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The case of east and west Germany

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Bundesagentur für Arbeit

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Auch mit seiner neuen Reihe „IAB-Discussion Paper“ will das Forschungsinstitut der Bundesagentur für Arbeit den Dialog mit der externen Wissenschaft intensivieren. Durch die rasche Verbreitung von Forschungsergebnissen über das Internet soll noch vor Drucklegung Kritik angeregt und Qualität gesichert werden.

Also with its new series "IAB Discussion Paper" the research institute of the German Federal Employment Agency wants to intensify dialogue with external science. By the rapid spreading of research results via Internet still before printing criticism shall be stimulated and quality shall be ensured.

How does experience and job mobility determine wage gain in a transition and a non-transition economy?

The case of east and west Germany.*

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Abstract

This paper studies individual log real wage change of east and west Germans over the period 1990/91 to 1995/96 using data from the German Socio-economic Panel. Parameters are estimated by median regression. Human capital theory and job mobility theories have implications for wage changes that differ between a transition and a non-transition economy. Wage changes decrease in experience according to human capital theory. But during a transition shock the introduction of new production techniques implies that experienced and inexperienced workers invest similarly in on-the-job training. Hence, annual wage changes do not vary much with experience. The estimation results reflect this difference. Matching and on-the-job search theory imply the following: A higher a worker's experience the higher his/her match quality and in turn the less (more) he/she can gain (lose) from an additional voluntary (involuntary) job change. But a transition shock destroys the high match quality of many experienced workers' jobs, so that wage changes due to voluntary and involuntary job change vary less with experience in a transition country than in a non-transition country. For involuntary job change, I find evidence for this hypothesis. Causal effects of job mobility on wages are estimated by comparing wage changes of this period movers with wage changes of next period movers. The results show that voluntary job changes raise real wages of both east and west Germans; involuntary changes tend to lower real hourly wages.

JEL classification: J31, J63 and P23

Keywords: Wage change, median regression, job mobility, economies in transition

*The data used in this study are from the public use version of the German Socio-economic Panel Study. These data were provided by the Deutsches Institut für Wirtschaftsforschung.

1 Introduction

This study analyses the individual determinants of real wage change during the first six years of the east German transition process. Its focus is on wage change that is associated with job change. Moreover results for east Germans workers are compared with results for west Germans workers, to reveal particular effects of the transition process. The data used in the analysis is the German Socio-economic Panel (GSOEP). It has the advantage, in contrast to other data sets, to provide the relevant information for both German regions for the first years of the east German transition process (1990/91 to 1995/96). The parameters of log wage change equations are estimated by median regression.

There is already a large literature on the determinants of wage differentials in east Germany. Most of these studies rely on cross-sectional wage equations.[1] However, to my knowledge only one study, Hunt (2001), analyses individual determinants of real wage change using panel data from the GSOEP and is concerned at the same time with the effects of job change on the wage outcome. Hunt (2001) studies the determinants of wage gain during the first six years of the east German transition process, as this study does. In these six years after the introduction of the German Economic, Monetary and Social Union in July 1990 the real consumption wages of east German workers aged 18 to 54 rose by 83 % (Hunt, 2001, p. 190). In particular, Hunt quantified to what extent the median annual wage change is associated with job mobility. However, her study is rather descriptive. It does not regard important specific predictions of human capital theory and job mobility theories for the transition process. Nor, does she attempt to quantify the causal effect of job mobility on wages.

There are well known implications of human capital and job mobility theories for wage changes. Human capital theory predicts that workers accumulate general and job-specific human capital, while working. The amount of time that they invest in these types human capital accumulation though decreases with experience, as their time horizon to achieve a net gain from such investment becomes shorter. The implication is that real wages rise with experience and tenure at a decreasing rate in a non-transition country.

For a transition country there are reasons to assume that this empirical implication is different. One may expect that an additional year of experience is not associated with a wage change that differs much between inexperienced and experienced workers.

[1] Examples of these studies are Bird, Schwarze, and Wagner (1994), Burda and Schmidt (1997), Krüger and Pischke (1997), Steiner and Puhani (1997), Steiner and Wagner (1997), Franz and Steiner (2000) and Gang and Yun (2002).

The restructuring of firms implies that both types of workers have to adapt to new techniques in the production process. Hence, they accumulate human capital on-the-job in a more similar way than in a non-transition country.

In this paper I will particularly focus on predictions of matching and on-the-job search theories that differ between a transition and a non-transition economy. The studies of Wolff and Trübswetter (2003) and of Wolff (2004) highlighted that job mobility in east Germany during the first years of the transition shock was far higher than in west Germany during the first years of the transition shock.

Theories of job mobility, on-the-job search and matching theory (e.g., see Burdett, 1978; Jovanovic, 1979) predict that workers change their job until the expected present value of the cost of job search is no higher than the expected present value of a job change. Moreover, the more experienced workers are, the higher tends to be their wage and job match quality. A voluntary job change should lead to a real wage gain, but this gain should be decreasing in experience. The reason is that more experienced workers in contrast to less experienced ones tend to work in high quality job matches and therefore have less scope to still raise their wages by job change. For this reason also wage losses due to involuntary job change should rise with experience.[2] Naturally, another reason for this may be the loss of job-specific skills of involuntary job changers. The analysis controls for tenure in the previous job to account for this. These are effects that one should expect for a non-transition country.

But theories of job mobility can have different empirical implications for a transition economy. The transition process is an adverse shock to many of the old job matches. Therefore, a high match quality that many experienced workers had achieved under socialism was very frequently destroyed. In turn experienced workers can achieve gains from voluntary job mobility that are similar to those of inexperienced workers. Moreover, in case of an involuntary job loss they do not necessarily face higher wage losses than the inexperienced workers. However, this argument assumes that the wages of the old job-matches are sufficiently flexible, i.e., they adjust downwards as a response to an adverse transition shock to their match quality. If they are not flexible, there is no or little downward wage adjustment and the implications of the theories of job mobility may be similar for the non-transition and the transition economy. All these implications were not investigated by the paper of Hunt (2001).

The advantage of analyzing the east German transition process is simple: We can

[2]The assumption is that involuntary job loss is a result of an adverse shock to a job match. Moreover, I assume that wages are not entirely flexible. Then in particular for workers in previously high quality job matches an involuntary job change should be associated with a wage loss.

make a judgement on the above hypotheses by comparing the effects of covariates on wage changes of east German workers and on wage changes of west German workers. Due to the German Economic, Monetary and Social Union in July 1990 and German unification in October 1990, the same legal and economic framework applies to the east and the west German region.

The paper is organized as follows. Section two discusses the econometric model and the data. Section three presents the median regression results and discusses them together with the main hypotheses. A summary and conclusions are provided in section four.

2 Econometric model and sample

Suppose we have the following types of determinants of an individual's (i) logarithmic real wage, $ln(w_{i,t})$, at some point in time t : $\underline{x}_{1,i}$ are time-invariant regressors that have a time-constant effect, e.g., parental background. $\underline{x}_{2,i}$ are a subgroup of such time-invariant regressors that interact with time. In the analysis for example gender and the highest educational degree are such regressors. Their interaction in time implies that I allow the wage structure to change with such characteristics over time. The next set of regressors, $\underline{x}_{3,i,t}$ are time-varying regressors that are assumed to have a time-constant effect on real wages and which can change by one unit only between two subsequent points in time. The number of voluntary and involuntary moves between jobs will be such a regressor and I assume here that the return to each such job change is constant and only one such job change is possible between two subsequent points in time. Moreover, individual specific unobservables and time specific unobservables affect the logarithmic real wage. Their effects are represented by the parameters α_i and μ_t. Finally, an error term $\varepsilon_{i,t}$ captures unobserved effects on $ln(w_{i,t})$ that vary both over individuals and time. Then, a linear model of the logarithmic real wage is

$$ln(w_{i,t}) = \beta_0 + \underline{x}'_{1,i}\underline{\beta}_1 + (\underline{x}_{2,i} \cdot t)'\underline{\beta}_2 + \underline{x}'_{3,i,t}\underline{\beta}_3 + \alpha_i + \mu_t + \varepsilon_{i,t} \quad (1)$$

The time unit will be years. In first differences we get the annual change of the log wage as

$$\Delta ln(w_{i,t}) \;=\; \underline{x}'_{2,i}\underline{\beta}_2 + \Delta\underline{x}'_{3,i,t}\underline{\beta}_3 + \Delta\mu_t + \Delta\varepsilon_{i,t} \quad (2)$$

I modify equation 2 and assume that the error term, $\Delta\varepsilon_{i,t}$, is made up of an individual specific error term u_i and an error term that both varies over individuals and time, $v_{i,t}$. I assume u_i to be a random effect of individual specific changes of log wages. The model is hence

$$\Delta ln(w_{i,t}) \;=\; \underline{x}'_{2,i}\underline{\beta}_2 + \Delta\underline{x}'_{3,i,t}\underline{\beta}_3 + \Delta\mu_t + u_i + v_{i,t} \quad (3)$$

I additionally introduce in this equation regressors that are time-varying in a systematic way provided that their effect on the log real wage is non-linear. This will be different groups of labour market experience in the analysis. I will introduce such regressors with their value in period $t-1$, $\underline{x}_{4,i,t-1}$.[3] Their parameters hence give some insight on whether they non-linearly determine the logarithmic real wage. E.g., human capital theory suggests that log wages rise with experience at a decreasing rate. In turn the annual log wage changes are lower the higher is experience. The final equation is then:

$$\Delta ln(w_{i,t}) = \underline{x}'_{2,i}\underline{\beta}_2 + \Delta\underline{x}'_{3,i,t}\underline{\beta}_3 + \underline{x}_{4,i,t-1}\underline{\beta}_4 + \Delta\mu_t + u_i + v_{i,t} \quad (4)$$

So we have a model of real wage change in which we can identify the following: $\underline{\beta}_2$ represents annual changes in the wage structure of different groups of individuals. $\underline{\beta}_3$ is the effect of a unit increase in a time-varying covariate on the individual log real wage. The elements of $\underline{\beta}_4$ identify non-linear effects of time-varying covariates that change systematically with time. Finally $\Delta\mu_t$ represents annual changes in the log real wages that stem from changes in unobservables that only vary over time and hence the effects of time dummies. The estimated parameters will be interpret in the usual way: $[exp(\beta_j) - 1] \cdot 100\%$ is the exact percentage change of the wage due to a rise of some covariate x_j by one unit. For small parameter values this percentage change can be approximated by $\beta_j \cdot 100\%$.

I use panel data to estimate the parameters of equation 4. Thus the econometric model will take into account that $\Delta ln(w_{i,t})$ may depend on an individual specific effect u_i, when computing standard errors of the coefficients: Observations of the very same individual are treated as a cluster. The method for estimating the parameters is median regression .[4] The advantage of median regression in this context is that it is less sensitive to outliers than ordinary linear regression models.

The data stem from the German Socio-economic Panel (GSOEP). It is the only data set that provides such information for both east and west Germany for the period of interest from 1990 to 1996. The panel study started in west Germany already in 1984. Its first interviews in east Germany were carried out in June 1990. It provides information on the monthly gross wage in the month prior to the interview as well as on hours worked, so that an hourly wage can be computed. Usually the annual interviews are carried out in late winter/early spring. The exception is the first wave for east Germany which collected data mainly in June and July 1990. I compute real wages of the respondents by deflating their wages with the consumer price of the region of

[3] I will also control for the industry at in period $t-1$. Hence, if individuals change their job and industry, the effect of the industry change will be part of the effect of the job change.

[4] For a discussion of this technique see Koenker and Hallock (2001).

residence (east or west Germany) in each year. The east German consumer price index was made comparable to the west German one (1990=1) using a computed purchasing power parity as in Krause (1994).

The sample is selected as follows: I include observations (pairs of two subsequent years) of respondents with at least two subsequent interviews in the period 1990/91 to 1995/96 and who were employed at these interviews and provided valid wage information to compute their annual log wage difference. The sample is further restricted to workers aged 18 to 53 years, who are not self-employed or on vocational training. Moreover, only observations are kept with valid values of the covariates.

Table 1 shows some descriptive statistics of the sample. I consider three samples: east Germans in 1990/91, the first year of the transition process, east Germans from 1991/92 to 1995/96, and west Germans over the entire period from 1990/91 to 1995/96.[5] The first and third row show that there are immense differences in the average change of log monthly and of log hourly real wages of these samples. The average change of log monthly wages of east Germans in the first year of the transition process is 0.189, while in the remainder part of the observation period it is only about half as high. For west Germans over the entire period we have an average log monthly wage change of 0.03 that is far smaller than for east Germans.

Let me turn your attention to the last five rows in Table 1 which represent covariates of job change. "Δ working in west" is a covariate that takes on the value 0 if there is no change in the region of the job. It is 1 if there is a change of job from east to west Germany and -1 if the move is in the other direction.[6] This covariate is not considered for west Germans as the number of west German sample members changing their job form the west to the east German region is very small. The other job change covariates are binary variables that take on the value 0 if no such move occurred and 1 otherwise. Voluntary move mainly refers to a quit.[7, 8] Involuntary movers are respondents who were either dismissed, whose company closed or whose temporary contract terminated. The final group "other move reason" identifies respondents who moved for other reasons or did not provide a reason for their job end. The groups is extremely small in size.

[5]The two periods for east Germans were chosen as in Hunt (2001).

[6]This does not imply that there also must be a change in the region of residence.

[7]The GSOEP collects information on the month of a job end and the reason for such a job end retrospectively each year. The respondents are asked to specify the calendar month of a job end both for the last calendar year and for the interview year. The wage information in each wave refers to the month prior to the interview month. Hence, I used the job end information to determine the reason of a job end that occurred between the months of two subsequent wage observations of an individual.

[8]I also categorized a few individuals who responded to the reason for job end question with "end of training" or "leave of absence", provided they did not return to their employer, as voluntary movers. They make up less than five percent of the voluntary moves.

Table 1: Descriptive statistics of the sample

	East, 1990/91		East, 1991/92 - 1995/96		West, 1990/91 - 1995/96	
	Mean	SD	Mean	SD	Mean	SD
Δ Log monthly wage	0.189	(0.350)	0.096	(0.248)	0.030	(0.206)
Log monthly wage	7.391	(0.361)	7.778	(0.396)	8.022	(0.498)
Δ Log hourly wage	0.285	(0.457)	0.082	(0.304)	0.029	(0.258)
Log hourly wage	2.172	(0.314)	2.580	(0.377)	2.925	(0.386)
Female	0.485		0.471		0.391	
Foreign	.		.		0.272	
General schooling	0.027		0.020		0.254	
University	0.107		0.128		0.110	
Apprenticeship	0.607		0.583		0.404	
Vocational training	0.259		0.269		0.232	
Experience:						
$<$ 6 years	0.068		0.048		0.046	
6 to 10 years	0.137		0.125		0.174	
11 to 15 years	0.207		0.206		0.186	
16 to 20 years	0.164		0.203		0.153	
21 to 25 years	0.165		0.173		0.141	
26 to 30 years	0.121		0.130		0.147	
$>$ 30 years	0.138		0.115		0.152	
Tenure (months)	135.5	(105.4)	103.9	(104.0)	111.9	(96.5)
Working in west	.		0.090		.	
Job Change:						
Stay with the firm	0.836		0.909		0.938	
Voluntary move	0.081		0.039		0.040	
Involuntary move	0.076		0.049		0.018	
Other move reason	0.007		0.003		0.004	
Δ working in west	0.051		0.005		.	
Sample size	1498		6050		15005	

[a] Undifferenced variables refer to the value of covariate at $t-1$, the start of a year pair, differenced values represent the first difference of some variable, $\Delta x_t = x_t - x_{t-1}$.
[b] The number of months between two subsequent interviews is not always 12. But the change of the log wage represents an annualized change. From the raw data of a respondent the average monthly rate of wage increase between two interviews was computed. This rate was then assumed to be constant to compute the wage rise over one year and in turn the annualized log wage change.

The descriptive statistics in Table 1 show that voluntary moves where quite important for east Germans in the first year of the transition process at 8 % of the sample. In the next five years the corresponding number is only about half as a high for east Germans and roughly as high as for west Germans (column 3). But not surprisingly involuntary moves are more frequent among east than among west Germans. At 7.6 % in 1990/91 and 4.9 % in the years between 1991/92 and 1995/96 in both subperiods east German respondents are characterised by a much higher percentage of involuntary job changers than west German respondents at only 1.8 %.

Table 2 displays the median of the change in the log monthly wage of stayers and compares it to that of voluntary and involuntary movers. Note first, that these numbers

are quite similar to those presented in Hunt (2001). Note next, that compared with stayers in the first year of the east German transition process voluntary movers and involuntary movers are characterised by a higher median log monthly wage change. For west Germans and east Germans over the period 1991/92 to 1995/96 instead it is lower for involuntary movers than for stayers.

Table 2: Median of changes in log monthly wages of stayers, voluntary movers and involuntary movers

	East, 1990/91	East, 1991/92 - 1995/96	West, 1990/91 - 1995/96
Stay with the firm	0.127	0.072	0.018
Voluntary move	0.443	0.113	0.083
Involuntary move	0.216	0.039	0.001

In the Appendix Table A1 I compare some descriptive statistics and regression results to those presented in the related study of Hunt (2001). The appendix also discusses differences between the definitions of types of job change in this and in Hunt's study. Instead of defining them mainly as respondents who quit their job, voluntary movers are much more broadly defined in her study.

3 Median regression results

The parameters of all specifications presented in this section were estimated by median regression for both the change in log real monthly earnings and log real hourly wages. They are estimated separately for the entire sample and for men only. The observation period includes wage changes from 1990/91 to 1995/96. For east German workers I estimated two separate equations for each of the periods 1990/91, a period of extremely rapid real wage growth, and 1991/92 to 1995/96. For west Germans I only consider one equation for the entire period.

Base specification

The first specification controls for gender, different experience[9] and education groups, tenure, and type of job change. I also add controls for industry and year dummies, provided that several years of data are pooled.[10] For the sample of East Germans in the period 1991/92 to 1995/96, I additionally control for working in the west (German region). I concentrate the discussion on the key covariates: Experience and type of job change (whether an employer change leads to working in west Germany, whether the

[9]Experience is computed as age − 6 − years of full-time education.

[10]I control for eight industry dummies and year dummies for each period except for the first reference period.

employer change was voluntary, involuntary or due to other reasons). Table 3 presents the coefficients and bootstrapped standard errors for the first specification.[11] The first two columns present the estimation results for east Germans in the period 1990/91. The third and fourth column do so for east Germans for 1991/92 to 1995/96, while the last two columns display the results for the pooled observations of west Germans over the period 1990/91 to 1995/96.

The first seven coefficients represent effects of experience dummies. The reference individual has less than six years of experience. For east Germans in both periods there is very little variation of the change of log annual earnings over experience groups (column one and three). The same holds for the change of log hourly wages over 1991/92 to 1995/96 period. Only for the first year of the east German transition process (column 2) the coefficients imply that the log hourly wage change tends to depend negatively on experience: The two highest experience groups (26 to 30 years and more than 30 years) are characterised by an annual wage change that is more than four percent lower than for the reference group. However, these differences are not well determined. This is what we would have expected for a transition economy, where due the introduction of new production techniques experienced as well as inexperienced workers invest similarly in on-the-job training. In contrast, the annual wage change of west Germans over the period 1990/91 to 1995/96 generally tends to decrease in experience and many of the differences to the reference group are significant. E.g., for the hourly wage (column six), the experience group 6 to 10 years already gains more than two percent less than the reference group. The experience groups 26 to 30 and more than 30 years even gain roughly four percent less than workers with less than six years of experience.[12]

Now turn to the coefficients on job changes: The reference group are stayers. The effects of a voluntary and an involuntary move/job change represent effects of job changes within the region. The comparison group are stayers. Between 1990 and 1991, voluntary job change is associated with a significant and substantial rise of earnings of east Germans of close to 14 %, while the hourly wage rise is much lower at 3.6 % and badly determined. The coefficients for voluntary change in column three and four of Table 3 imply for the period from 1991/92 to 1995/96 that the monthly and

[11] 1000 bootstraps were performed.

[12] The effect of on-the-job training on wages and hence annual wage changes may work through experience (general human capital accumulation) and through tenure (job-specific human capital accumulation). In order to see their combined effect on wage changes one should actually not include a tenure control. I nevertheless included a linear term for tenure in the specifications as a control variable. Tenure could also measure other types of impacts on wage changes than the accumulation of job-specific-human capital like the taste for mobility of the worker. I have estimated the specifications also without this tenure control variable and the results do not change considerably.

Table 3: Base specification, entire sample (coefficients)[a]

	Dependent variable: $\Delta ln(w)$					
	East, 1990/91		East, 1991/92 - 1995/96		West, 1990/91 - 1995/96	
	monthly	hourly	monthly	hourly	monthly	hourly
Female	0.0243	0.0118	0.0103	0.011	-0.001	-0.002
	(0.015)	(0.018)	(0.005)	(0.006)	(0.002)	(0.002)
Foreigner	.	.	.	.	-0.006	-0.0018
	.	.	.	.	0.002	(0.003)
Experience:						
6 to 10 years	-0.0058	-0.0173	0.0138	-0.0056	-0.0179	-0.0211
	(0.033)	(0.040)	(0.016)	(0.016)	(0.005)	(0.008)
11 to 15 years	0.0018	-0.0188	-0.0059	-0.019	-0.027	-0.0273
	(0.031)	(0.039)	(0.015)	(0.016)	(0.005)	(0.008)
16 to 20 years	-0.0045	-0.0179	-0.0123	-0.0236	-0.0334	-0.0328
	(0.032)	(0.043)	(0.015)	(0.015)	(0.005)	(0.008)
21 to 25 years	-0.014	-0.0216	-0.0077	-0.013	-0.035	-0.0355
	(0.036)	(0.042)	(0.015)	(0.015)	(0.005)	(0.008)
26 to 30 years	-0.0185	-0.0406	-0.0128	-0.0116	-0.0409	-0.0418
	(0.041)	(0.048)	(0.015)	(0.016)	(0.005)	(0.008)
$>$ 30 years	-0.0297	-0.0427	-0.0154	-0.0117	-0.0403	-0.0379
	(0.039)	(0.045)	(0.016)	(0.017)	(0.005)	(0.008)
General schooling	0.0824	0.0885	-0.0101	0.0001	-0.0052	-0.0038
	(0.072)	(0.062)	(0.022)	(0.019)	(0.003)	(0.003)
General schooling (foreign)	.	.	.	.	-0.0043	-0.004
	.	.	.	.	0.004	(0.004)
University	-0.0683	-0.086	0.014	0.0174	0.0011	-0.0052
	(0.019)	(0.029)	(0.006)	(0.009)	(0.002)	(0.003)
Vocational training	-0.033	-0.0559	-0.0044	-0.0097	-0.0027	-0.0007
	(0.017)	(0.020)	(0.005)	(0.006)	(0.002)	(0.002)
Tenure (months)/1000	-0.0162	0.0056	0.0377	-0.0078	-0.02	-0.0385
	(0.079)	(0.111)	(0.026)	(0.027)	(0.033)	(0.046)
Works in the west	.	.	-0.0432	-0.0487	.	.
	.	.	(0.008)	(0.010)	.	.
Voluntary move	0.1301	0.0358	0.0478	0.0388	0.0456	0.0488
	(0.045)	(0.047)	(0.024)	(0.024)	(0.009)	(0.011)
Involuntary move	0.0589	-0.0472	-0.0391	-0.0553	-0.0237	-0.0339
	(0.040)	(0.039)	(0.022)	(0.020)	(0.014)	(0.020)
Other move reason	0.289	0.3525	0.0325	-0.0047	-0.0133	-0.022
	(0.216)	(0.254)	(0.049)	(0.065)	(0.039)	(0.063)
Δ working in west	0.4191	0.3669	0.0819	0.0868	.	.
	(0.056)	(0.086)	(0.038)	(0.029)	.	.
Constant	0.3204	0.3786	0.1602	0.1372	0.0431	0.0563
	(0.056)	(0.057)	(0.019)	(0.020)	(0.006)	(0.009)
Industry dummies	Yes		Yes		Yes	
Year dummies	.		Yes		Yes	
# of obs.	1498		6050		15005	
Pseudo-R^2	0.102	0.071	0.050	0.029	0.012	0.008

[a] Bootstrapped standard errors in brackets.

hourly wage rise of voluntary job changers is much more similar at 4.8 % and about four percent, respectively. But these two coefficients are insignificant. Compared with these latter two figures the corresponding west German wage gain of voluntary job

changers is of a similar order of magnitude.

For involuntary job change I find a six percent monthly wage gain and roughly five percent hourly wage loss for east Germans between 1990 and 1991. But both coefficients are not significant. This is different for wage changes of the years 1991/92 to 1995/96, where the monthly earnings loss associated with an involuntary change is close to four percent and the hourly wage loss is more than five percent for east Germans. For west Germans a statistically significant (10 % level) wage loss is associated with involuntary job changes from 1990/91 to 1995/96. Though in absolute terms it is about two percentage points lower than for east Germans from 1991/92 to 1995/96. I will not comment on the coefficients of the group of job changers referred to as "other move reason". This group represents only very few observations.

Column one and two show that a change to west Germany in the first year of the transition process is associated with an immense wage gain of east Germans: The coefficients imply a (statistically significant) gain of more than 50 % on a monthly basis and about 44 % on an hourly basis. Over the next five years of the observation period (column three and four) though it is much lower at 8.5 to nine percent.[13]

Table 4 repeats the exercise of Table 3 limiting the sample to men only.[14] In qualitative terms, the results on experience for west Germans (column five and six) are similar to those achieved with the entire sample. The differences in wage change between the six experience groups and the reference group is though a bit more pronounced than in Table 4. For east Germans the main message of Table 4 is that the coefficients for the period 1991/92 to 1995/96 now imply that all experience groups are characterised by a lower hourly wage gain than the less then six years references group. These differences are much more pronounced than for the entire sample, but they are still insignificant. Moreover, the hourly wage change of all the experience groups starting with six to ten up to more than 30 years of experience is quite similar, which is still in line with the expectations.

Some coefficients displayed in Table 4 imply remarkable differences between the results for the male and for the entire sample. One remarkable difference in terms of size is that involuntary job changes of east German men for the monthly wage is associated

[13]One may interpret these effects as additional to the effects of another type of move. Note however, that individuals who changed the region of their job from east to west and vice versa may be individuals who did not end their job/employer but just changed the from one workplace of their company to another.

[14]I have not carried out an analysis for women only, since there is much lower job change among female than among male workers. Nor did I display descriptive statistics for the female subsample. They are available on request.

Table 4: Base specification, men (coefficients)[a]

	Dependent variable: $\Delta ln(w)$					
	East, 1990/91		East, 1991/92 - 1995/96		West, 1990/91 - 1995/96	
	monthly	hourly	monthly	hourly	monthly	hourly
Foreigner	.	.	.	.	-0.0068	-0.0034
	.	.	.	.	(0.003)	(0.004)
Experience:						
6 to 10 years	0.0097	0.024	0.012	-0.0302	-0.0213	-0.0301
	(0.057)	(0.066)	(0.024)	(0.034)	(0.009)	(0.013)
11 to 15 years	0.0142	-0.027	-0.0054	-0.03	-0.0283	-0.0336
	(0.052)	(0.062)	(0.025)	(0.034)	(0.008)	(0.012)
16 to 20 years	0.0052	0.0229	-0.0035	-0.0257	-0.0364	-0.039
	(0.053)	(0.068)	(0.025)	(0.034)	(0.008)	(0.012)
21 to 25 years	-0.0039	-0.0169	0.0008	-0.025	-0.0399	-0.0461
	(0.062)	(0.067)	(0.025)	(0.033)	(0.008)	(0.013)
26 to 30 years	0.019	0.0225	-0.0203	-0.0409	-0.0449	-0.0518
	(0.069)	(0.073)	(0.026)	(0.034)	(0.008)	(0.012)
$>$ 30 years	-0.0063	-0.0365	-0.0237	-0.0325	-0.0451	-0.0484
	(0.061)	(0.064)	(0.025)	(0.035)	(0.008)	(0.013)
General schooling	0.1245	0.162	-0.006	0.0003	-0.0031	-0.0006
	(0.130)	(0.118)	(0.038)	(0.033)	(0.004)	(0.005)
General schooling (foreign)	.	.	.	.	-0.0073	-0.0024
	.	.	.	.	(0.004)	(0.005)
University	-0.0756	-0.1018	0.0114	0.0155	-0.0006	-0.0081
	(0.028)	(0.048)	(0.010)	(0.014)	(0.003)	(0.003)
Vocational training	-0.0002	0.0093	-0.0148	-0.0082	-0.0006	-0.0009
	(0.033)	(0.036)	(0.008)	(0.011)	(0.002)	(0.003)
Tenure (months)/100	-0.0665	-0.1493	0.0503	-0.003	-0.0128	-0.0353
	(0.126)	(0.145)	(0.033)	(0.046)	(0.011)	(0.015)
Works in the west	.	.	-0.0593	-0.0523	.	.
	.	.	(0.010)	(0.014)	.	.
Voluntary move	0.148	0.0311	0.0561	0.0303	0.0433	0.0614
	(0.059)	(0.058)	(0.026)	(0.035)	(0.015)	(0.014)
Involuntary move	0.0988	0.0086	-0.0176	-0.0661	-0.0082	-0.0083
	(0.080)	(0.091)	(0.023)	(0.025)	(0.016)	(0.018)
Other move reason	0.4478	0.4066	0.0068	-0.009	-0.0133	-0.0154
	(0.435)	(0.203)	(0.117)	(0.110)	(0.067)	(0.074)
Δ working in west	0.4281	0.4786	0.1273	0.1259	.	.
	(0.082)	(0.110)	(0.042)	(0.043)	.	.
Constant	0.296	0.3915	0.1162	0.0935	0.0442	0.0609
	(0.069)	(0.067)	(0.028)	(0.036)	(0.009)	(0.014)
Industry dummies	Yes		Yes		Yes	
Year dummies	.		Yes		Yes	
# of obs.	771		3199		9136	
Pseudo-R^2	0.147	0.090	0.036	0.021	0.014	0.010

[a] Bootstrapped standard errors in brackets.

with a rise that is close to ten percent and nearly twice as high as for the entire sample in the period 1990/91. Moreover, in contrast to results for the entire sample, there is nearly no wage loss associated with involuntary job change of west German men and it is also not well determined.

Job change interacting with experience

Table 5 presents results of a specification that adds interactions terms between the job change variables and two experience groups: 11 to 20 years and more than 20 years of experience. The wage change associated with job change should be lower the more experienced workers are in the non-transition economy. The reason is that experienced workers gain less from job changes, since they are more likely than inexperienced workers to work in good job matches. But in the transition economy this is not necessarily the case: The transition process may have destroyed a high match quality that experienced workers had achieved during their career.

The coefficients of the six experience groups as displayed by Table 5 still by and large reflect the implications of Table 3. So let us directly turn to the effects of job change and in particular their interaction with experience. In nearly all regressions the interaction terms between voluntary or involuntary moves and experience groups are badly determined. The exception is one interaction term for the hourly wage rate of west Germans: The coefficient for the interaction of involuntary move with more than 20 years of experience.

Most of the coefficients for quits displayed in Table 5 indicate considerable wage gains for workers with an experience of less than 11 years. For east Germans over the period 1991/92 to 1995/96 these wage gains are statistically significant and high at a more than 16 % rise of the monthly wage and a more than 13 % rise of the hourly wage. For west Germans in the same experience group instead the corresponding numbers are between five and six percent and hence much lower. There is no clear pattern for the two higher experience groups of 11 to 20 and more than 20 years. First of all, only in 1990/91 both interaction coefficients of east Germans imply that they do not gain less (or even lose) in terms of monthly and hourly wages from a quit than workers with no more than 10 years of experience. I expected this also for the period 1991/92 to 1995/96. But in this period the interaction coefficients imply that east German workers with more than ten years experience gain much less from a voluntary job change than those with less than 11 years of experience. For west Germans negative values of these interaction terms were expected, as experienced workers should have less room to improve wages by voluntary job changes than relatively inexperienced workers. The coefficients experience interactions with voluntary quits are negative, but they are quite small, so that the results are not in line with this hypothesis. In none of the equations the coefficients of interactions between quits and experience are well-determined.

The coefficients of involuntary job change in Table 5 imply the following for east Ger-

TABLE 5: JOB CHANGE INTERACTING WITH EXPERIENCE, ENTIRE SAMPLE (COEFFICIENTS)[a]

	Dependent variable: $\Delta ln(w)$					
	East, 1990/91		East, 1991/92 - 1995/96		West, 1990/91 - 1995/96	
	monthly	hourly	monthly	hourly	monthly	hourly
Female	0.0265	0.0142	0.0107	0.0127	-0.0011	-0.0019
	(0.014)	(0.018)	(0.005)	(0.006)	(0.002)	(0.002)
Experience:						
6 to 10 years	-0.0023	-0.0165	0.0143	-0.0045	-0.0182	-0.0215
	(0.034)	(0.041)	(0.016)	(0.015)	(0.005)	(0.008)
11 to 15 years	0.0087	-0.0189	-0.0059	-0.0156	-0.027	-0.027
	(0.032)	(0.040)	(0.015)	(0.015)	(0.005)	(0.007)
16 to 20 years	0.0059	-0.0131	-0.0109	-0.022	-0.0332	-0.0323
	(0.033)	(0.044)	(0.016)	(0.015)	(0.005)	(0.008)
21 to 25 years	0.0047	-0.0192	-0.0083	-0.0137	-0.0347	-0.035
	(0.035)	(0.043)	(0.016)	(0.015)	(0.005)	(0.007)
26 to 30 years	-0.013	-0.0312	-0.013	-0.0104	-0.0407	-0.041
	(0.040)	(0.046)	(0.016)	(0.015)	(0.005)	(0.008)
$>$ 30 years	-0.022	-0.0406	-0.0158	-0.0098	-0.0397	-0.0375
	(0.040)	(0.045)	(0.017)	(0.016)	(0.005)	(0.008)
Works in the west	.	.	-0.0433	-0.0507	.	.
	.	.	(0.007)	(0.010)	.	.
Job change:						
Voluntary move	0.1167	0.021	0.1529	0.1251	0.0516	0.0594
	(0.083)	(0.103)	(0.079)	(0.073)	(0.013)	(0.016)
Voluntary move	0.0298	0.0262	-0.1355	-0.1151	0.0011	-0.0143
x exper. 11 to 20 years	(0.107)	(0.116)	(0.085)	(0.081)	(0.026)	(0.026)
Voluntary move	0.0353	-0.1199	-0.0992	-0.0845	-0.0212	-0.014
x exper. $>$ 20 years	(0.159)	(0.171)	(0.099)	(0.087)	(0.024)	(0.028)
Involuntary move	0.1058	0.0066	-0.0653	-0.0752	0.0013	-0.0038
	(0.072)	(0.093)	(0.043)	(0.038)	(0.029)	(0.021)
Involuntary move	-0.0545	-0.0222	0.0347	-0.0034	-0.0329	-0.0105
x exper. 11 to 20 years	(0.084)	(0.112)	(0.054)	(0.060)	(0.045)	(0.042)
Involuntary move	-0.1365	-0.1218	0.0359	0.0332	-0.0441	-0.0818
x exper. $>$ 20 years	(0.096)	(0.108)	(0.057)	(0.051)	(0.041)	(0.031)
Other move reason	0.309	0.3385	0.0344	-0.0035	-0.0133	-0.0215
	(0.221)	(0.251)	(0.053)	(0.055)	(0.037)	(0.063)
Δ working in west	0.402	0.3854	0.1877	0.1731	.	.
	(0.094)	(0.133)	(0.068)	(0.054)	.	.
Δ working in west	-0.1501	-0.178	-0.0822	-0.0709	.	.
x exper. 11 to 20 years	(0.160)	(0.204)	(0.096)	(0.086)	.	.
Δ working in west	0.0946	0.3336	-0.1697	-0.1737	.	.
x exper. $>$ 20 years	(0.204)	(0.230)	(0.080)	(0.066)	.	.
Constant	0.334	0.3935	0.1584	0.1366	0.043	0.0561
	(0.059)	(0.058)	(0.019)	(0.018)	(0.006)	(0.009)
Education, industry	Yes		Yes		Yes	
Further controls	tenure		tenure, year dummies		foreigner, tenure, year dummies	
# of obs.	1498		6050		15005	
Pseudo-R^2	0.106	0.075	0.052	0.030	0.012	0.009

[a] Bootstrapped standard errors in brackets.

man workers: During the first year of the transition process (period 1990/91) those with less than 11 years of experience gain from an involuntary move by a rise of more than ten percent in terms of monthly wages. But for them there is nearly no hourly wage gain. The interaction terms with experience show that the higher the experience, the lower the monthly wage change during the first year of the transition process. In terms of monthly wages, the more than 20 years experience group even faces a wage loss. In terms of hourly wages both higher experience groups do so. During the period 1991/92 to 1995/96 the situation is different for east German workers. For the experience group of less than 11 years an involuntary move is associated with a wage loss of more than 6.5 % in terms of earnings and more than 7.5 % in terms of hourly wages. The interaction terms for the two other experience groups imply that they also face a wage loss. But it is either the same or lower than for the less than 11 years experience group.

The last two columns of Table 5 show that for west Germans in the low experience group there is nearly no wage change associated with involuntary job changes. But according to the interaction terms there is a wage loss for the two higher experience groups which tends to increase with experience. The interaction coefficient for those with 11 to 20 years of experience implies a decline of the monthly wage associated with an involuntary move by about three percentage points of the hourly wage of about one percentage point. The corresponding numbers for the more than 20 years experience group are more than four and more than eight percent.

The results for east Germans on voluntary and involuntary job change only refer to a change within the region. The additional wage change if the east German workers also moved to west Germany is again considerable. Those with less than 11 years of experience gained close to 50 % in terms of monthly and hourly wages in the period 1990/91 and close to 20 % over the period 1991/92 to 1995/96. In both periods the change to the west is associated with a considerably lower gain for east German workers with 11 to 20 years of experience. For the hourly wage it is roughly 24 percentage points lower in the first period and roughly nine percentage points lower in the second period. The more than 20 years experience group instead in the 1990/91 period gained even more from a change to the west than the less than 11 years experience group. In terms of hourly wages their wage rise associated with a job change to west Germany was nearly twice that of the less than 11 years experience group. However, in the 1991/92 to 1995/96 period they nearly did not gain at all by changing from east to west Germany.

Table 6 presents the coefficients of the same specifications estimated for the male sub-

Table 6: Job change interacting with experience, men (coefficients)[a]

	Dependent variable: $\Delta ln(w)$					
	East, 1990/91		East, 1991/92 - 1995/96		West, 1990/91 - 1995/96	
	monthly	hourly	monthly	hourly	monthly	hourly
Experience:						
6 to 10 years	-0.0012	0.0067	0.0217	-0.012	-0.0218	-0.0279
	(0.057)	(0.066)	(0.024)	(0.032)	(0.009)	(0.012)
11 to 15 years	0.0297	-0.0237	0.011	-0.0077	-0.0288	-0.0305
	(0.051)	(0.058)	(0.025)	(0.032)	(0.009)	(0.012)
16 to 20 years	0.0265	0.0427	0.0106	-0.0065	-0.0368	-0.0358
	(0.053)	(0.065)	(0.024)	(0.032)	(0.009)	(0.012)
21 to 25 years	0.0035	-0.009	0.0168	-0.0083	-0.0402	-0.0425
	(0.060)	(0.066)	(0.025)	(0.032)	(0.009)	(0.012)
26 to 30 years	0.0304	0.028	-0.0026	-0.0246	-0.045	-0.0486
	(0.072)	(0.073)	(0.025)	(0.033)	(0.009)	(0.012)
$>$ 30 years	0.0142	-0.0144	-0.0071	-0.0136	-0.0454	-0.0445
	(0.062)	(0.060)	(0.025)	(0.032)	(0.009)	(0.012)
Works in the west	.	.	-0.0546	-0.0589	.	.
	.	.	(0.010)	(0.014)	.	.
Job change:						
Voluntary	0.1422	0.0188	0.1525	0.0591	0.0489	0.0675
	(0.109)	(0.140)	(0.069)	(0.072)	(0.022)	(0.021)
Voluntary	0.0017	0.0247	-0.1445	-0.0649	-0.0057	-0.0057
x exper. 11 to 20 years	(0.137)	(0.152)	(0.074)	(0.086)	(0.034)	(0.034)
Voluntary	0.0393	0.0589	-0.0643	-0.0295	-0.0026	-0.0163
x exper. $>$ 20 years	(0.207)	(0.206)	(0.086)	(0.095)	(0.044)	(0.042)
Involuntary	0.2062	0.0706	-0.0314	-0.0894	-0.003	0.0017
	(0.132)	(0.116)	(0.071)	(0.049)	(0.033)	(0.024)
Involuntary	-0.1725	-0.0781	0.0314	0.0265	0.0039	0.0225
x exper. 11 to 20 years	(0.187)	(0.194)	(0.078)	(0.070)	(0.042)	(0.055)
Involuntary	-0.1493	-0.2883	0.0004	0.0331	-0.0346	-0.0867
x exper. $>$ 20 years	(0.224)	(0.229)	(0.078)	(0.062)	(0.049)	(0.047)
Other move reason	0.449	0.3917	0.0081	0.0383	-0.01	-0.0158
	(0.423)	(0.192)	(0.124)	(0.121)	(0.066)	(0.076)
Δ working in west	0.4441	0.4997	0.2144	0.2012	.	.
	(0.143)	(0.140)	(0.103)	(0.082)	.	.
Δ working in west	-0.1659	-0.3245	-0.0726	-0.0558	.	.
x exper. 11 to 20 years	(0.244)	(0.242)	(0.117)	(0.136)	.	.
Δ working in west	0.0934	-0.0132	-0.1489	-0.1915	.	.
x exper. $>$ 20 years	(0.257)	(0.272)	(0.121)	(0.098)	.	.
Constant	0.3157	0.3993	0.0987	0.0733	0.0446	0.0576
	(0.068)	(0.069)	(0.028)	(0.033)	(0.009)	(0.013)
Education, industry	Yes		Yes		Yes	
Further controls	tenure		tenure, year dummies		foreigner, tenure, year dummies	
# of obs.	771		3199		9136	
Pseudo-R^2	0.152	0.097	0.039	0.024	0.014	0.010

[a] Bootstrapped standard errors in brackets.

sample. In qualitative terms and often in quantitative terms the coefficients on job change are by and large similar to those of the entire sample in Table 5. One important quantitative difference emerged for the hourly wage change equations of east

Germans in the 1991/92 to 1995/96 period. Voluntary job change of workers with less than 11 years of experience is associated with an about six percent wage rise, which is less than twice as high as for the entire sample.

A second difference emerges for involuntary job change of east Germans in the period 1990/91. The hourly wage change associated with an involuntary move of workers with less than 11 years experience was close to zero for the entire sample but is above seven percent for the male sample (column 2 of Table 6). Moreover, the additional result on the interaction between involuntary job change and > 20 years of experience indicates a wage loss of these high experience workers of roughly 20 % for the male sample; for the entire sample it was only 11 percent.

A third and substantial difference to the results achieved with the entire sample emerged for the coefficients of moving to west Germany in the 1990/91 period. The hourly wage gain of east Germans in the less than 11 years experience group is considerably higher at more than 64 percent than for the entire sample at only 47 percent. The corresponding numbers for the more the 20 years experience group are about 63 % and 105 %, as implied by their interaction terms of changing to the west with this experience group.

I interpret the results on interactions between job change and experience as follows: First of all only in the first year of the east German transition process higher experience is not associated with a lower wage gain from voluntary job change within the region. A potential reason for this is that the transition shock destroyed the old job match quality and hence a wage gain from voluntary job change should be similar for inexperienced and experienced workers. I expected this to hold for the period 1991/92 to 1995/96, which is not confirmed by the results. Matching theory suggests for a non-transition economy and hence for west Germans that voluntary job change is associated with a lower wage gain the higher is the worker's experience: The estimated coefficients are partly in line with this hypothesis but they are badly determined.

For involuntary job change, I find east Germans with more than 10 years of experience to gain less and even lose in terms of hourly wages compared with east Germans with less than 11 years of experience in the first year of the transition process. One reason for this is that initially the transition shock did probably not affect the wages in old job matches. Therefore, inexperienced movers who held job matches with a relatively low match quality gained more from changing their job than experienced movers. Yet over the period 1991/92 to 1995/96 this is different. Involuntary job change was associated with a wage loss for east German workers but the wage loss was no higher for experienced than for inexperienced workers. This is what I expected

for a transition economy, provided that the wages in old job matches react flexibly to the transition shock. In this case experienced workers become similar to inexperienced ones in terms expected gains (or losses) in match quality from a job change.

Finally for west Germans we find nearly no wage losses associated involuntary job change for the workers with less than 11 years of experience, while there are considerable wage losses for those with more than 20 years of experience. This would be in line with implications of matching or on-the-job search theory: Inexperienced workers who in contrast to experienced ones tend to work in job matches that are still at the lower end of the match quality distribution should face lower wage losses due to involuntary job changes than the more experienced workers.

Causal effects of job change on wages

So far the median regression results were rather concerned with wage changes that are associated with a job change. To quantify a causal effect, one would have to compare the wage change of individuals who do change job in the current period with their wage change had they stayed in their job. The latter is unobservable. The previous analysis assumed as a comparison group stayers, but their annual wage change is unlikely to approximate this unobservable term. Stayers may differ from movers with respect to unobservable determinants of their annual change in wages. The analysis that follows defines another comparison group: Workers who do stay in their job in this period but change the job in the subsequent period.[15] This implies for the stayers we need valid information of not only two but three subsequent waves of the GSOEP so that he/she contributes with one observation to the sample. In turn the sample sizes of this analysis are somewhat reduced.[16]

Table 7 present the coefficients of this median regression analysis. The specification is similar to that of Table 3. It additionally controls for stayers who changed their job not in this but in the subsequent period. This is done by adding a dummy variable for each type of their job changes (to the west, voluntary, involuntary, and other reason). The causal effect of a specific type of job change is then computed by the difference of the coefficient of movers in this period and the coefficient of movers in the subsequent (next) period. These causal effects are displayed at the bottom of Table 7.

The estimated causal effects of voluntary moves on wages are higher for east than for

[15]This identification strategy goes back to Mincer (1986) and underlies for example the study of Abbott and Beach (2001) on gains from job change of Canadian women.

[16]For the samples of east Germans the size decrease by about 27 % in the first period and 22 % in the second period. The sample size of west Germans decreases by roughly 20 %.

Table 7: Movers this period versus movers next period, entire sample (coefficients)[a]

	Dependent variable: $\Delta ln(w)$					
	East, 1990/91		East, 1991/92 - 1995/96		West, 1990/91 - 1995/96	
	monthly	hourly	monthly	hourly	monthly	hourly
Experience:						
6 to 10 years	-0.0741	-0.0643	0.0211	0.0224	-0.0145	-0.0121
	(0.040)	(0.053)	(0.016)	(0.017)	(0.006)	(0.009)
11 to 15 years	-0.0245	-0.0466	-0.0016	0.0133	-0.0232	-0.0202
	(0.041)	(0.052)	(0.015)	(0.016)	(0.006)	(0.009)
16 to 20 years	-0.0239	-0.0434	-0.0067	0.0048	-0.0283	-0.0238
	(0.041)	(0.052)	(0.015)	(0.016)	(0.006)	(0.009)
21 to 25 years	-0.028	-0.057	-0.0049	0.0145	-0.03	-0.027
	(0.041)	(0.051)	(0.015)	(0.016)	(0.006)	(0.009)
26 to 30 years	-0.0331	-0.0494	-0.0077	0.0132	-0.036	-0.0349
	(0.051)	(0.060)	(0.016)	(0.017)	(0.006)	(0.009)
$>$ 30 years	-0.0524	-0.0565	-0.0187	0.0051	-0.0323	-0.0285
	(0.052)	(0.057)	(0.016)	(0.019)	(0.006)	(0.009)
Works in the west	.	.	-0.0453	-0.0485	.	.
	.	.	(0.008)	(0.011)	.	.
Job change:						
Voluntary move	0.0741	-0.0119	0.0406	0.0269	0.0466	0.0472
this period	(0.043)	(0.055)	(0.028)	(0.026)	(0.010)	(0.011)
Voluntary move	-0.0985	-0.0915	-0.018	-0.0304	-0.0033	0.001
next period	(0.046)	(0.065)	(0.023)	(0.029)	(0.008)	(0.010)
Involuntary move	0.0088	-0.1053	-0.0397	-0.0564	-0.026	-0.0374
this period	(0.039)	(0.042)	(0.027)	(0.022)	(0.014)	(0.018)
Involuntary move	0.0001	0.0324	-0.0232	-0.0138	0.0082	0.0241
next period	(0.036)	(0.044)	(0.012)	(0.030)	(0.012)	(0.010)
Other move reason	0.2209	0.236	0.0523	-0.0198	-0.0135	-0.0232
this period	(0.260)	(0.323)	(0.063)	(0.081)	(0.037)	(0.061)
Other move reason	0.112	-0.1501	0.0322	-0.0365	0.0547	0.0283
next period	(0.020)	(0.024)	(0.067)	(0.156)	(0.031)	(0.037)
Δ working in west	0.4449	0.4448	0.0883	0.0979	.	.
this period	(0.061)	(0.089)	(0.042)	(0.037)	.	.
Δ working in west	-0.0488	-0.049	0.0196	0.034	.	.
next period	(0.060)	(0.095)	(0.018)	(0.022)	.	.
Constant	0.3904	0.445	0.1638	0.1171	0.0409	0.0526
	(0.068)	(0.072)	(0.021)	(0.021)	(0.007)	(0.010)
Education, industry	Yes		Yes		Yes	
Further controls	female, tenure		female, tenure, year dummies		female, foreigner, tenure, year dummies	
# of obs.	1088		4716		12147	
Pseudo-R^2	0.131	0.094	0.054	0.030	0.012	0.009
Causal Effects:						
Voluntary move	0.1726	0.0796	0.0586	0.0572	0.0499	0.0462
	(0.062)	(0.081)	(0.037)	(0.039)	(0.013)	(0.016)
Involuntary move	0.0087	-0.1377	-0.0165	-0.0426	-0.0342	-0.0615
	(0.052)	(0.058)	(0.030)	(0.040)	(0.020)	(0.022)
Δ working in west	0.4938	0.4937	0.0686	0.064	.	.
	(0.085)	(0.132)	(0.045)	(0.040)	.	.

[a] Bootstrapped standard errors in brackets.

west Germans. For west Germans it is 5.1 % on a monthly basis and 4.7 % on an hourly basis over the period 1990/91 to 1995/96. In the initial period 1990/91, the corresponding numbers for east Germans are 18.8 % and 8.3 % and for the period 1991/92 to 1995/96 they are both about six percent. Nevertheless, the standard errors imply that 95 % confidence bands for coefficients of west Germans would overlap with the corresponding ones of east Germans. So we cannot be very confident about these differences.

Now turn to the results on involuntary movers. For east Germans both in the initial year and the period 1991/92 to 1995/96, there is only a very little monthly wage change due to an involuntary move. On an hourly basis though their wages decrease considerably by about 13 % in the initial year and by 4.2 % in the period 1991/92 to 1995/96. The hourly wage loss in the 1990/91 period is high compared with that estimated for west Germans over the entire period 1990/91 to 1995/96. For them it is only about six percent. But again 95 % confidence bands for coefficients of west Germans would overlap with the corresponding ones of east Germans.

Finally turn to east Germans moving to west Germany. In the period 1990/91 the wage gain of this period movers is 56 % for both the monthly and hourly wage. But for both wage measures, the causal effect of a current period move is higher at about 64 %, since the next period movers though face a wage decrease. The causal effect for the period 1991/92 to 1995/96 is far lower: The wage rise due to changing to the west is 7.1 % for the monthly wage and 6.6 % for the hourly wage.[17]

4 Summary and conclusions

This paper analysed the determinants of real wage changes of east and of west German workers during the period of the first six years of the east German transition. Both changes of monthly earnings and hourly wages are considered. The focus is on effects of experience and different types of job change on wage changes. I applied median regression techniques to estimate these effects for different samples drawn from the German Socio-economic Panel.

The finding suggest first of all that annual log wage changes vary less with experience for workers in the transition economy than for workers in the non-transition economy. Moreover, the annual wage change tends to decrease in experience for the non-transition country. These findings are in line with hypotheses of human capital theory on the

[17] I estimated the same model as in Table 7 for men only. But I do not display the results, since most of the estimated causal effects do not differ substantially from those estimated for the entire sample. The results are available on request.

accumulation of human capital on the job. For a non-transition economy it expects workers to invest less in such human capital the higher their experience and hence the lower their time horizon to reap the benefits of such an investment. Hence, wages should increase at a declining rate with experience. In turn the annual wage changes should decline with experience. As in a transition economy new production techniques are introduced, the time invested in on-the-job training may vary less with the experience of workers than in a non-transition country. Hence, there is less variation of the annual wage change over different experience groups than in a non-transition country. And these results imply for a transition economy in contrast to a non-transition economy that the wage of a cohort of a experienced workers relative to that of a cohort of less experienced ones who keep their jobs should not decrease (much) over time during the period of the transition shock.

On-the-job search and matching theories imply that voluntary job changes should be associated with wage rise as workers change from lower to higher job match qualities. In a non-transition economy these wage rises should be lower the higher is a worker's experience. The reason is that workers with a high in contrast to a low experience in the labour market are more likely to have achieved a relatively high match quality in their current job match. Therefore their scope for raising the wage by a job change is lower than for workers with a low experience. This is not naturally the case for a transition economy, since the transition shock may destroy high match qualities of experienced workers. Therefore, their wage gain associated with a voluntary job change may be similar to that of inexperienced workers. But these hypotheses for the transition economy and the non-transition economy are not supported by the findings for east and west Germans. The estimated interaction effects between experience and voluntary job changes do not always reflect these implications and are for all samples badly determined.

Matching theories of job mobility also have implications with respect to the relationship between wage changes and involuntary job change. As inexperienced workers have still a larger scope to find better job matches than experienced ones, an involuntary job change should be associated with higher wage losses for the latter. And this is what I find for west Germans and hence the non-transition country. In contrast, for east Germans at least for the period 1991/92 to 1995/96 the evidence points to wage losses of involuntary leavers that are not higher for the experienced workers than for those with very little experience. That may imply that the transition shock made experienced workers similar to inexperienced ones: The high match quality of their old job match was destroyed and their wages in the old jobs partly adjusted downwards relative to

other wages in the economy.

Finally, I estimated causal effects of different types of job mobility. The identification strategy was to compare the wage change of this period movers with the wage change of stayers who move in the next period. A voluntary move causes a roughly five percent (hourly and monthly) wage gain for west Germans. Only in the first year of the transition process and only for their monthly wage, for east Germans this causal effect is substantially higher at more than 17 % (for a voluntary move within the region). But this difference to west Germans is not well determined. Involuntary job changes do nearly not alter the monthly wages of east Germans. But they decrease their hourly wages by nearly 14 % in the initial year of the transition process and by more than four percent in the next five year period. The hourly wage loss of west Germans caused by involuntary job changes is higher than six percent.

The results summarized so far are concerned with job changes within the economy. I also quantified the additional effect of changing job from east to west Germany. Let me only emphasize its causal effect on wages, which is not surprisingly immense. It is estimated to lead to a more than 60 % wage rise in the first year of the transition process. However in the following five years it is somewhat lower than ten percent.

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Appendix A: Appendix tables

The Appendix Tables compare some of the descriptives statistics of this paper with those presented in the paper of Hunt (2001). Note that for this comparison agricultural workers were excluded from my sample. Table A1 compares means and standard deviations of important variables. It is clear from the table that I could not entirely reproduce Hunt's sample as the sample sizes are larger than those in Hunt (2001).

For many of the variables though the means and standard deviations are very similar. This is particularly true for east Germans in the period 1990/91. Let me discuss some important differences between the two samples. The average log wage increase in of the subsample of west Germans over the period 1990/91 to 1995/96 is about only three quarters of that in Hunt's sample. Moreover for the same subsample the average tenure is 113.3 months compared to only 93.3 months in Hunt's sample.

There are some considerable difference concerning covariates of job change. The important difference is observed for voluntary movers whose share tends to be higher in her sample than in mine, while her share of involuntary movers tends to be below the one of my sample. This applies to east Germans over the period 1991/92 to 1995/96 and west Germans over the period 1990/91 to 1995/96.

One reason for these differences is that Hunt classified as involuntary movers all movers who were either dismissed or whose company closed. All others who terminated a job were classified as voluntary movers including those workers who terminated a fixed term contract. Provided that respondents did not specify the reason for the job termination, they were classified to a third category, "move reason unknown". Within firm movers were defined as stayers. In contrast to Hunt, I classified workers who terminated a fixed term contract as involuntary movers and not as voluntary movers.

Moreover, for east Germans over the period 1991/92 to 1995/96 and west Germans over the period 1990/91 to 1995/96 her share of stayers is lower than the one in my sample. One reason for this may be that respondents state the same job end twice in two different waves. The GSOEP asks respondents about the calendar month of a job end between the beginning of the last calendar year and the survey year's interview month. Hence, a respondent over two subsequent waves may indicate the same job end in both waves, provided that it occurred in the year of the first of two subsequent waves. In such cases I only classified the first of these two job end responses as a move. It is not clear from Hunt (2001) whether she proceeded in a similar way.

Table A1: Descriptive statistics: this sample versus the sample of Hunt (2001)

	East, 1990/91				East, 1991/92 - 1995/96				West, 1990/91 - 1995/96			
	Sample		Hunt's sample		Sample		Hunt's sample		Sample		Hunt's sample	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Δ Log monthly wage	0.177	(0.34)	0.20	(0.27)	0.096	(0.25)	0.09	(0.23)	0.031	(0.21)	0.04	(0.22)
Log monthly wage	7.40	(0.36)	7.39	(0.36)	7.78	(0.40)	7.82	(0.40)	8.06	(0.50)	8.07	(0.57)
Δ Log hourly wage	0.270	(0.45)	0.28	(0.34)	0.083	(0.30)	0.08	(0.29)	0.028	(0.26)	0.03	(0.26)
Log hourly wage	2.18	(0.31)	2.17	(0.30)	2.58	(0.38)	2.64	(0.38)	2.96	(0.38)	3.00	(0.41)
Female	0.507		0.51		0.476		0.48		0.397		0.40	
Age	37.81	(8.85)	37.3	(9.1)	38.25	(8.33)	37.40	(8.8)	37.88	(9.03)	36.90	(9.1)
Foreign	.		.		.		.		0.108		0.08	
General schooling	0.028		0.03		0.019		0.02		0.184		0.15	
University	0.112		0.11		0.131		0.13		0.143		0.15	
Apprenticeship	0.609		0.60		0.584		0.59		0.433		0.46	
Vocational training	0.251		0.25		0.266		0.26		0.240		0.24	
Tenure (months)	135.8	(106.98)	140.00	(110)	102.9	(104.21)	104	(107)	113.3	(96.43)	98.30	(81.7)
Working in west	.		.		0.092		0.09		.		.	
Stay with the firm	0.849		0.85		0.912		0.90		0.934		0.93	
Voluntary move	0.072		0.07		0.039		0.05		0.044		0.05	
Involuntary move	0.072		0.07		0.047		0.04		0.019		0.01	
Move reason unknown	0.007		0.01		0.003		0.01		0.003		0.01	
Δ working in west	0.045		0.045		0.005		0.005		.		.	
Sample size	1382		1323		5878		5653		15010		14600	

[a] Undifferenced variables refer to the value at the beginning of the period, differenced values represent the difference of two subsequent years.

[b] Arithmetic mean for west Germans weighted with sample weights.

Table A2 compares some median regression results of Hunt (2001) with those achieved with the sample constructed for this paper (excluding agricultural workers). The set of covariates though differs, because Hunt controlled for 27 industry dummies, while I controlled only for eight. Nevertheless, many coefficients are quite similar in sign and sometimes in size. Differences occur in particular with respect to the job change variables. In this compared to Hunt's analysis the coefficients of east Germans changing to the west turn out to be much higher in the period 1990/91 and somewhat higher in the period 1991/92 to 1995/96. Moreover, for east Germans in this latter period the coefficient of a voluntary change indicates a wage gain that is about two percentage points higher than in Hunt's analysis. Finally, involuntary job change is associated with larger wage losses as in Hunt's analysis when we regard east Germans in the period 1991/92 to 1995/96 and west Germans in the period 1990/91 to 1995/96. The reason for this most likely is again that job loss due to terminating a temporary contract in my analysis is classified as an involuntary job loss, while in Hunt's analysis it is a voluntary one. Note, this is not important for the sample of east Germans in the 1990/91 period as for this period no job loss due to the end of a temporary contract is observed.

Table A2: Median regression results for the change of log monthly wages: Comparison of coefficients estimated with the sample underlying this paper with those of Hunt (2001)[a]

	East, 1990/91		East, 1991/92 - 1995/96		West, 1990/91 - 1995/96	
	Sample	Hunt's sample[b]	Sample	Hunt's sample[c]	Sample	Hunt's sample[d]
Female	0.0215	0.037	0.0084	0.012	0.0001	0.001
	(0.015)	(0.014)	(0.005)	(0.005)	(0.002)	(0.002)
Age	-0.0005	-0.0011	-0.0007	-0.001	-0.006	-0.0009
	(0.001)	(0.001)	(0.000)	(0.000)	(0.002)	(0.000)
Foreign	.	.	.	.	-0.001	-0.003
	.	.	.	.	(0.000)	(0.002)
General schooling	0.0936	0.098	-0.0036	0.016	.	.
	(0.075)	(0.055)	(0.020)	(0.021)	.	.
General schooling German	.	.	.	.	-0.005	-0.003
	.	.	.	.	(0.003)	(0.003)
General schooling Foreign	.	.	.	.	-0.0053	-0.008
	.	.	.	.	(0.004)	(0.004)
University	-0.065	-0.053	0.0212	0.016	0.0072	0.008
	(0.020)	(0.020)	(0.006)	(0.006)	(0.002)	(0.003)
Vocational training	-0.0306	-0.018	-0.0021	0.001	-0.0026	-0.003
	(0.017)	(0.013)	(0.005)	(0.006)	(0.002)	(0.002)
Civil Service	.	.	.	.	0.005	-0.001
Training	.	.	.	.	(0.003)	(0.003)
Tenure (months/1000)	-0.0585	-0.07	0.0356	0.024	-0.0278	-0.027
	(0.075)	(0.069)	(0.024)	(0.026)	(0.008)	(0.010)
Working in west			-0.0448	-0.04	.	.
			(0.008)	(0.007)	.	.
Voluntary move	0.109	0.11	0.0478	0.029	0.0485	0.052
	(0.055)	(0.050)	(0.027)	(0.025)	(0.010)	(0.011)
Involuntary move	0.0564	0.042	-0.0449	-0.028	-0.0229	-0.015
	(0.038)	(0.032)	(0.019)	(0.024)	(0.015)	(0.016)
Move reason unknown	0.2366	0.242	0.0377	0.022	-0.0143	0.136
	(0.254)	(0.212)	(0.053)	(0.035)	(0.035)	(0.049)
Δ working in west	0.418	0.288	0.0734	0.058	.	.
	(0.062)	(0.075)	(0.040)	(0.043)	.	.
Industry dummies[d]	Yes		Yes		Yes	
Time dummies	.		Yes		Yes	
Sample size	1382	1323	5878	5653	15010	14600
Pseudo-R^2	0.08	0.12	0.05	0.05	0.01	0.01

[a] Bootstrapped standard errors in brackets.
[b] Hunt (2001) Table 3, column 3.
[c] Hunt (2001) Table 4, column 3.
[c] Hunt (2001) Table 5, column 1.
[d] Hunt (2001) controlled for 27 industry dummies, while this analysis controls for only eight industries.

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