2.6	0.381	0.266	0.254	0.320	0.386	3129
Location: Rural											
1994	131.3	6.8	2.8	2.5	2.9	0.387	0.302	0.310	0.429	0.422	728
1995	140.3	8.7	3.0	2.9	3.1	0.431	0.326	0.328	0.455	0.436	626
1996	157.6	8.8	3.0	2.9	3.3	0.457	0.331	0.325	0.431	0.436	630
1998	97.5	6.8	2.4	2.8	2.8	0.365	0.292	0.311	0.475	0.414	599
2000	121.1	7.8	3.4	2.3	3.0	0.516	0.419	0.495	0.940	0.499	717
2001	130.9	7.1	2.8	2.6	2.8	0.408	0.329	0.367	0.628	0.441	758
2002	153.8	7.7	2.7	2.9	2.7	0.377	0.284	0.280	0.354	0.407	854
2003	166.8	8.0	2.9	2.8	3.0	0.431	0.320	0.319	0.423	0.431	855

	Average wage	90/10	90/50	50/10	75/25	GE(–1)	GE(0)	GE(1)	GE(2)	Gini	N
Employer ownership: State											
1994	195.2	8.5	2.7	3.1	3.0	0.452	0.309	0.290	0.360	0.416	2559
1995	184.0	7.7	2.5	3.0	3.0	0.410	0.290	0.275	0.347	0.404	2040
1996	214.0	7.9	2.5	3.1	3.1	0.432	0.296	0.274	0.327	0.407	1901
1998	140.2	7.8	2.6	2.9	2.9	0.411	0.303	0.304	0.441	0.416	1805
2000	144.0	7.8	2.8	2.8	3.2	0.457	0.344	0.361	0.578	0.446	1820
2001	174.7	7.1	2.5	2.8	2.9	0.432	0.327	0.355	0.600	0.434	1836
2002	197.0	6.7	2.3	2.9	2.6	0.359	0.260	0.252	0.326	0.383	1905
2003	205.1	7.5	2.5	3.0	2.8	0.388	0.272	0.254	0.306	0.390	1794
Employer ownership: Private											
1994	259.8	8.2	2.4	3.4	2.9	0.462	0.297	0.275	0.354	0.400	919
1995	258.2	7.1	2.6	2.8	2.8	0.448	0.319	0.322	0.460	0.426	1127
1996	285.8	7.8	2.5	3.1	2.9	0.492	0.320	0.307	0.423	0.418	1147
1998	193.8	7.9	2.5	3.1	2.9	0.484	0.332	0.334	0.520	0.430	1177
2000	219.8	8.1	2.7	3.0	3.1	0.482	0.342	0.341	0.476	0.441	1435
2001	263.8	7.8	2.6	3.0	2.9	0.490	0.342	0.346	0.507	0.439	1844
2002	278.2	7.1	2.4	2.9	2.8	0.411	0.285	0.276	0.362	0.399	2047
2003	307.1	7.1	2.4	3.0	2.8	0.427	0.286	0.269	0.335	0.398	2190

Notes: In 1994 rubles/1000.

Table 4. Inequality of permanent and transitory components

	90/10	90/50	50/10	75/25	GE(–1)	GE(0)	GE(1)	GE(2)	Gini
Permanent wages									
1994–2003	6.2	2.4	2.5	2.7	0.323	0.251	0.250	0.317	0.384
Transitory wages									
1994	3.8	1.9	2.0	2.0	0.198	0.151	0.148	0.175	0.293
1995	3.5	1.8	1.9	1.9	0.163	0.138	0.141	0.174	0.283
1996	3.4	1.8	2.0	1.8	0.159	0.127	0.125	0.148	0.268
1998	3.2	1.7	1.9	1.7	0.145	0.118	0.116	0.137	0.257
2000	3.2	1.8	1.8	1.8	0.137	0.117	0.121	0.159	0.259
2001	3.0	1.7	1.8	1.7	0.126	0.107	0.108	0.126	0.248
2002	2.8	1.7	1.7	1.6	0.112	0.094	0.093	0.105	0.231
2003	3.0	1.7	1.8	1.7	0.132	0.105	0.100	0.109	0.244

Table 5. Effects of changes in regional costs of living

	Average wage	90/10	90/50	50/10	75/25	GE(–1)	GE(0)	GE(1)	GE(2)	Gini
Fixed costs of living										
1994	212.2	8.6	2.7	3.2	3.1	0.469	0.315	0.294	0.373	0.417
1995	205.8	8.0	2.6	3.1	3.0	0.453	0.318	0.314	0.437	0.424
1996	226.9	7.9	2.6	3.1	3.0	0.467	0.318	0.305	0.409	0.421
1998	148.3	7.9	2.6	3.0	2.9	0.427	0.313	0.319	0.492	0.422
2000	175.7	8.6	2.8	3.0	3.2	0.491	0.354	0.360	0.534	0.450
2001	221.7	8.5	2.7	3.1	3.0	0.503	0.352	0.356	0.525	0.447
2002	248.0	7.6	2.5	3.0	2.8	0.428	0.297	0.289	0.386	0.409
2003	273.4	8.1	2.6	3.1	3.0	0.481	0.319	0.300	0.385	0.420
Difference (fixed weights values minus actual values)										
1994	0.0	0.0	0.0	0.0	0.0	0.000	0.000	0.000	0.000	0.000
1995	–4.6	0.0	0.0	0.0	0.1	0.008	0.005	0.004	0.005	0.003
1996	–14.1	–0.2	0.0	0.0	0.0	–0.003	0.003	0.006	0.013	0.004
1998	–13.0	–0.4	–0.1	–0.1	0.0	–0.031	–0.014	–0.012	–0.019	–0.008
2000	–1.8	–0.1	0.0	0.0	–0.1	–0.017	–0.011	–0.012	–0.024	–0.006
2001	2.4	0.2	0.0	0.1	0.1	0.007	–0.003	–0.014	–0.053	–0.003
2002	8.9	0.6	0.1	0.2	0.1	0.020	0.010	0.008	0.011	0.006
2003	12.2	0.5	0.1	0.1	0.1	0.038	0.019	0.018	0.027	0.012

Table 6. Gini decomposition

Variable*)		1994		1996		1998		2000		2002**)	
		Value	%	Value	%	Value	%	Value	%	Value	%
Sex	Between	0.105	25	0.101	24	0.106	25	0.108	24	0.099	25
	Overlap	0.110	26	0.115	28	0.118	27	0.128	28	0.110	27
	Within	0.201	48	0.201	48	0.207	48	0.220	48	0.193	48
Location (rural/urban)	Between	0.080	19	0.072	17	0.079	18	0.070	15	0.077	19
	Overlap	0.052	12	0.060	14	0.049	11	0.083	18	0.053	13
	Within	0.285	68	0.286	68	0.301	70	0.303	66	0.272	68

Variable[*)]		1994		1996		1998		2000		2002[**)]	
		Value	%	Value	%	Value	%	Value	%	Value	%
Region	Between	0.077	18	0.083	20	0.078	18	0.110	24	0.084	21
	Overlap	0.285	68	0.280	67	0.293	68	0.285	62	0.263	65
	Within	0.054	13	0.054	13	0.059	14	0.062	14	0.055	14
Age	Between	0.011	3	0.008	2	0.024	6	0.040	9	0.024	6
	Overlap	0.247	59	0.252	60	0.247	57	0.253	55	0.238	59
	Within	0.159	38	0.158	38	0.159	37	0.164	36	0.140	35
Education	Between	0.062	15	0.061	15	0.086	20	0.081	18	0.089	22
	Overlap	0.243	58	0.238	57	0.222	52	0.240	53	0.199	50
	Within	0.113	27	0.118	28	0.122	28	0.136	30	0.115	29
Occupation	Between	0.111	27	0.092	22	0.109	25	0.117	26	0.107	27
	Overlap	0.241	58	0.262	63	0.260	60	0.276	60	0.241	60
	Within	0.066	16	0.064	15	0.062	14	0.064	14	0.055	14
Industry	Between	0.173	41	0.188	45	0.184	43	0.198	43		
	Overlap	0.220	53	0.208	50	0.224	52	0.235	51		
	Within	0.023	6	0.022	5	0.023	5	0.024	5		
Ownership (state/private)	Between	0.059	14	0.070	17	0.079	18	0.105	23	0.085	21
	Overlap	0.117	28	0.137	33	0.138	32	0.132	29	0.120	30
	Within	0.241	58	0.211	50	0.213	50	0.219	48	0.198	49

[*)] Region — 8 categories, age — 3 categories, education — 5 categories, occupation — 10 categories, industry — 24 categories.

[**)] Data on industry affiliation are not available for 2001–2003.

Table 7. Effects of industrial shifts on changes in wage inequality

Years	Total change in variance	Within industry		Between industry	
		Change in variance	Composition effect	Change in wages	Composition effect
1994–2000	0.037	0.018	0.001	0.026	–0.007
1994–1996	–0.008	–0.012	0.001	0.001	0.002
1996–1998	–0.012	–0.011	0.004	0.003	–0.008
1998–2000	0.058	0.034	0.002	0.028	–0.007

Table 8. Effects of sectoral shifts on changes in wage inequality

Years	Total change in variance	Within sector		Between sector	
		Change in variance	Composition effect	Change in wages	Composition effect
1994–2003	–0.036	–0.067	0.010	0.025	–0.004
1994–1996	–0.008	–0.013	0.005	–0.002	0.002
1996–1998	–0.012	–0.018	0.001	0.004	0.000
1998–2000	0.058	0.033	0.001	0.022	0.001
2000–2003	–0.073	–0.070	0.004	–0.004	–0.002

Table 9. Fields decomposition, %

	1994	1995	1996	1998	2000	2001	2002	2003
Sex	4.5	4.5	4.3	3.5	4.0	4.6	5.6	4.9
Marital status	0.2	0.2	0.0	0.2	0.1	0.0	0.2	0.2
Size of location	6.2	11.5	6.7	2.9	2.4	9.6	18.1	25.1
Region	3.8	–1.5	4.7	8.9	10.1	6.0	–5.5	–12.3
Demographic characteristics	14.7	14.8	15.7	15.5	16.6	20.3	18.5	17.9
Education	1.9	2.4	2.1	3.2	3.2	3.6	4.0	4.3
Occupation	4.5	3.3	3.8	4.9	4.3	4.0	4.8	5.6
Experience	0.4	0.4	0.1	0.4	0.8	0.5	0.4	0.5
Human capital characteristics	6.7	6.1	5.9	8.4	8.3	8.0	9.2	10.4
Wage arrears	4.0	3.7	2.3	2.0	3.5	2.6	2.9	3.5
Full/part time	1.3	1.2	1.2	1.8	1.6	1.5	1.4	1.6
Job characteristics	5.3	4.9	3.4	3.8	5.1	4.1	4.3	5.1
Industry	10.4	10.4	11.5	11.3	12.1			
Ownership	0.9	1.4	0.7	1.2	2.4	4.2	3.2	4.5
Firm size	0.9	0.5	0.1	0.2	0.6	0.8	1.0	0.9
Firm characteristics	12.1	12.3	12.3	12.6	15.0	5.0	4.2	5.4
Seasonality	–0.2	0.1	0.0	0.2	0.0	0.7	0.2	0.5
Residual	61.4	61.8	62.7	59.4	55.1	61.8	63.6	60.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

A2. Figures

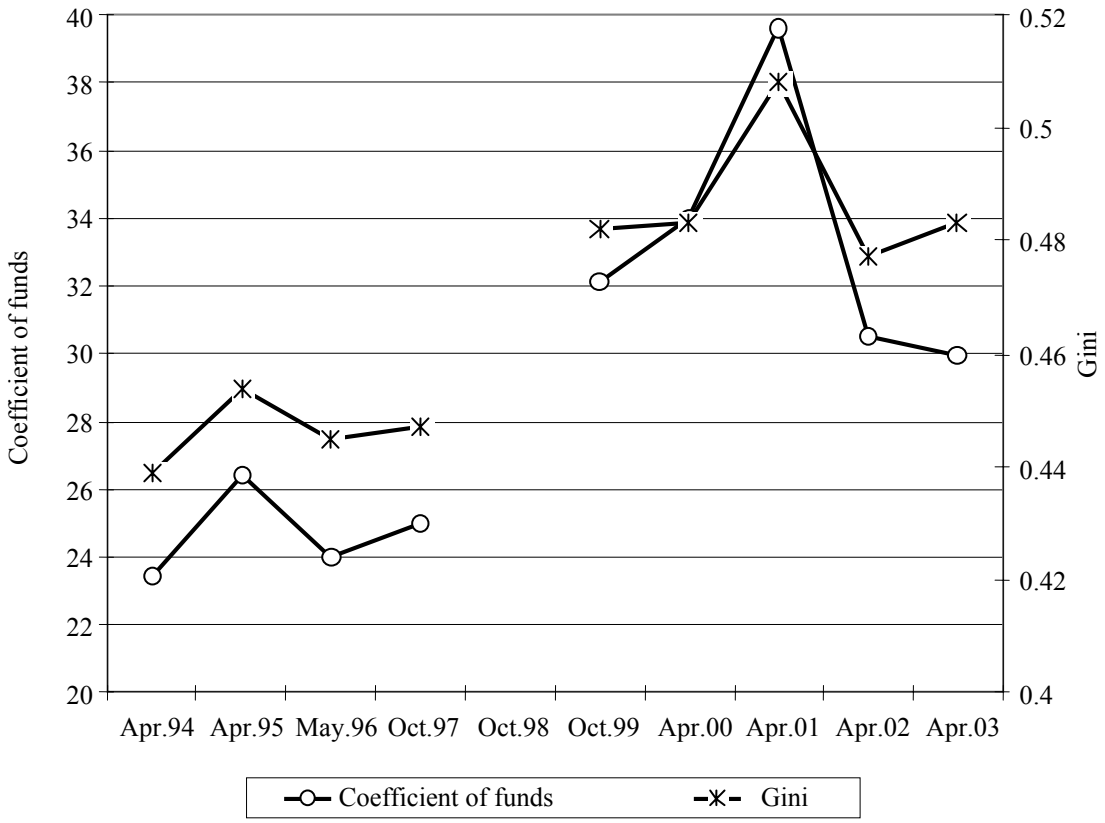

Fig. 1. Goskomstat estimates of wage inequality. From establishment-based survey of wage distribution. The survey was not carried in 1998. *Source*: Goskomstat (1999, 2001, 2003) "Trud i zaniatost' v Rossii"; Goskomstat (2004) "Sotsial'noe polozhenie I uroven' zhizni naseleniya Rossii"

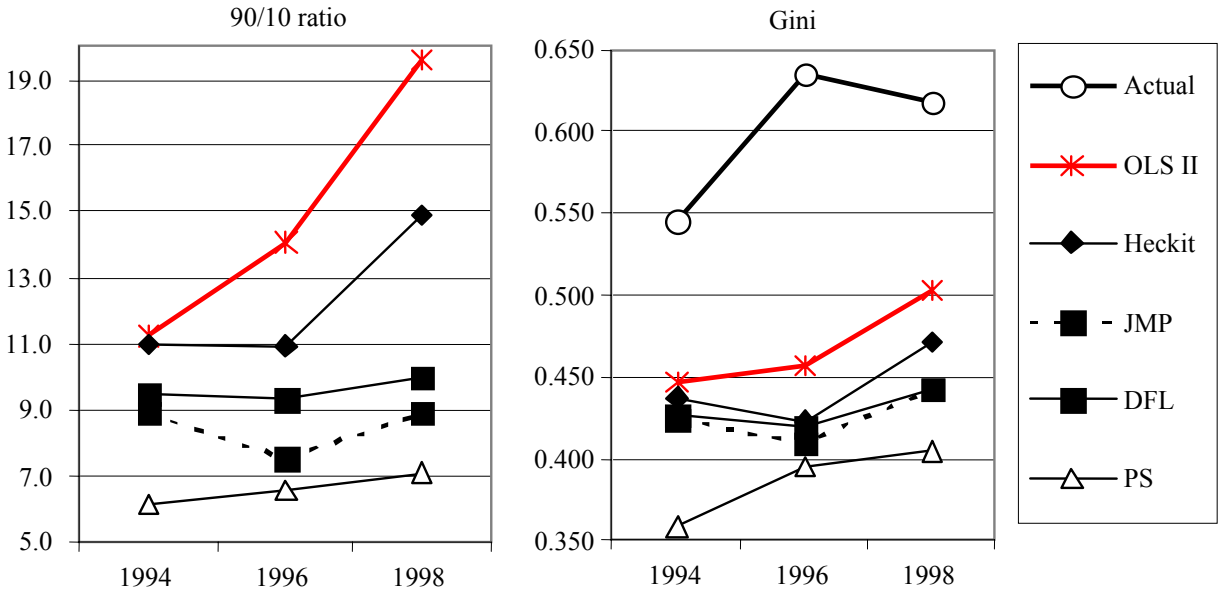

Fig. 2. Inequality measures adjusted for wage arrears — based on L&W (2001). Actual values are not available for the 90/10 ratio because of wage arrears

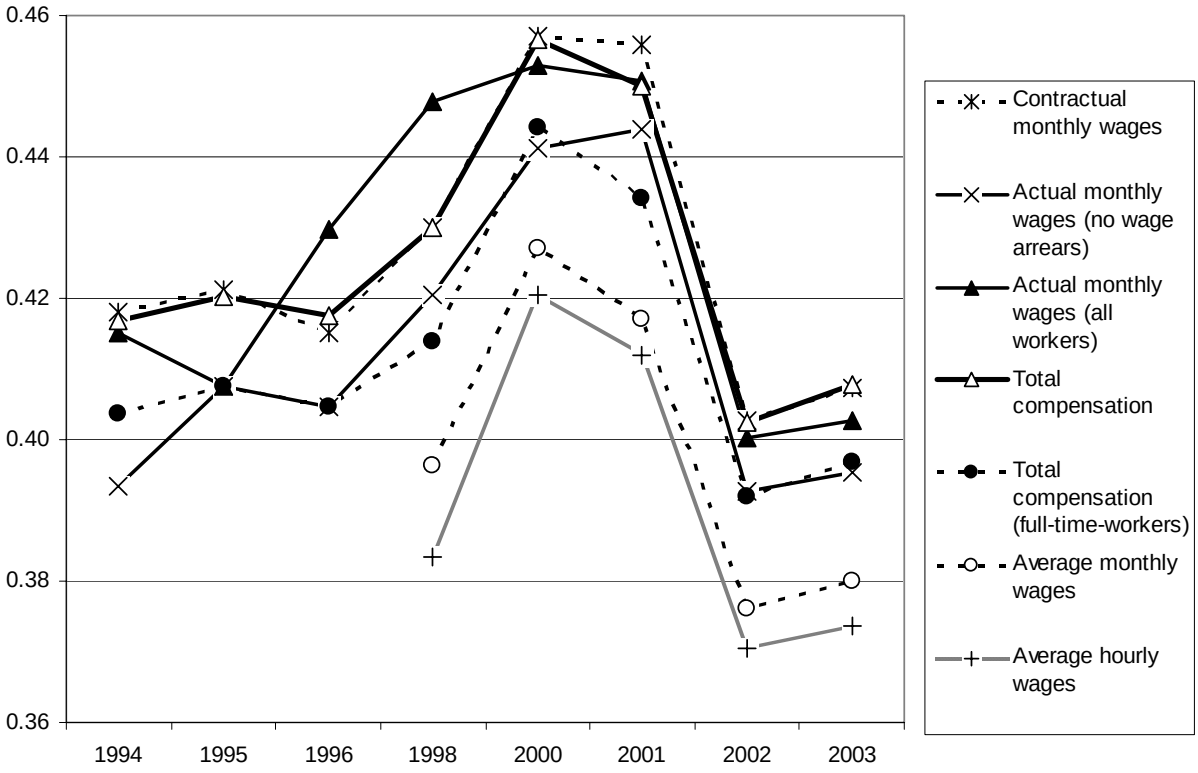

Fig. 3. Dynamics of Gini coefficient under different definitions of earnings

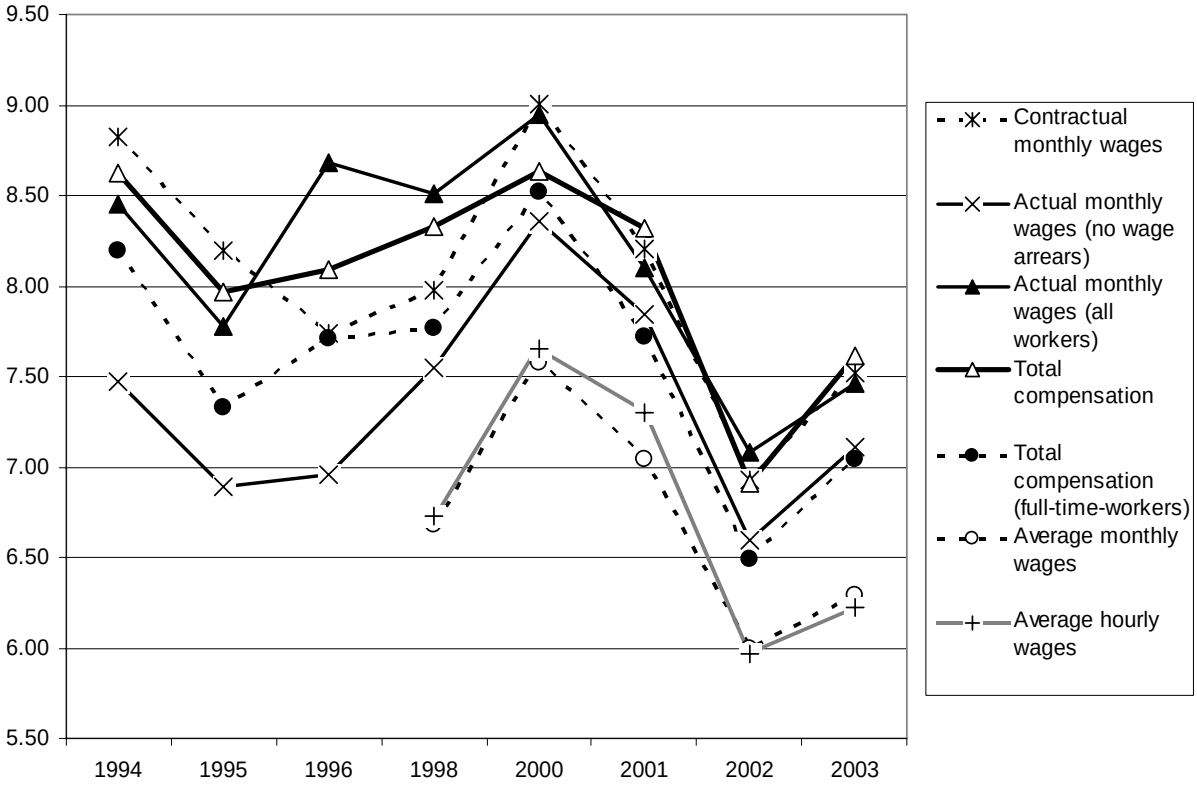

Fig. 4. Dynamics of the 90/10 ratio under different definitions of earnings

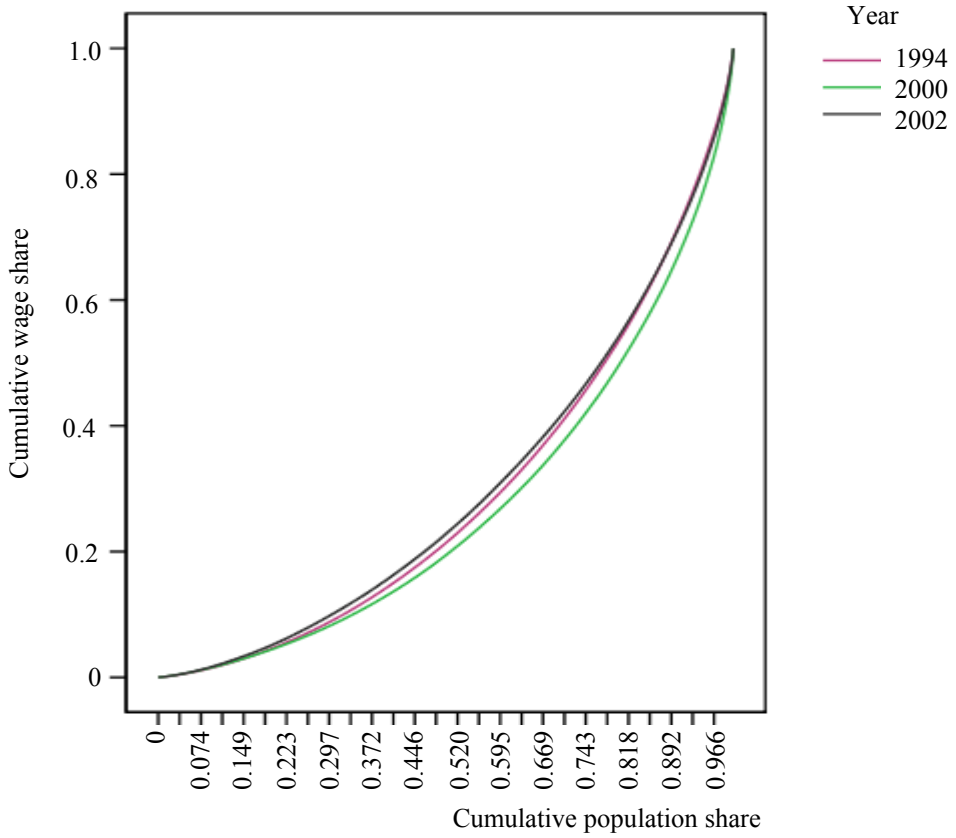

Fig. 5. Lorenz curve

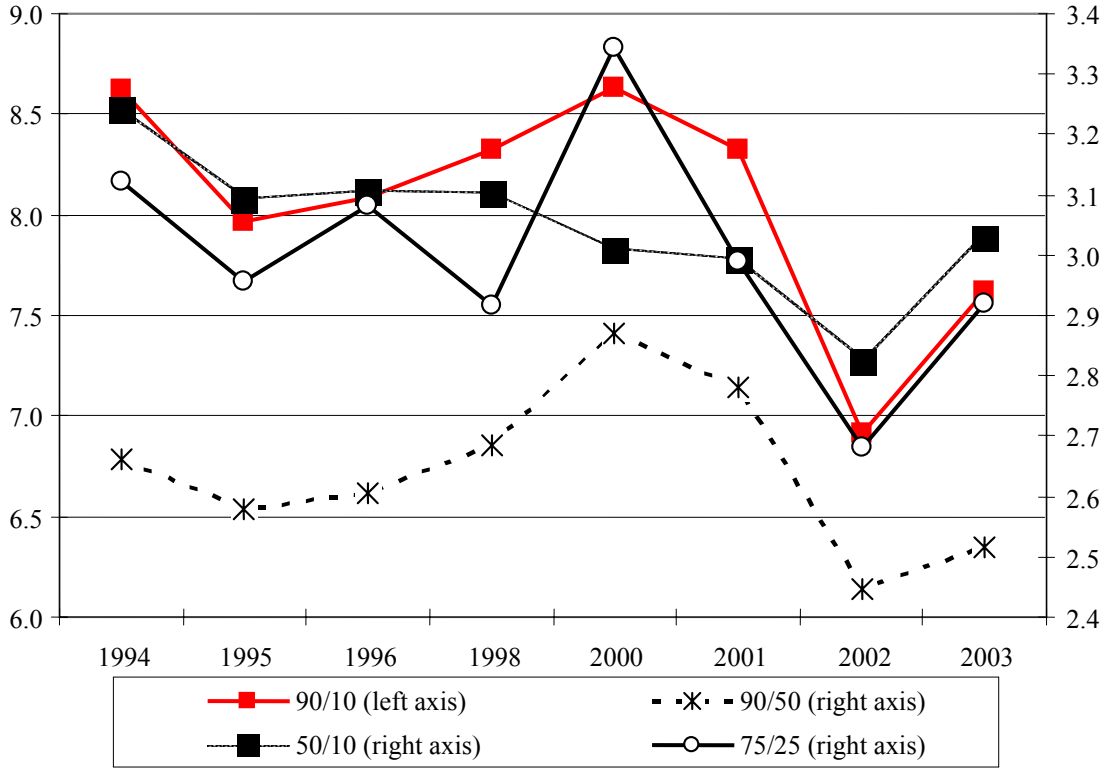

Fig. 6. Percentile ratios

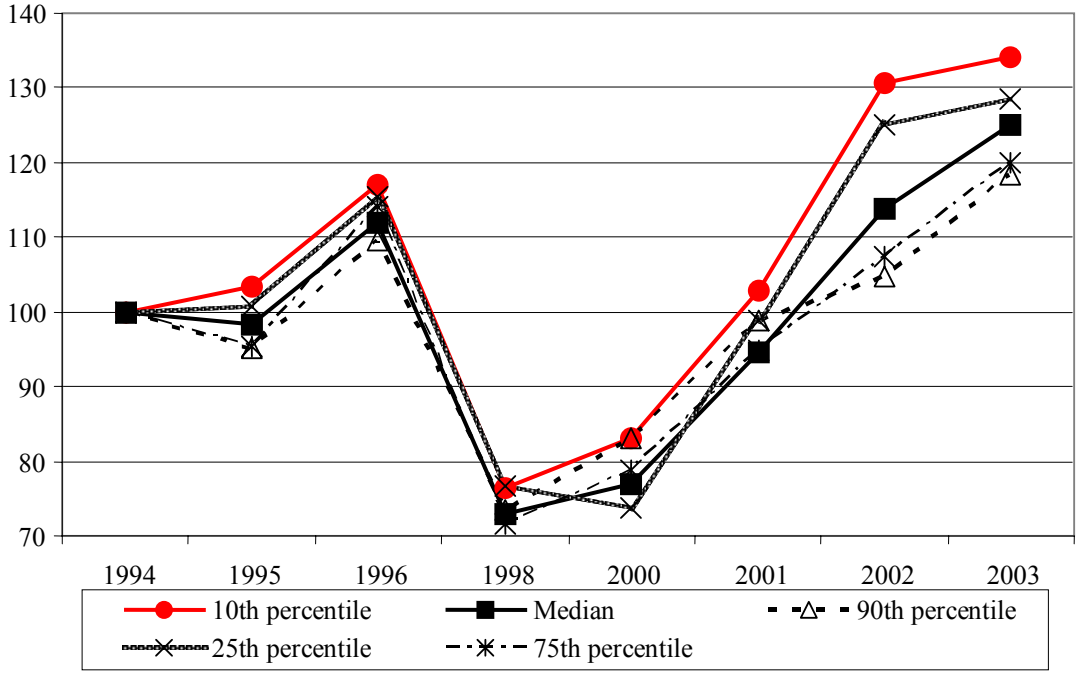

Fig. 7. Real monthly wages by percentile

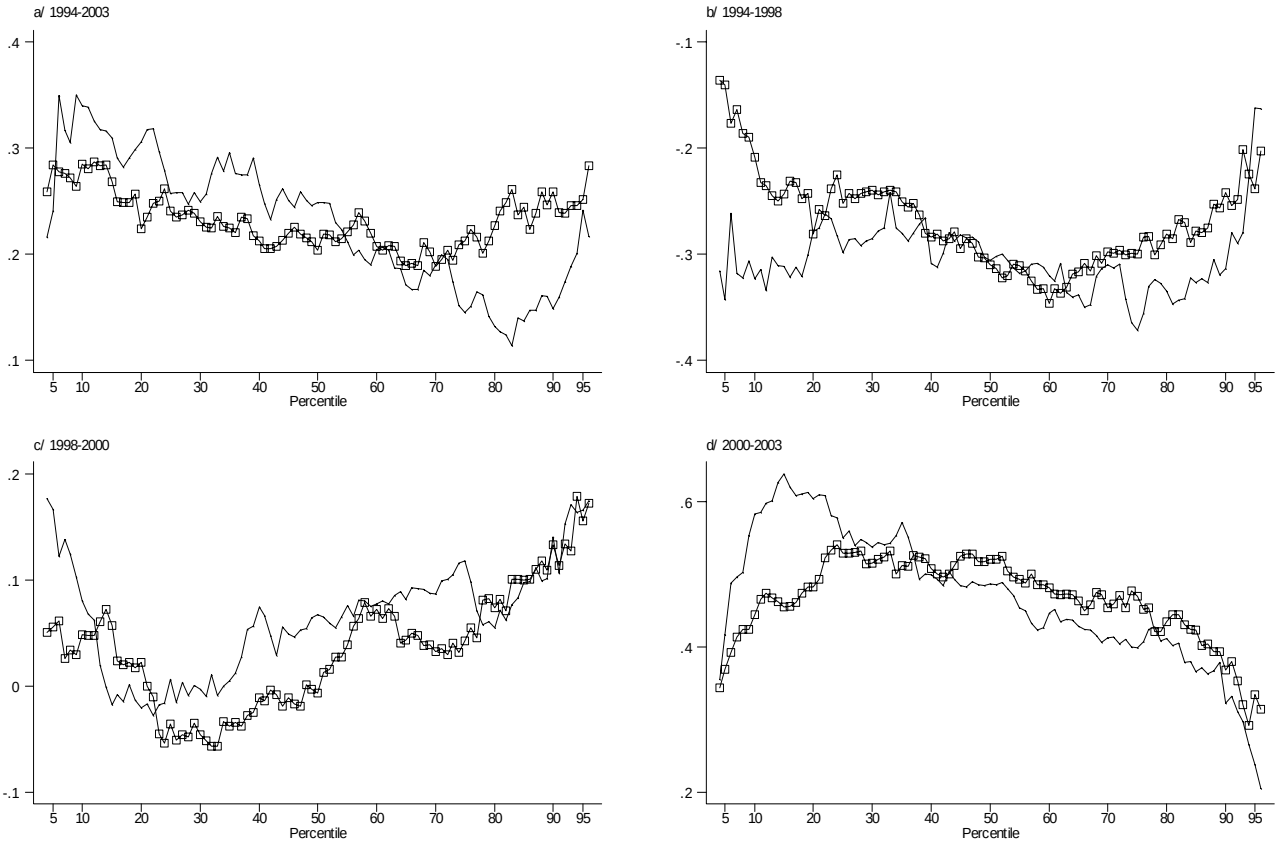

Fig. 8.1. Change in log real monthly wages by percentile: males vs. females. (–) — Males, (□) — Females

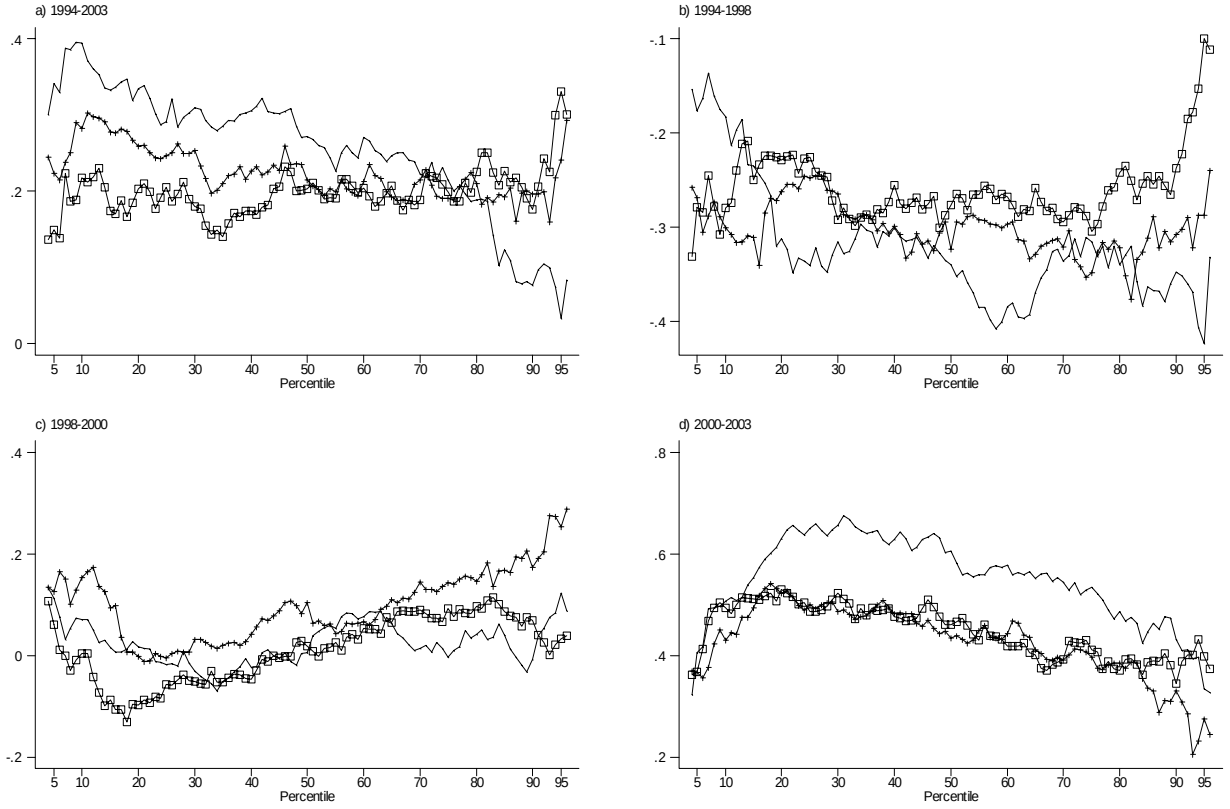

Fig. 8.2. Change in log real monthly wages by percentile: age. (–) — 16–30, (+) — 30–45, (□) — 45+

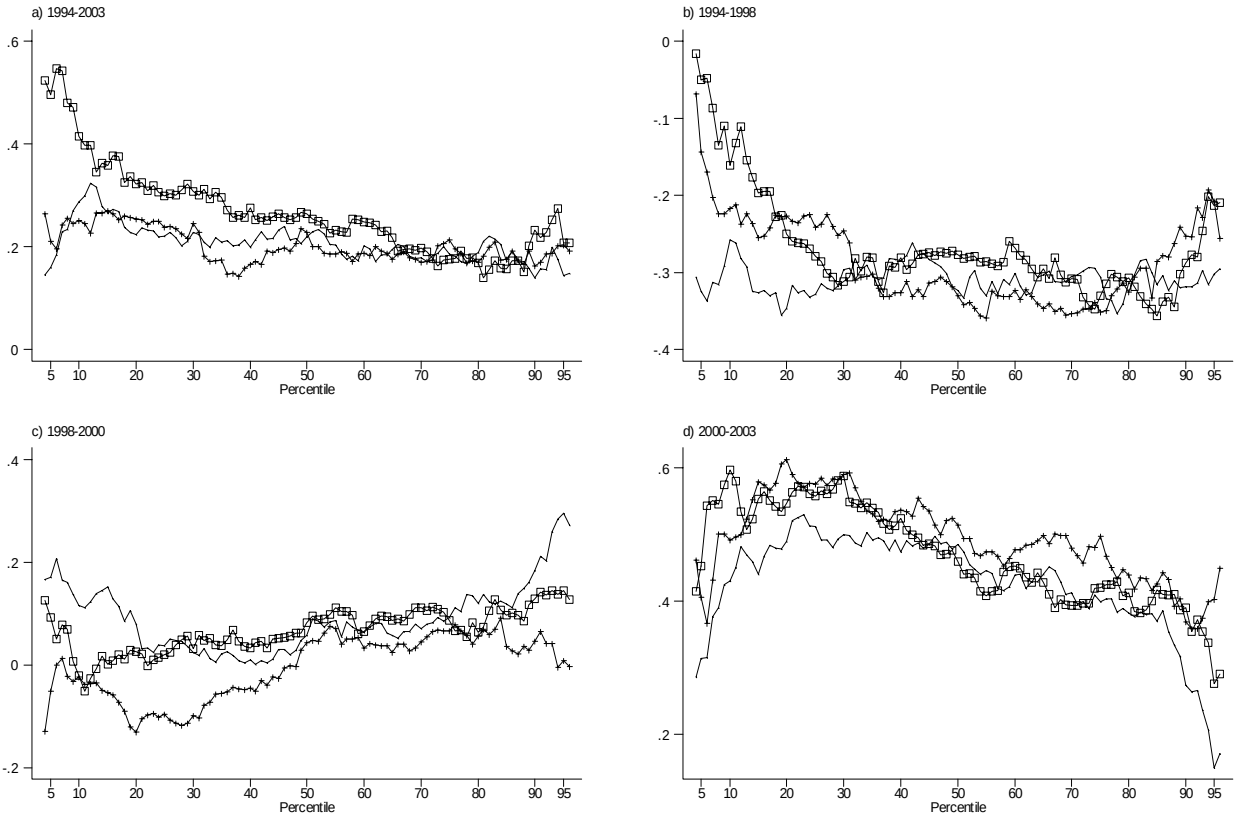

Fig. 8.3. Change in log real monthly wages by percentile: education. (–) — Secondary school, (+) — College, (□) — University

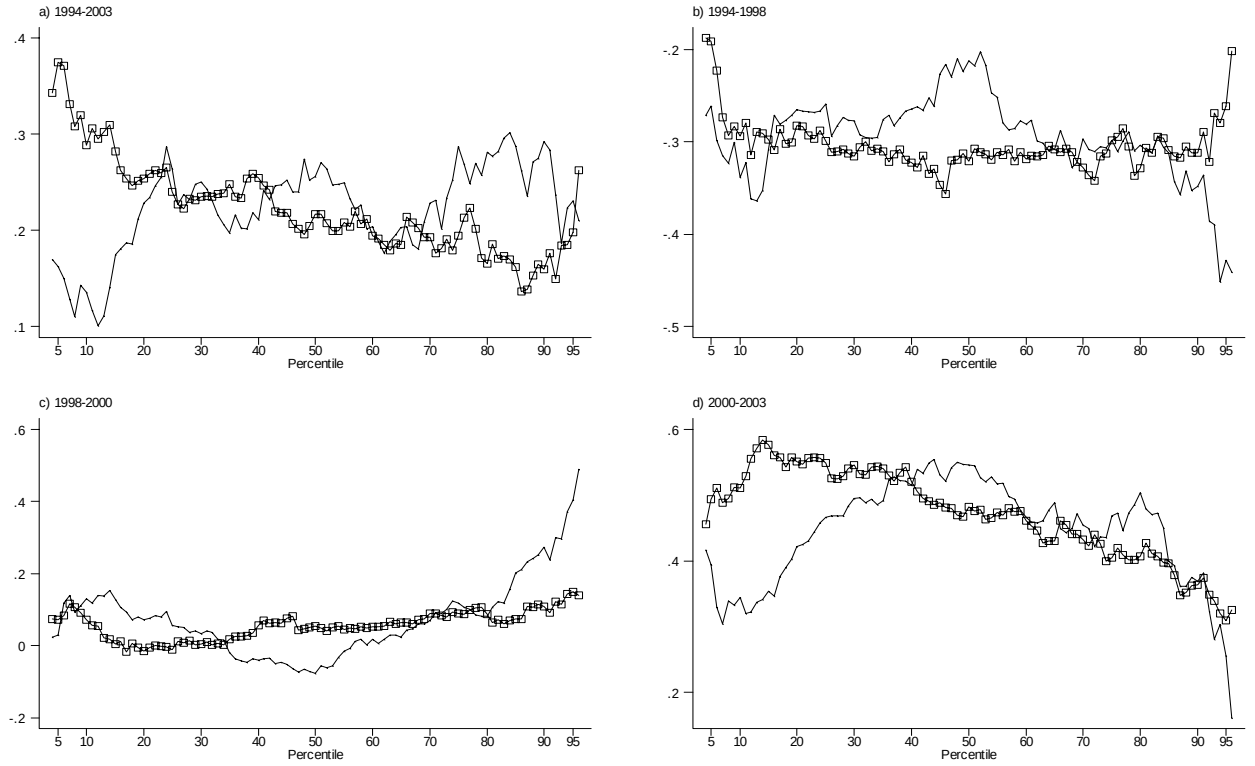

Fig. 8.4. Change in log real monthly wages by percentile: location. (–) — Rural, (□) — Urban

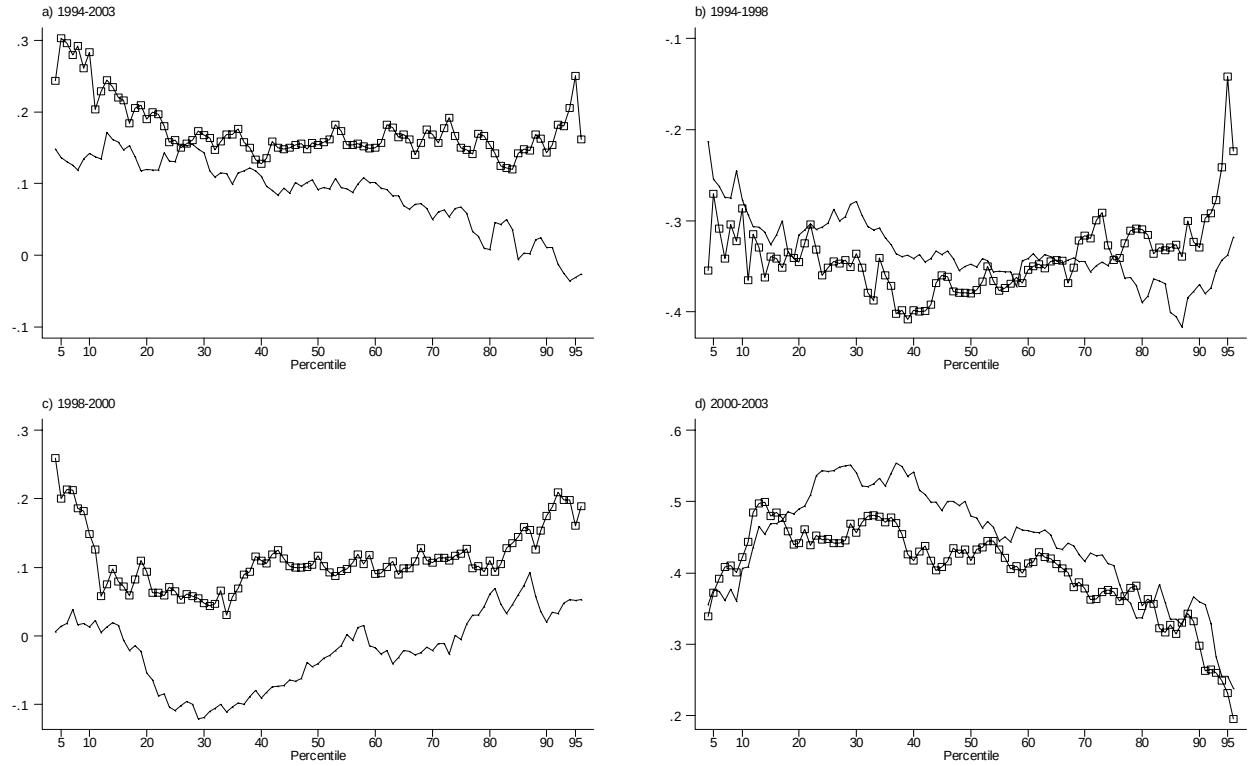

Fig. 8.5. Change in log real monthly wages by percentile: employer ownership. (–) — State, (□) — Private

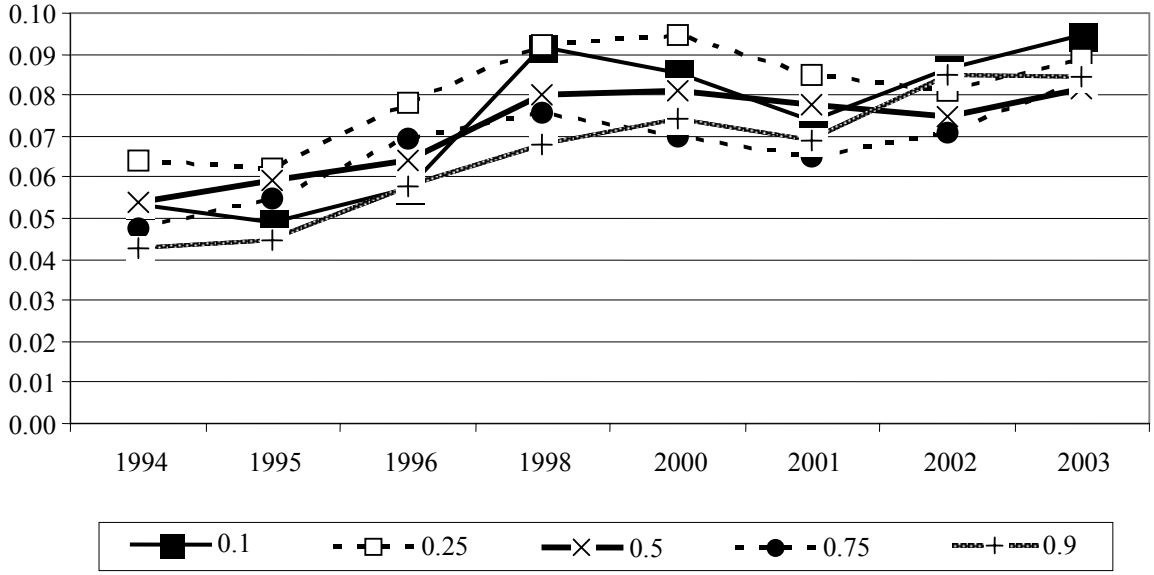

Fig. 9.1. Returns to a year of education by quantiles

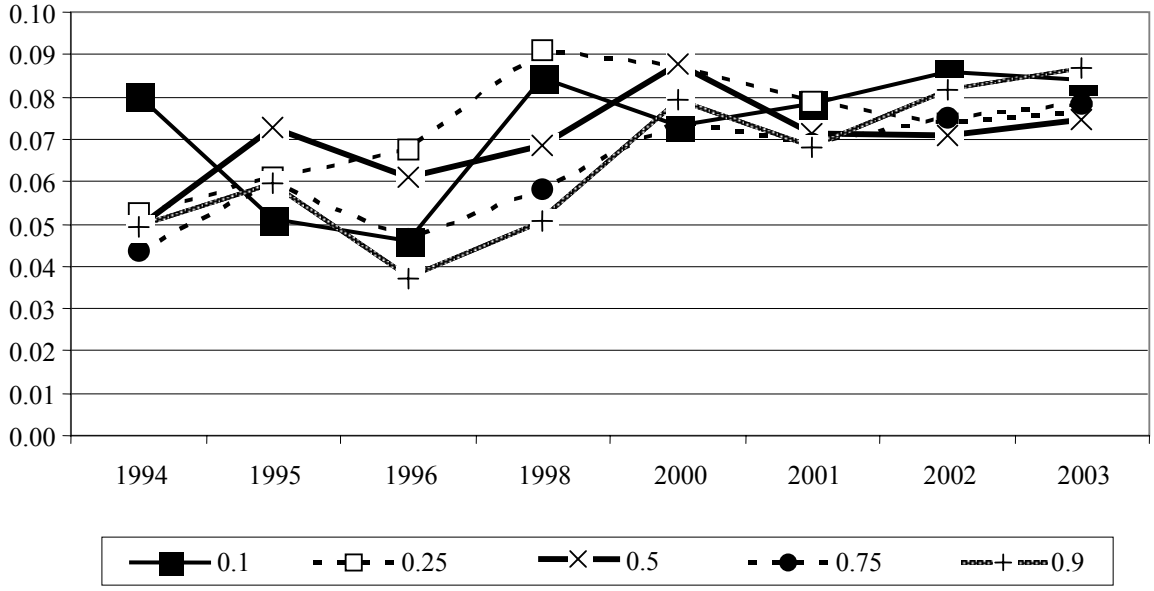

Fig. 9.2. Returns to a year of education by quantiles: private sector

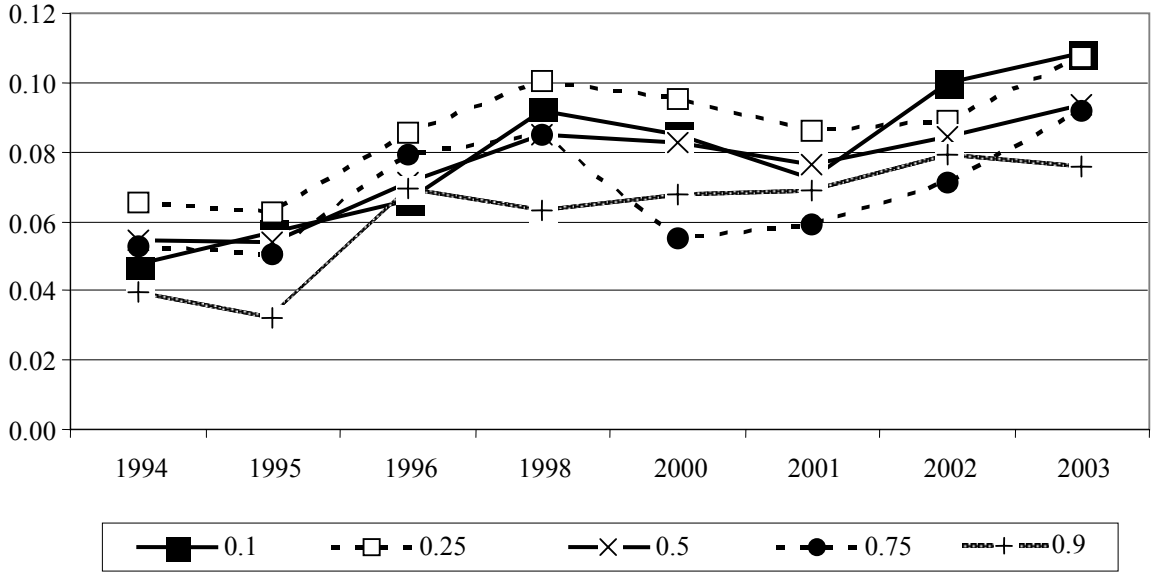

Fig. 9.3. Returns to a year of education by quantiles: state sector

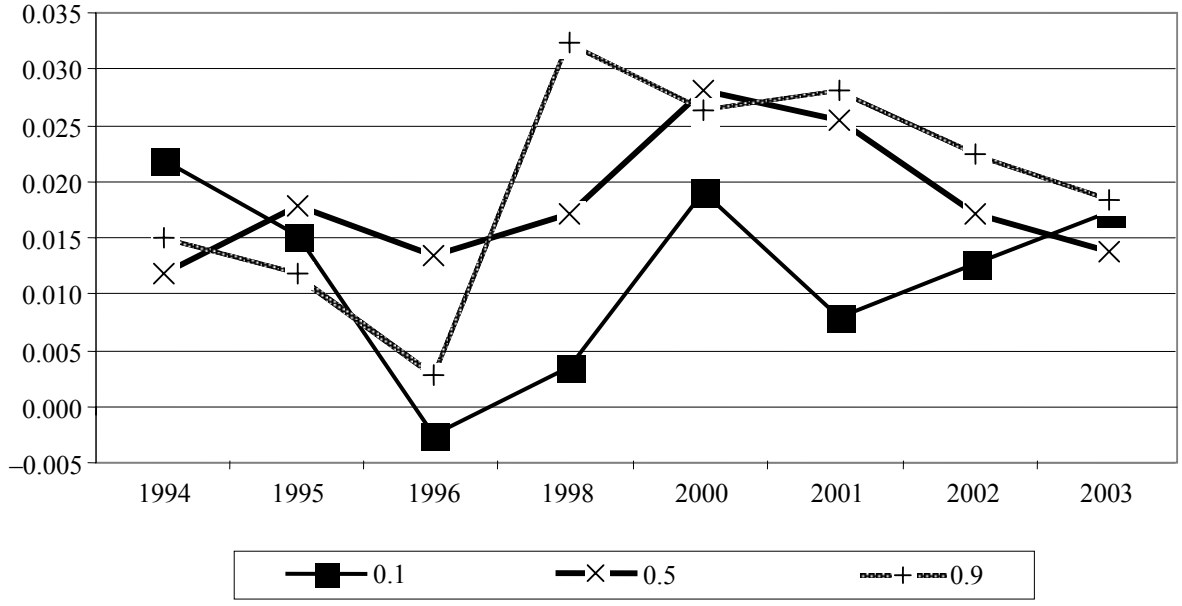

Fig. 10.1. Returns to a year of experience by quantiles (experience = 5 years)

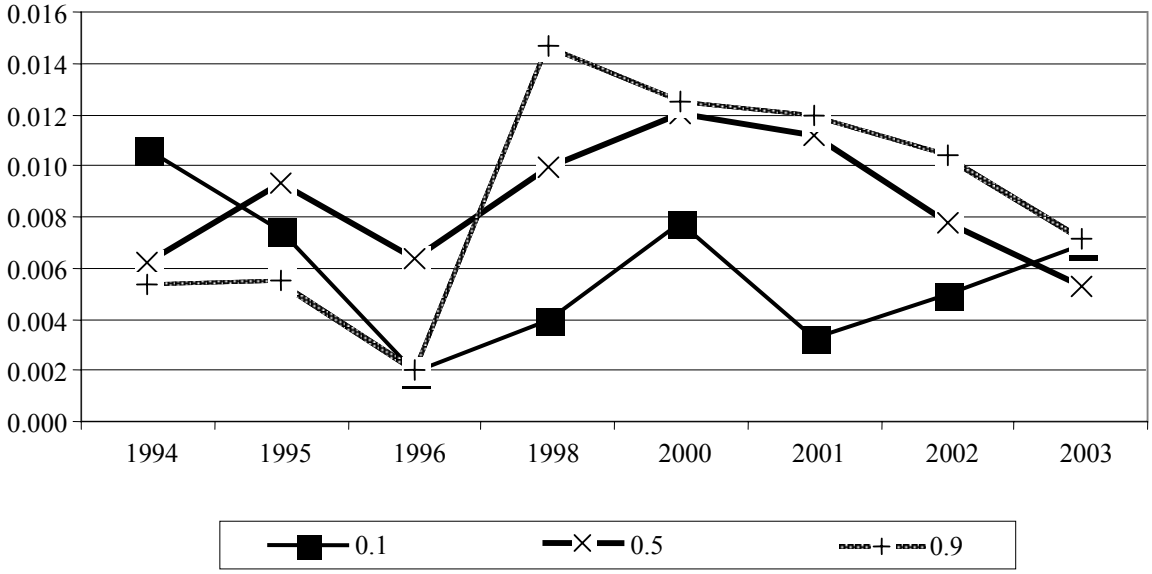

Fig. 10.2. Returns to a year of experience by quantiles (experience = 15 years)

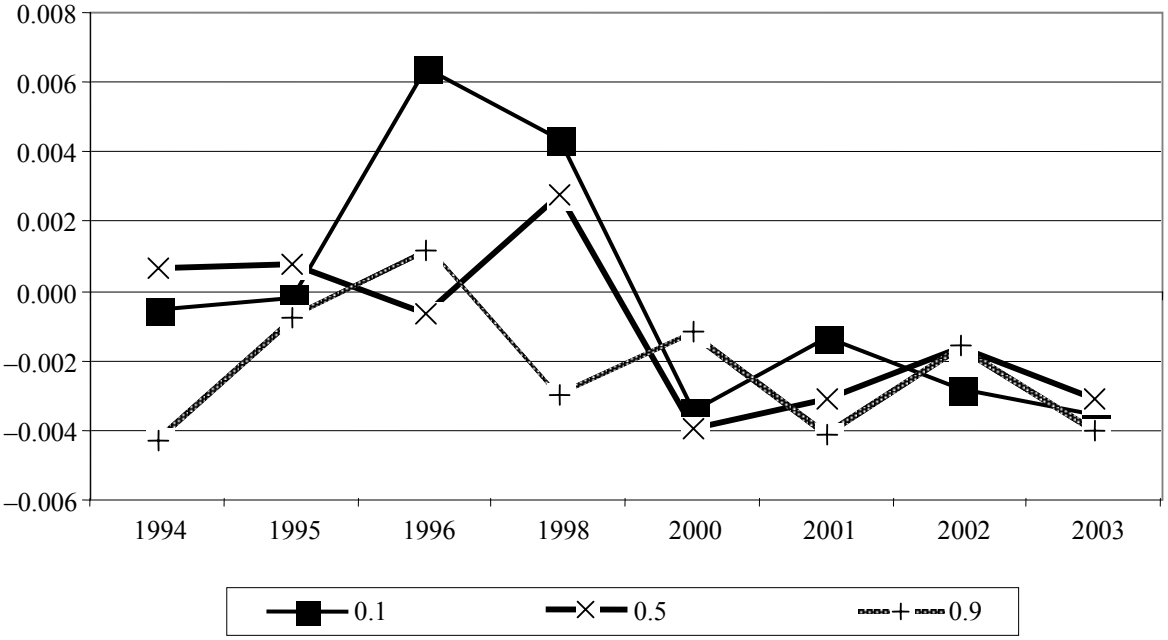

Fig. 10.3. Returns to a year of experience by quantiles (experience=25 years)

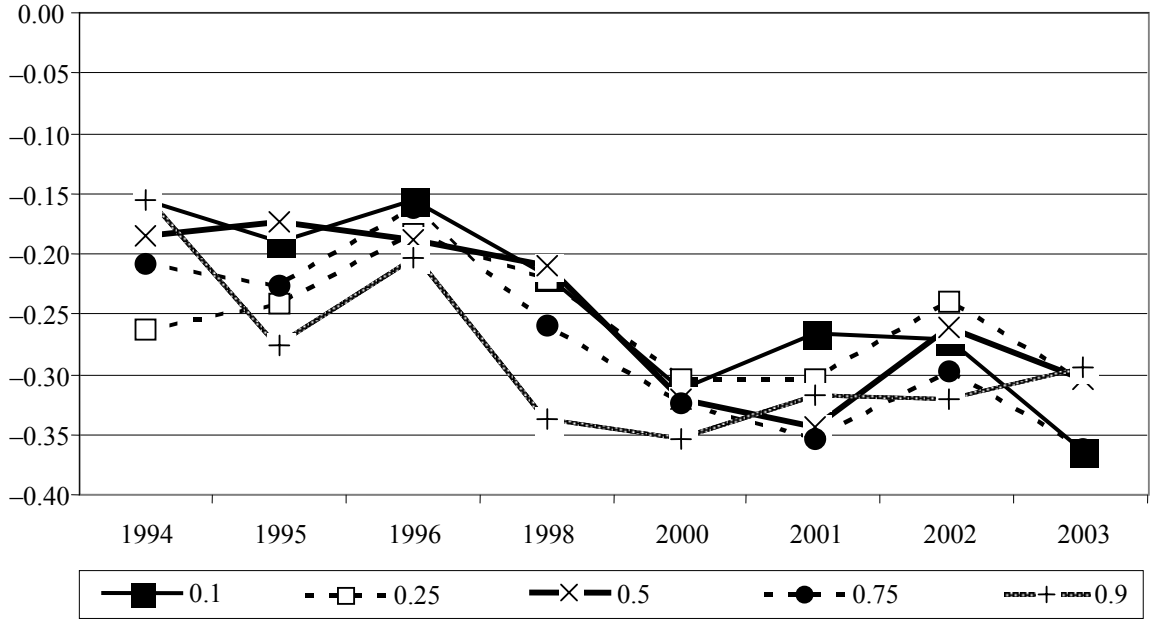

Fig. 11. State sector wage differential by quantiles

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