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Rising Wage Inequality in Germany

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Abstract:

Based on samples from the German Socio-Economic Panel (GSOEP) 1984 to 2004, this paper investigates the evolution of wages and wage inequality in Germany. Between 1984 and 1994 wages for prime age dependent male workers increased on average by 23 percent and the wage distribution in West Germany was fairly stable. Between 1994 and 2004 average wages rose by about 8 percent in West Germany and 28 percent in East Germany. In this period wage inequality for prime age dependent males, measured by the ratio of the ninetieth to tenth percentile of the wage distribution, increased from 2.1 to 2.5 in West Germany and from 2.3 to 2.9 in East Germany. In West Germany rising wage inequality has occurred mainly in the lower part of the wage distribution, whereas in East Germany wage inequality predominantly rose in the upper part of the wage distribution. In West Germany the group of workers with low tenure experienced higher increases in wage inequality.

Keywords: Tenure, skill composition, wage inequality, wage rigidity.

JEL-classification: J21, J24, J31

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1 Introduction

The issue of rising wage inequality has attracted a considerable amount of research in international labour economics.[1] For a long time rising inequality in Great Britain and the United States has been contrasted by a stable wage distribution in Europe and especially in Germany.[2] However, due to its strong trade orientation Germany, as well as other industrialized countries, experienced an increase in the demand for high skilled labour and a decrease in the demand for the low skilled. Social transfers might have hindered a rise in inequality for low wage workers, while union bargaining power in the German system of central wage negotiation together with an increasing supply of highly skilled workers may have contributed to the remarkable stability of the wage distribution.[3]

This paper contributes to the ongoing debate by investigating the evolution of wage inequality in Germany based on the German Socio-Economic Panel (GSOEP). It is shown that in the past decade wage inequality is rising in Germany. Our contribution to the empirical literature is threefold: First, the paper provides evidence for the recent strong increase in wage inequality between 1994 and 2004 (the ratio of the ninetieth to tenth percentile of the wage distribution for all workers was around 2.47 in 1994 and 3.01 in 2004 in West Germany) and discusses possible explanations. Our findings are in line with results of other studies based on different German data for the period until 2001.[4] Similarities and differences in the evolution of wage inequality around the world can be illustrated by two examples.

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[1] See among others Acemoglu (2002, 2003), Autor et al. (2005a, b), Blau and Kahn (1996), DiNardo et al. (1996), Gottschalk and Smeeding (1997), Juhn et al. (1993) and Katz and Autor (1999).

[2] See for example Prasad (2004). The issue has been highlighted by Krugman (1994) who argued that rising inequality and low unemployment rates in the United States and rising unemployment combined with a stable wage distribution in Europe are two sides of the same coin.

[3] Previous findings from Fitzenberger et al. (2001), Moeller (2000, 2005) and Pfeiffer (2003), among others, suggest that wages in Germany have always been flexible to some degree.

[4] Part of the literature on wage inequality in Germany is based on register data from the IAB employment sample (IABS 1975-2001). Self-employed and civil servants as well as very low wage workers are not available in this data. Furthermore the number of hours of work is missing. Fitzenberger et al. (2001) report rising wage inequality for young workers with intermediate education levels using IABS 1976-1984; Moeller (2005), using the IABS 1975-2001, for wages in the lower part of the wage distribution and Kohn (2006) who finds a general trend of rising wage inequality between 1992 and 2001 using the IABS 1975-2001.

Compared to Germany, in the United States wage inequality is higher (4.4 in 2004), but remained stable between 1994 and 2004 (Mishel et al., 2006). In Spain inequality is also higher (3.6 in 2002), although it is decreasing since 1995 (Izquierdo and Lacuesta, 2006).

Second, we investigate the evolution of wage inequality both for East and for West Germany in order to account for the different economic transition processes after unification. Third, based on the Juhn et al. (1993) decomposition method, the role of tenure, self-employment, education, nationality and gender for the rise in inequality in each part of Germany is analysed.

Our measures of wage inequality is the ninetieth to tenth percentile of real gross hourly wage, as well as its two sub-groups, the ninetieth to fiftieth, and fiftieth to tenth percentile of the wage distribution. Two samples of workers are drawn from the GSOEP, one for all workers including the self-employed and one only for the group of prime age dependent male workers (age group 25 to 55; for more details see section 2). Based on the rich GSOEP data the findings suggest that wage inequality in Germany started to increase after the economic downturn 1992/93.[5] The significant rise in wage inequality in Germany is a phenomenon that seems not to be related to specific groups of workers as for example the self-employed, women or foreigners. Figure 1 and Figure 2 show the evolution of wages between 1984 and 2004 for West Germany and for East Germany, respectively.

Figure 1 here

Figure 2 here

Between 1994 and 2004 the average hourly wage of prime age dependent males increased by 27.5 percent in East Germany and by 7.7 percent in West Germany. For prime age dependent males the ratio of wages of high wage workers as measured by the ninetieth percentile of the wage distribution and low wage workers as measured by the tenth percentile of the wage distribution increased from 2.3 to 2.9 in East Germany and from 2.1 to 2.5 in West Germany. For West Ger-

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many this implies a strong increase in inequality in a period with only moderate average wage growth. Between 1984 and 1994 the wage distribution was stable even though average wage growth was 22.6 percent for prime age dependent males. The evolution of wages and wage inequality in East Germany differs considerably from that in West Germany. During the transition process to a market economy mean wages rose faster than in West Germany. In East Germany rising inequality affected mainly high wage workers, while in West Germany it had a higher impact on low wage workers.

The rest of the paper is organized as follows: Section 2 describes the data and major changes in the structure of the German workforce. Section 3 discusses the evolution of wages and wage inequality while section 4 concentrates on the findings from the econometric decomposition of wage changes. Section 5 concludes.

2 Data and Changes in the Structure of the German Workforce

For the purpose of the analysis two samples were drawn from the 21 waves of the German Socio-Economic Panel (GSOEP[6]) 1984 to 2004, both separately for West and for East Germany. First, a full sample was drawn containing all workers aged 16 to 65 years including the self-employed. All observations with missing information on at least one variable were dropped. The variable real gross hourly wage[7] is obtained for all workers including the self-employed by calculating the ratio of last months' salary and hours worked. Hourly wages are trimmed at the two percent highest and lowest observations to reduce the risk of measurement error from extreme values. With this first sample the general evolution of wage inequality in Germany is analysed based on all individuals participating in the workforce, including women and the self-employed. Second, a restricted sample was drawn containing only prime age dependent male workers, aged between 25 and 55 years

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[5] After the unification boom the German economy experienced a severe recession with employment losses in the private sector of 1.97 percent in 1992/93, 1.56 percent in 1993/94 and 1 percent in 1994/95, (DIW Vierteljährliche Gesamtrechnung, own calculations).
[6] See Haisken-DeNew and Frick (2005).
[7] All wages are deflated with the Consumer Price Index for Germany, Statistisches Bundesamt (2005).

(about 45 percent of the full sample). This restricted sample is chosen to facilitate comparisons with previous studies which concentrate on the populations of dependent workers who are part of the German system of social security.[8] Furthermore we would like to answer the question whether rising wage inequality is also prevalent in the group of workers with the highest commitment to the labour market which are prime age dependent males.[9] For those, average hourly wages in West Germany were 11.80 €in 1984 (compared to 10.37 €in the full sample), 14.47 €in 1994 (12.85 € in the full sample) and 15.59 €in 2004 (13.96 €in the full sample). Weekly hours worked were 43.84 in 1984 (40.84 in the full sample), 42.68 in 1994 (38.91 in the full sample) and 43.58 in 2004 (38.02 in the full sample).

In the subsequent econometric analysis wages are it is necessary to estimate wages as a function of educational qualification, tenure, potential experience, sex (female), self-employment and nationality (foreigner) of workers. The evolution of these variables reflects structural changes in the German economy. In West Germany the share of highly educated workers[10] doubled between 1984 and 2004. Prime age dependent male workers are better educated compared to workers in the full sample. In both samples, the average duration of years of schooling increased by 0.9 years (to 12.33 years in the sample of all workers and to 12.45 in the sample of prime age dependent males in 2004). Female participation increased from 37 to 47 percent, while the share of foreigners fluctuates around 8 percent. About 6 percent of the workers in the overall sample are self-employed.[11] Self-employment has been rising continuously since 1994. The share of people whose tenure is seven years (the median) or longer ("high tenure") decreased in the sample of

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[8] For example Kohn (2006), Moeller (2005), see footnote 4.

[9] The GSOEP is a representative survey of the German population. We compared our results with the quarterly wage survey of the German Federal Statistical Office (see Statistisches Bundesamt 1995, 2005) which contains average wages for blue collar unskilled workers and blue collar skilled workers and wages for white collar skilled and unskilled workers from manufacturing. Between 1994 and 2004 the wage gap of male blue collar skilled and unskilled workers increased from 26.5 percent in 1994 to 33.3 percent in 2004 in West Germany and from 19.5 percent to 29.4 percent in East Germany. Between 1994 and 2004 the wage gap of male white collar skilled and unskilled workers increased from 53.5 percent in 1994 to 62.6 percent in 2004 in West Germany and from 40.2 percent to 63.6 percent in East Germany. These numbers from official data confirm our evidence of rising wage inequality in Germany.

[10] These are people with a degree from a technical college or university.

[11] Shares for weighted data with cross sectional weights.

prime age dependent West German males from 64 percent in 1984 to 58 percent in 2004. In this sample the average years of tenure was 12.10 in 1984 and 11.58 in 2004. For workers with high tenure (low tenure), average wages increased 43 percent between 1984 and 2004 (1984: 11.57 €, 1994: 14.61 €, 2004: 14.20 €), while for workers with low tenure, average wages increased 34 percent between 1984 and 2004 (1984: 10.73 €, 1994: 12.88 €, 2004: 14.20 €).

In East Germany average wages in 2004 amount to 77 percent (69 percent in 1994) of average wages in West Germany in the full sample and to 74 percent (62 percent in 1994) in the sample of prime age dependent male workers.[12] East German prime age dependent males work on average one hour more than West Germans, while in the full sample the difference is 3.5 hours in 2004. Compared to West Germany there are more workers with high education. Female participation rates are higher, although they are converging in West Germany to East German levels. The share of foreigners in East Germany does not exceed one percent. There was a continuous rise in the share of self-employed workers (3.89 percent in 1994, 8.46 percent in 2004) after the transition to a market economy and private enterprises. In East Germany, the share of individuals with high tenure more than doubled in the sample of prime age dependent males (1994: 26 percent, 2004: 53 percent). Not surprisingly the average number of tenure (9.63 for the full sample in 2004) is still lower compared to West Germany. The ratio of the officially registered unemployed in the workforce[13] increased from 15.7 percent in 1994 to 20.1 percent in 2004 in East Germany and from 9.1 percent in 1984 and 1994 to 9.4 percent in 2004 in West Germany.

3 The Evolution of Wage Inequality

West Germany 1984 to 2004

This section gives evidence on the development of wage inequality in the GSOEP samples for West Germany. *Table 1* presents the central measure for wage inequality, the ratio of the ninetieth

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[12] In the full sample, average wages in East Germany (West Germany) amount to 8.92 € (12.85 €) in 1994 and to 10.75 € (13.96 €) in 2004. For prime age dependent males average wages amount to 9.04 € (14.47 €) in 1994 and to 11.53 € (15.59 €) in 2004 in East Germany (West Germany).

to tenth percentile in the wage distribution. In the full sample the quotient of the ninetieth to tenth percentile first decreased from 2.59 in 1984 to 2.47 in 1994, indicating moderate wage compression and than increased to 3.01 in 2004, indicating rising inequality. According to the 95 percent confidence interval this difference is significant (*Table 1*, in brackets). Wage inequality is lower in the sample of prime age dependent male workers and for foreigners, although the increase in wage inequality is also present in those subgroups. Wage inequality is highest for the self-employed, but the numbers do not indicate a clear tendency of rising wage inequality in the period under investigation. Wage inequality is significantly lower for workers with more years of tenure (see "high tenure"). For the group of workers with low tenure the tendency of rising wage inequality since 1994 is strongest. The ninetieth to tenth percentile in the group of prime age dependent male workers was 2.18 in 1994 and 2.87 in 2004.

Table 1 here

Figure 3 illustrates the wage distributions for workers in the overall and in the restricted samples for the years 1984, 1994 and 2004. For 1984 and, to some degree, for 1994 the figures indicate the well-known compressed distribution of German wages which is skewed to the right and shaped like a log-normal distribution. The 2004 figure, however, shows more dispersion and more symmetry. Apparently, compared to 1994, more workers earn both very low and also relatively high wages.

Figure 3 here

A comparison between twenty percentiles of the wage distribution for 1994 and 2004 in the full sample (*Figure 4*) reveals that real wages below the twenty-fifth percentile decreased, and that wages above the median grew at roughly similar rates. This suggests that the rise in inequality has been stronger below the median, which seems to be line with findings from Kohn (2006) and Moeller (2005). In the group of prime age dependent male workers real wages below the tenth percentile decreased (see *Figure 4*). For self-employed workers wage growth was more diverse at

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[13] Official unemployment rate for dependent employed civil workers (Statistisches Bundesamt 2005).

all percentiles. Foreigners experienced a significant rise in inequality which confirms the findings of Riphahn (2003).

Figure 4 here

Interestingly, however, wage growth for workers with low and high tenure differs to a higher degree. Between 1994 and 2004 wage growth for the "high tenure" group of workers exceeds growth for the "low tenure" group in all percentiles below the sixtieth percentile of the wage distribution (figures available upon request). The differences are quantitatively large. There is no percentile with a wage decrease for the high tenure group. In comparison, real wages of workers with low tenure decreased below the fortieth percentile of the wage distribution. According to these results tenure seems to be an important dimension of wage inequality and wage flexibility. Wage growth in the group of workers with low tenure shows more inequality and dispersion compared to the "high tenure" group. These results suggest that the adjustment of wages to labour market conditions primarily takes place among entrants to the labour market. In the group of workers with high tenure, adjustment to market conditions for labour mainly takes place through reduction of employment or hours of work, not through a cutting of wages.

East Germany 1994, 2004

This section investigates the evolution of wages and wage inequality in East Germany. For comparison reasons with West Germany, the period of observation is 1994 to 2004. *Figure 5* illustrates the evolution of wages in East Germany for the whole sample and *Figure 6* for twenty percentiles. Rising wage inequality is present and concentrated to some extend in the upper tail of the wage distribution.

Figure 5 here
Figure 6 here

Table 2 reports wage inequality as measured by the ninetieth to tenth percentile for the different samples and subgroups of workers (females, self-employed, low and high tenure), including 95 percent confidence intervals. In the full sample the ninetieth to tenth percentile was 2.40 in

1994 and 3.02 in 2004. The 95 percent confidence intervals do not overlap, indicating rising wage inequality. For males and females wage inequality is similar in the overall sample. As in West Germany, wage inequality is highest within the self-employed. Along the tenure dimension results differ in East and West Germany. In East Germany inequality is similar in the high and low tenure group. One reason is that tenure in East Germany does not mean the same as in West Germany. Firm foundation emerged after unification, only 14 years ago. Smaller firms show a higher degree of volatility. It is, for example, well known that firms are smaller in East Germany and that fewer firms are engaged in central wage bargaining (see Franz and Pfeiffer, 2006).

Table 2 here

4 Further Findings from Econometric Decomposition

This section presents further analysis applying econometric decomposition methods introduced by Juhn et al. (1993) to our samples. The idea of Juhn et al. (1993) is to decompose the changes in wage inequality into changes in prices for observable characteristics (age, tenure, educational qualification, sex, self-employment and foreigner), changes in the composition of the workforce concerning these variables over time and unobserved or residual wage inequality. For this purpose, linear wage equations are estimated with the GSOEP. The estimated coefficients are interpreted as returns to the observable variables, and changes in the observable variables over time are interpreted as changes in the composition of the workforce.

Although the three components of wage change are meaningful from an economic point of view, empirical assessment and quantification with the GSOEP is not without problems. In order to receive unbiased estimates for the composition, price and residual effects, the Gauss-Markov Theorem has to hold accordingly. All relevant variables explaining wages and wage changes over time have to be observed and measured correctly.[14] In real data the counterfactual decomposition

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[14] Not surprisingly a significant part of the recent international literature on wage inequality deals with the issue of measurement errors in wages and its components as well as with omitted variables, see Autor et al. (2005b), Lemieux (2002, 2006). Taber (2001) discusses the influence of unobserved abilities on rising inequality.

results do not need to add up to the total observed change. Therefore in the present study the residual component is calculated as the difference between the observed percentage change in wage inequality and the estimated price and quantity components from the wage equation. Growing residual wage inequality might reflect increasing inequality in the distribution of unobserved skills. Since the variance of wages for different skill groups varies[15], changes in the skill composition of the workforce might indicate unobserved skills as well. The decomposition results therefore should be interpreted carefully.

In order to get a reasonable empirical wage equation, wages have been trimmed and some non-linearities are allowed for. Tenure is divided into thirteen[16], potential experience into seventeen categories[17].[18] All wage equations have been estimated separately for East and West Germany, for the full sample and the restricted sample of prime age dependent male workers as well as for various subgroups, for example workers with low and high tenure. The following discussion of the econometric findings concentrates on the ninetieth to tenth wage differentials as well as its two sub-groups, the ninetieth to fiftieth and the fiftieth to tenth differentials.

West Germany 1984, 1994, 2004

The econometric decomposition confirms findings on wage inequality from section 3 and may be helpful in clarifying the role of the observed explanatory factors for rising inequality. *Table 3* summarizes the findings for the full sample and the restricted sample of prime age dependent male workers.[19]

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[15] There is more information on variances for specific skill groups, which might be helpful in understanding possible biases (potential mechanical composition effects). In the West German full sample the variance increased between 1994 and 2004 in all education groups, for example from 10.15 in 1994 to 20.82 in 2004 for individuals within the lowest educational degree and from 25.92 to 35.53 for individuals with a degree from a technical college. In the U.S. rising variance occurred primarily for high educated, high wage workers (see Lemieux, 2006).

[16] The groups range from 0-3 years over 3-6 years to 33-36 years, the group with highest duration are those employees who stayed with the same employer for more than 36 years.

[17] The groups range from 0-3 years over 3-6 years to 45-48 years, the highest group is "more than 48 years".

[18] All wage equations are available from the authors upon request.

[19] To read table 3, look, for example, at its first row: The wage dispersion between the ninetieth and the tenth percentile (column one) decreased in total (column two) by 0.050 log points or 4.88 percent ($(e^{-0.05} - 1) * 100 = -4.88$). The total wage growth is decomposed into a quantity effect (column 3), a price effect (column 4) and a residual effect (column 5).

Table 3 here

Detailed findings can be summarized as follows:

- The estimated composition effects seem to have only a minor impact on the evolution of wages in each decade. Their impact is visible however over the two decades in the overall sample. In the restricted sample of prime age dependent males there is no significant impact at all.

- There occurred some price effects in the period from 1994 to 2004. Price changes for observed characteristics seem to be responsible for one quarter to one third of overall rising inequality.

- Even though wage inequality increased significantly over the whole period, the increase concentrated on the period between 1994 and 2004. For the period between 1984 and 1994 our findings confirm the stability of the German wage distribution (although from 1984 to 1989 there was some rise in wage inequality, too).

- In the full sample of workers there is an asymmetry in the increase of wage inequality between 1994 and 2004: Although wage inequality increased in the upper part of the wage distribution as well (the total increase in the ninetieth to fiftieth percentile, that is in the upper part of the wage distribution, was 0.050 log points) the increase is quantitatively more pronounced in the lower part of the wage distribution (the total increase in the fiftieth to tenth percentile, that is in the lower part of the wage distribution, was 0.145 log points).

- The group of self-employed workers experienced a higher degree of wage inequality in all periods. Interestingly however, there was a period of significant wage compression in this group around 1994 and no overall tendency to an increase in inequality in the observation period. Therefore, the increase in self-employment presumably is not responsible for rising inequality.

- The econometric results differ between the full sample of all workers, including women, and the restricted sample of prime age dependent male workers. However, these differences are quantitatively small. There was slightly less wage dispersion in the period between 1994 and 2004 in the sample of prime age dependent male workers. Again, rising inequality is quantitatively more pronounced in the lower part of the wage distribution, confirming earlier findings of Moeller (2005) for West Germany (1984 to 2001). This finding appears to be partly in contrast to Kohn (2006) who finds that the increase in wage inequality below the median (and between 1992 and 2001) is predominantly concentrated among women. In our analysis this is not the case. Even if we restrict our observation period from 1992 to 2001 and estimate the wage equation separately for women and men, increasing wage inequality is concentrated below the median for both, males and females.

The analysis indicates empirical regularities behind rising wage inequality in West Germany. The findings are by and large in line with evidence from other industrialised countries and recent studies based on larger samples of German register data for dependent workers for the period between 1975 and 2001. Based on the GSOEP our results contribute to the knowledge of rising wage inequality. Increasing inequality in West Germany seems to be neither the result of rising participation of women or self-employment workers nor of changes in the share of foreigners.

More specifically we find that a larger part of the rise in inequality occurred in the group of workers with low tenure which has not been reported so far for Germany, confirming however findings from Spain (Izquierdo and Lacuesta, 2006). Since residual wage changes account for two thirds of the rise in inequality, the findings should nevertheless be interpreted cautiously. The estimates could suffer from omitted variable bias and measurement problems. For example, the content of the chosen categories of education might differ over time as well as the meaning of tenure in an employee-employer relationship.

East Germany 1994, 2004

Which factors can account for the rise in wage inequality in East Germany? Are there differences between East and West Germany? The results of the econometric decomposition (see *Table 4*) can be summarized as follows:

Table 4 here

- The overall measure (ninetieth to tenth differential) indicates a slightly stronger rise in wage inequality in the sample of East compared to West German workers, *Table 4*, which is in line with Kohn (2006). This is presumably a consequence of the transition from a socialist to a market economy after unification. The process of adjustment and convergence to the West German wage distribution and its degree of wage inequality is still on its way (see also Franz and Steiner, 2000).

- In contrast to West Germany a large part of rising inequality occurred in the upper tail of the wage distribution, 60 in comparison to 25 percent in West Germany (for the full sample). The total increase in the ninetieth to fiftieth percentile of the wage distribution for prime age dependent males was 0.145 log points, the total increase in the fiftieth to tenth percentile of the wage distribution was 0.090 log points (*Table 4*). So the relatively higher degree of rising wage inequality in East compared to West Germany is due to a higher extent of wage inequality for high wage workers.

- Composition effects seem to be of minor importance in the East German samples. However, price effects are significant especially in the upper part of the wage distribution. For prime age dependent male workers decomposition results suggest that price effects are quantitatively more important than residual effects (*Table 4*).

- The differences in wage inequality between educational groups are less pronounced in East compared to West Germany. However the tenure effect differs from West Germany. The in-

crease in wage inequality is restricted to workers with high tenure. There is no increase in wage inequality in the group of workers with low tenure.

One economic explanation for the differences between the two parts of Germany is the competition for high wage workers in both parts of Germany. This competition together with the well known mobility of high wage workers (especially from East to West Germany) enforced a higher degree of wage dynamics and inequality in the upper part of the wage distribution in East Germany. Another explanation is presumably the lower level of wages which may hinder a larger differentiation of the wages for workers with low tenure.

5 Conclusions

This paper contributes to the ongoing debate on the international trend in wage inequality. Based on the GSOEP 1984 to 2004 the evolution of wage inequality is investigated separately for East and West Germany. Despite the strong trade orientation of the German economy and rising wage inequality abroad, the German wage distribution was fairly stable for a long time. Our findings, based on the rich GSOEP data, hint at rising wage inequality which started after the economic downturn 1992/93 in both parts of Germany. The strong increase in wage inequality in Germany is a robust phenomenon that seems to be unrelated to specific groups of workers, for example the self-employed, women or foreigners, although there is a need for differentiation. Rising wage inequality in East Germany is quantitatively more pronounced among high wage workers and in West Germany among workers with low tenure. In times of high unemployment firms' adjustment takes place primarily through reductions of employment and hours of work while wage competition in West Germany seems to have been stronger among entrants and workers with low tenure.

Prominent additional explanations in the literature on rising wage inequality refer to the non-neutral nature of technical change, a rising demand for cognitive, non-routine abilities, to world-wide factor competition, decreasing social transfers and union power (German unions lost 2.8 million of their members between 1994 and 2004) changes in unobserved abilities and rising

inequality in abilities resulting from the German educational system of early tracking. The computer revolution fostered general education and analytical and cognitive non-routine skills while vocational education and non-cognitive manual and routine skills lost ground. Yet another specific factor for Germany might be the rise in active labour market policies in the observation period that might have influenced wage setting behaviour and the inequality of wages.

Future research could be directed more specifically to these different explanations and reasons for the evolution of wages and inequality in Germany. Furthermore the consequences for individual well-being, for employment as well as for the evolution of unemployment need to be investigated in greater detail.

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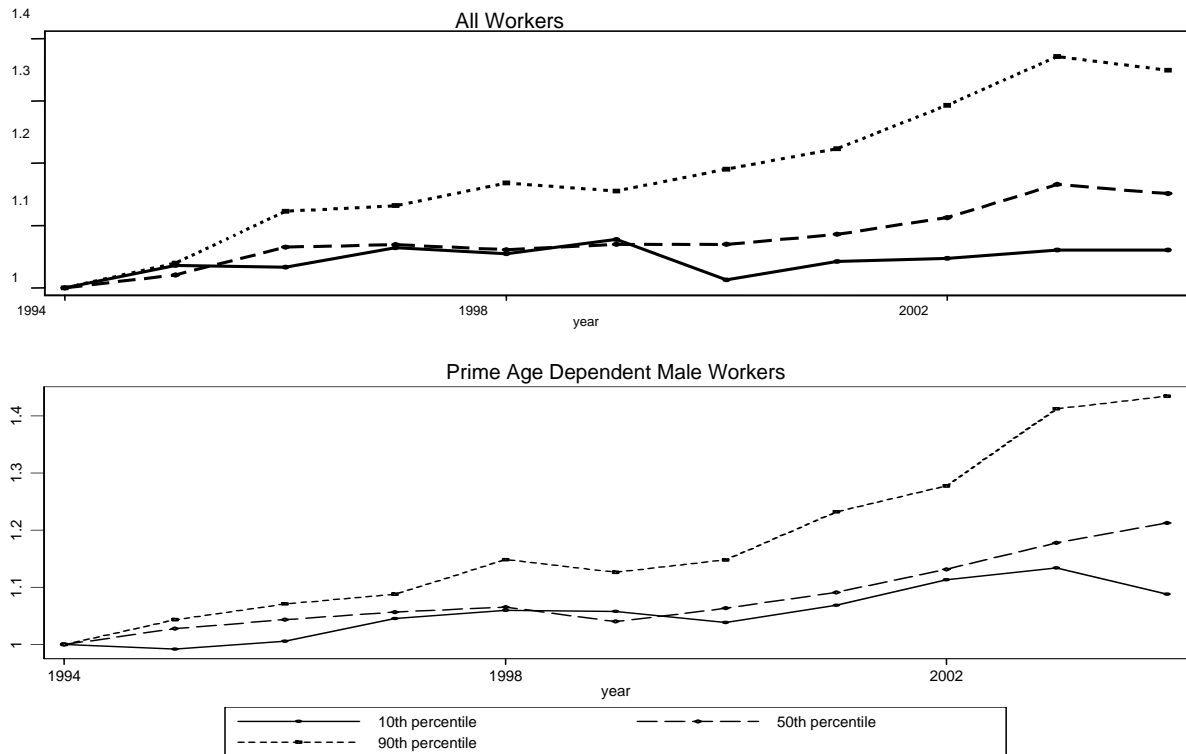
Figure 1: The Evolution of Wage Inequality, West German Workers 1984-2004
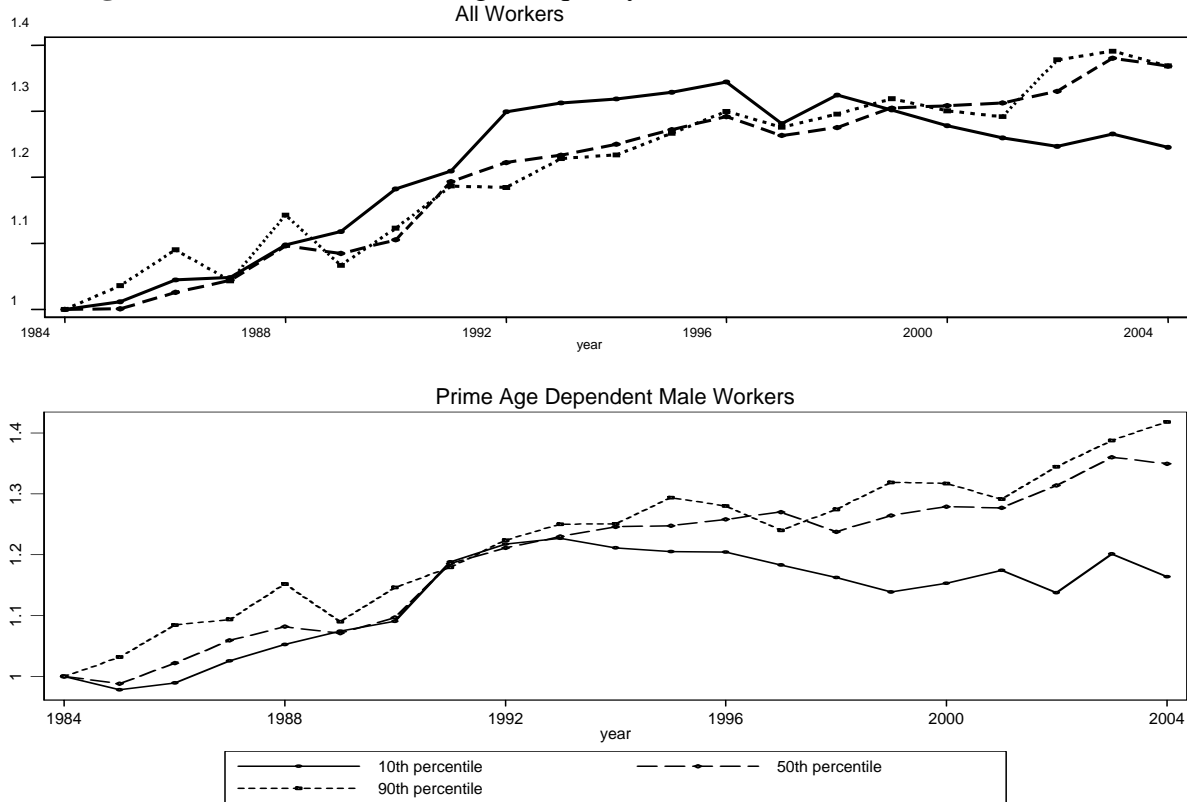
Source: GSOEP 1984-2004, own calculations based on cross-section weights; all wages for the three percentiles are normalized to 1 in 1984.

Real wages at the tenth percentile increased from 5.77 €in 1984 over 7.48 €in 1994 to 7.21 €in 2004 for all workers and from 7.48 €in 1984 over 9.37 €in 1994 to 9.39 €in 2004 for prime age dependent males. At the fiftieth percentile wages grew from 9.36 €in 1984 over 11.74 €in 1994 to 13.11 €in 2004 for all workers and from 10.48 €in 1984 over 13.23 €in 1994 to 14.89 in 2004 for prime age males. At the ninetieth percentile wages increased from 14.97 €in 1984 over 18.45 €in 1994 to 21.67 €in 2004 for the full sample and from 16.04 €in 1984 over 19.77 €in 1994 to 23.63 €in 2004 for the prime age dependent males.

Figure 2: The Evolution of Wage Inequality, East German Workers 1994-2004

Source: GSOEP 1994-2004, own calculations based on cross-section weights; all wages for the three percentiles are normalized to 1 in 1994.

Real wages at the tenth percentile increased from 5.31 €in 1994 to 5.65 €in 2004 for all workers and from 5.74 €in 1994 to 6.28 €in 2004 for prime age dependent males. At the fiftieth percentile wages grew from 8.38 €in 1994 to 9.75 €in 2004 for all workers and from 8.58 €in 1994 to 10.29 in 2004 for prime age males. At the ninetieth percentile wages increased from 12.75 €in 1994 to 17.05 €in 2004 for the full sample and from 12.99 €in 1994 to 18.01 € in 2004 for the prime age dependent males.

Figure 3: The Distribution of Wages in West Germany 1984, 1994, 2004

Figure 4: Wage Growth in 20 Percentiles, West Germany

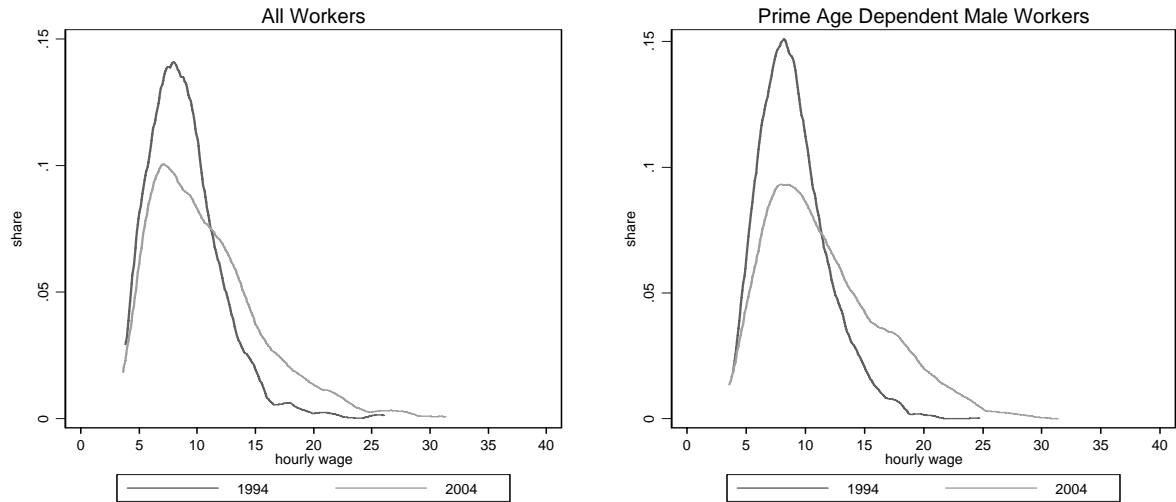**Figure 5:** The Distribution of Wages in East Germany, 1994, 2004
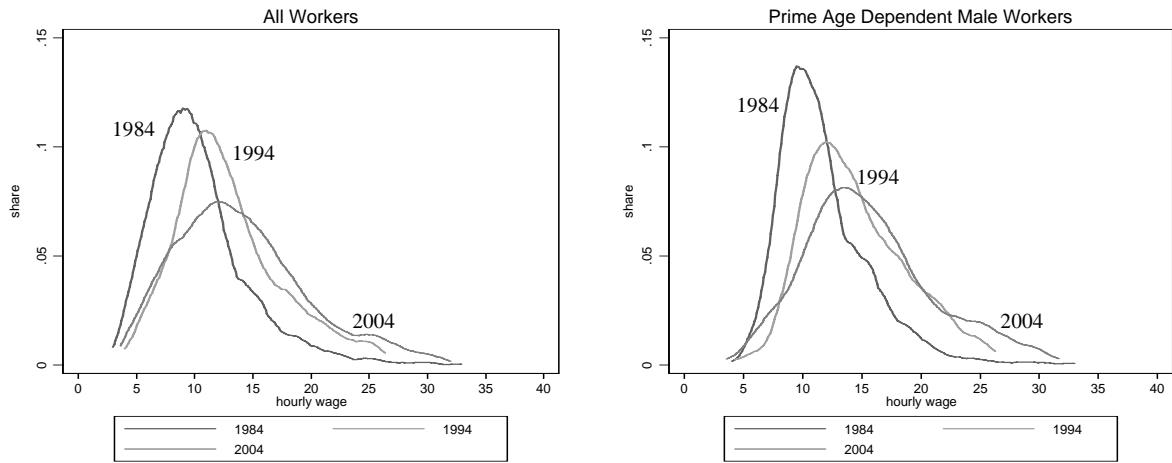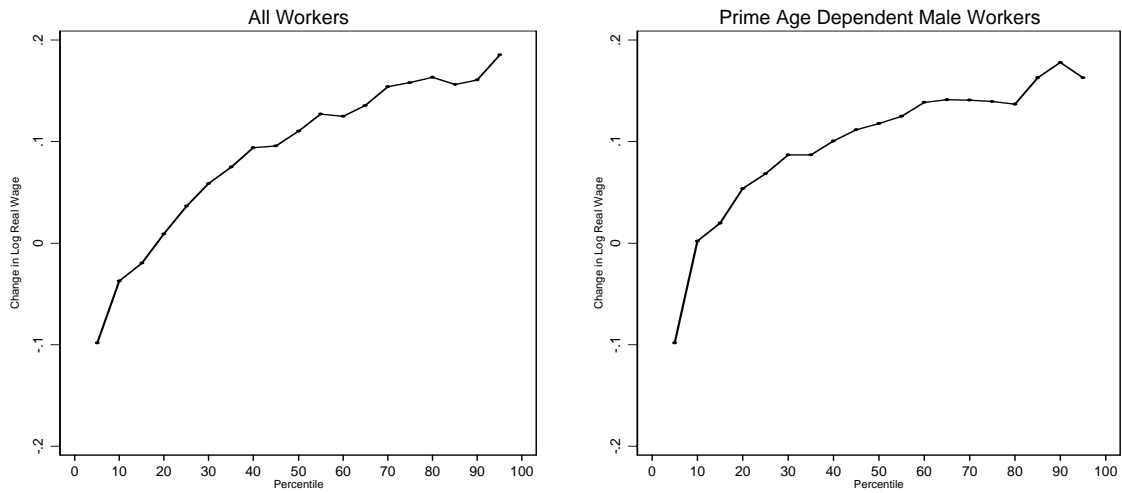
Source: SOEP (for the samples see Chapter 2), weighted data; own calculation.

Figure 6: Wage Growth in 20 Percentiles, East Germany
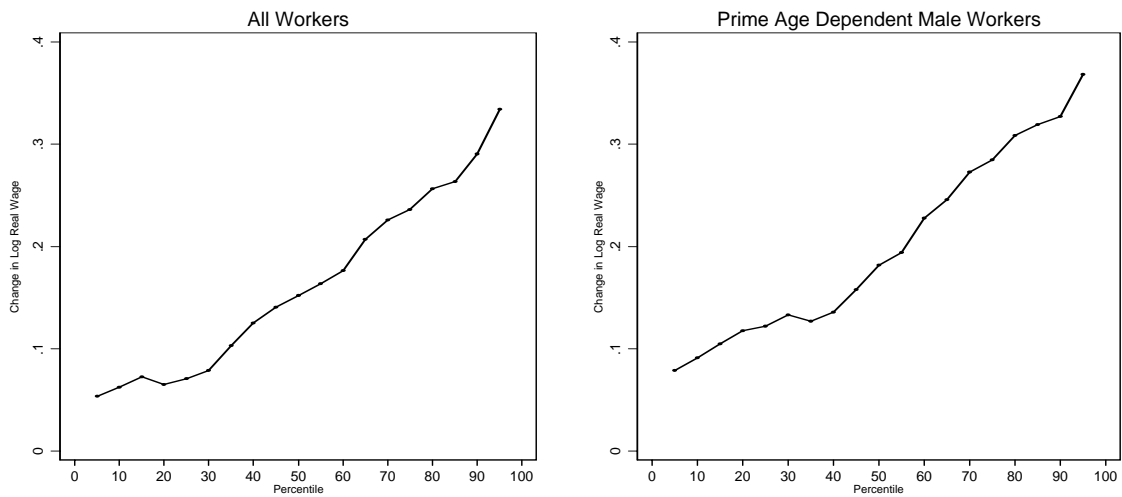

Source: GSOEP 1994-2004 (for the samples see Chapter 2); weighted data; own calculation.

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Table 1: Wage Inequality in West Germany: 90th to 10th Wage Percentiles

	All Workers			Prime Age Dependent Male Workers		
	1984	**1994**	**2004**	**1984**	**1994**	**2004**
All	2.59 (2.52 – 2.67) N=4,772	2.47 (2.39 – 2.54) N=3,913	3.01 (2.94 – 3.07) N=5,799	2.14 (2.07 – 2.22) N=2,322	2.11 (2.04 – 2.18) N=1,797	2.52 (2.40 – 2.63) N=2,467
Females	2.46 (2.32 – 2.60) N=1,752	2.37 (2.28 – 2.45) N=1,619	2.95 (2.76 – 3.14) N=2,668	.	.	.
Foreigners	2.13 (2.03 – 2.23) N=1,306	2.07 (1.95 – 2.19) N=860	2.63 (2.43 – 2.82) N=577	1.74 (1.64 – 1.85) N=652	1.83 (1.71 – 1.95) N=399	2.29 (2.00 – 2.57) N=269
Self-employed	5.25 (4.51 – 5.99) N=223	3.63 (3.21 – 4.06) N=182	4.51 (4.01 – 5.02) N=371	.	.	.
High tenure	2.39 (2.29 – 2.48) N=2,625	2.26 (2.16 – 2.36) N=2,051	2.67 (2.58 – 2.75) N=3,140	2.07 (2.00 – 2.14) N=1,506	1.99 (1.92 – 2.05) N=1,099	2.25 (2.17 – 2.33) N=1,436
Low tenure	2.57 (2.48 – 2.66) N=2,147	2.46 (2.33 – 2.58) N=1,862	3.09 (2.92 – 3.26) N=2,659	2.13 (2.02 – 2.25) N=816	2.18 (2.06 – 2.29) N=698	2.87 (2.66 – 3.07) N=1,031

Source: Samples from GSOEP 1984-2004, see text; in brackets: 95% confidence interval, calculated by boot-strapping (1,000 replications), N= number of observations, own calculations.

Table 2: Wage Inequality in East Germany: 90th to 10th Wage Percentiles

	All Workers			Prime Age Dependent Male Workers		
	1984	**1994**	**2004**	**1984**	**1994**	**2004**
All	.	2.40 (2.32 – 2.48) N=1,710	3.02 (2.88 – 3.15) N=1,923	.	2.26 (2.15 – 2.38) N=797	2.87 (2.70 – 3.04) N=739
Females	.	2.42 (2.30 – 2.53) N=769	3.00 (2.83 – 3.17) N=930	.	.	.
Self-employed	.	4.79 (n.a.) N=63	3.61 (3.00 – 4.22) N=139	.	.	.
High tenure	.	2.24 (2.10 – 2.37) N=596	2.91 (2.77 – 3.05) N=1,057	.	2.21 (2.02 – 2.40) N=285	2.77 (2.51 – 3.03) N=394
Low tenure	.	2.40 (2.29 – 2.52) N=1,114	2.73 (2.56 – 2.90) N=866	.	2.27 (2.12 – 2.43) N=512	2.71 (2.46 – 2.96) N=345

Source: Samples from GSOEP 1984-2004, see text; in brackets: 95% confidence interval, calculated by bootstrapping (1,000 replications), N= number of observations, own calculations. Since the share of foreigners is very low in this sample, they are excluded in the table.

Table 3: Decomposition Results for West Germany

All Workers

Differential	Total	Composition	Prices	Unobserved
1984-1994 (base year 1984)				
90-10	-0.050	0.020	-0.043	-0.027
90-50	-0.018	0.037	-0.033	-0.022
50-10	-0.032	-0.017	-0.010	-0.005
1994-2004 (base year 1994)				
90-10	0.196	0.007	0.055	0.134
90-50	0.050	-0.028	0.025	0.053
50-10	0.145	0.035	0.029	0.081
1994-2004 (base year 1994), only females				
90-10	0.218	0.037	0.038	0.143
90-50	0.098	0.019	0.021	0.058
50-10	0.120	0.018	0.016	0.086
1994-2004 (base year 1994), only foreigners				
90-10	0.237	0.018	0.099	0.121
90-50	0.158	0.039	0.057	0.062
50-10	0.079	-0.021	0.042	0.059

Prime Age Dependent Male Workers

Differential	Total	Composition	Prices	Unobserved
1984-1994 (base year 1984)				
90-10	-0.016	0.030	-0.022	-0.024
90-50	-0.025	0.015	-0.021	-0.019
50-10	0.009	0.015	-0.001	-0.005
1994-2004 (base year 1994)				
90-10	0.169	-0.001	0.055	0.116
90-50	0.060	-0.013	0.019	0.054
50-10	0.109	0.012	0.036	0.062
1994-2004 (base year 1994), only "low tenure"				
90-10	0.229	0.020	0.033	0.176
90-50	0.100	0.007	0.024	0.070
50-10	0.129	0.013	0.009	0.107

Source: GSOEP 1984-2004 (for the samples see chapter 2; Juhn et al. (1993) decomposition method, own calculations.

Table 4: Decomposition Results East Germany 1994-2004

All Workers

Differential	Total	Composition	Prices	Unobserved
1994-2004 (base year 1994)				
90-10	0.228	0.008	0.097	0.123
90-50	0.139	0.011	0.068	0.060
50-10	0.090	-0.003	0.029	0.064
1994-2004 (base year 1994), only females				
90-10	0.216	0.022	0.089	0.105
90-50	0.103	0.009	0.049	0.045
50-10	0.113	0.013	0.040	0.060

Prime Age Dependent Male Workers

Differential	Total	Composition	Prices	Unobserved
1994-2004 (base year 1994)				
90-10	0.236	-0.014	0.149	0.101
90-50	0.145	-0.022	0.140	0.027
50-10	0.090	0.008	0.008	0.074
1994-2004 (base year 1994), only "low tenure"				
90-10	0.128	-0.006	0.065	0.176
90-50	0.136	0.043	0.042	0.051
50-10	-0.009	-0.049	0.023	0.017

Source: GSOEP 1994-2004, for the selection of samples see chapter 2; own calculations. Since the share of foreigners is very low in this sample, they are excluded in the table.