Wage differentials between East and West Germany
Is it related to the location or to the people?

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Abstract

Despite rapid economic integration and massive help from the Federal Government large wage differences between East and West Germany still persist. We ask, whether those differences are related to disadvantageous locational conditions in East Germany or could be found in the characteristics of the people living there. Our paper analyses income adjustment of East-West migrants based on the German Socio-Economic Panel, 1990-2002. Since migrants earned their income in both, East and West Germany, the effect of the location can be identified. The results indicate that only a small part of wage differences can be attributed to the people.

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1 Introduction

In November 1989 the opening of the border between the Federal Republic of Germany and the German Democratic Republic initiated a rapid process of political and economic unification which took place in 1990. Immediately afterwards East Germany faced a breakdown of production and employment, but since 1991 a fast catching up of income began. Later on the convergence process faded out. Since 1996/1997, the growth rates of the East German economy are no longer higher than those of West Germany, despite enormous capital investment and massive help from the Federal Government.[1] Recently the overall wage differential between East and West Germany amounts to about 25 percent, the productivity gap is about 1/3, unit labour costs are high, and unemployment is increasing.[2]

This paper asks for the sources of the persisting East-West income differences. On the one hand, those differences could be related to the general economic conditions in East Germany, e.g. private and public capital accumulation, technological backwardness, infrastructure equipment or inappropriate economic institutions. On the other hand, those differences could be related to the people living and working there. One could think of differences of human capital equipment of the workers or, more general, of the inappropriateness of the qualification of the East German employees for the labour market conditions of a competitive market system. Basically we ask whether income differences are related to the location or to the people.

This paper is not about unemployment. As a consequence of East German wage increases well above productivity growth in the early nineties unit labour costs are about 10 percent above those in West Germany. Therefore the high and increasing unemployment should not come as a surprise. This story is already told in detail.[3] The development of unemployment is an important part of the adjustment process in East Germany, but it is not the theme of our paper. Instead, our analysis focusses on the sources of East-West wage differentials for those who found jobs. Since 1996/1997 this wage differential amounts to about 25 percent, and the gap hardly became smaller until today.[4]

The basic idea of the analysis is to identify the importance of individual characteristics of the East German employees for the wage differential, in contrast to the general conditions of the location in East Germany. For this purpose we ask what East German workers would have earned if their working place would have been in West Germany instead of East Germany. Of course, for those living and working in East Germany we cannot observe the income which they could have earned in the West (and the other way round). For some people we can estimate the income they could have earned in West Germany: migrants and commuters.

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[1] See Ragnitz (2003) and BMF (2003).

[2] See Smolny and Stiegler (2003).

[3] See e.g. Akerlof et al. (1991), Franz and Steiner (2000), Hunt (2001) and Burda and Hunt (2001).

[4] See Smolny and Stiegler (2003).

Our analysis concentrates on the development of earnings of East-West migrants, West-East migrants and commuters are left out.[5] The post-unification process saw a large number of East-West migrants, and until 2003 about 10-15 percent of the East German population moved towards West Germany.[6] In the early nineties most of them lived and worked in East Germany; in the more recent years most of them lived and worked in West Germany. As a starting point, we look at the income that those migrants earned in West Germany, as compared with employees in East and West Germany, respectively. However, movers (migrants) typically differ from stayers, both in terms of observable and unobservable determinants of wage income. Therefore we have to take those differences into account.

For this purpose, we estimate standard Becker/Mincer type of earnings functions which controls for observable determinants of wage income. We then place the migrants into those earnings functions and compare their earnings in West Germany with those in East Germany before migration. The estimated difference is interpreted as the effect of migration or the effect of the location. Given the limited number of observations we will not be able to estimate the returns of migration for the individual migrants, but we might be able to answer the question for migrants as a group. As a by-product of our empirical analysis we obtain an estimate of the human capital loss of the East German economy through migration.

The next section gives a short overview of the stylized facts of the East German transition process. Section 3 discusses differences of income and observable determinants of income in East and West Germany. Section 4 presents stylized facts on East-West migration and discusses the estimation strategie. In section 5 the estimation results are presented. They show that migrants, while living and working in East Germany, recieve an income slightly below those of non-migrating workers in East Germany. Migrants living and working in West Germany, on the other hand, recieve an income only slightly below West German income. Thus it is the location which should be blamed, not the people. The paper concludes with a short summary and some implications for economic policy.

2   The East German transition process

German unification started with the opening of the border November 9, 1989. In terms of the political development German unification was a great success. In less than a year the regulations and institutions of a democratic market economy were introduced to a formerly centrally planned and ruled country. Unification was concluded with the joining of the East German states October 3, 1990. Table A.1 in the appendix gives a short time table of the unification process.[7]

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[5]Our empirical analysis excludes Berlin as well.

[6]See Burda and Hunt (2001) and Werz (2001).

[7]For a detailed discussion of the political economy of German unification see Sinn and Sinn (1992).

In terms of the economic development the introduction of West German currency and institutions imposed many problems.[8] The currency conversion rate of 1:1 for flows implied a wage level in East Germany of about 30 to 40 percent of the West German level. On average East German productivity was not far beyond, but for the export-oriented industry sector the currency conversion rate implied an immediate loss of competitiveness. East German consumers switched to western products, East German investors had no interest in outdated technology, former CMEA partners[9] were not able to pay western currency, and east-west trade was low already before unification. In consequence output broke down by about one third of the former level, and employment slowly adjusted downward as well.

After the breakdown a fast catching-up process began. Wages increased quickly with a doubling of relative wages within 5 years. The central argument in the wage negotiations in the early nineties was wage convergence.[10] The goals of union leaders and workers were in favour of uniform living condititions in both parts of Germany which should be achieved with fast wage adjustments towards West German levels. The employers' side was less organized and, since it was dominated by West German firms, feared the competition of a low-wage region. Not surprisingly the public opinion was also in favour of fast wage convergence, and the political process with a sequel of elections in the East German states supported the view of the unions. Finally massive subsidies and transfers from the Federal Government and increasing investment already in 1990 stimulated the expectation of fast productivity increases of which unions and workers wanted to participate.

Productivity catching up began about one year after wages increased, and since 1992 huge increases of nominal labour productivity took place. Firstly, the reduction of labour hoarding through dismissals increased the utilization of labour. Secondly, relative prices increased through a mark up on increasing wage costs. Thirdly, increasing real wages and massive investment subsidies induced capital-labour substitution. Finally, total factor productivity adjustment through direct investment and technological diffusion could be expected.

Afterwards the development more or less normalized. Output growth became smaller, employment stabilized, and the utilization of labour increased. The low competitiveness and high unemployment changed the incentives and the power of unions and firms in the wage-setting process, and wage inflation became smaller. Inflation rates converged towards West German rates. Unfortunately productivity catching up faded out, too. In the late nineties the convergence process seems to have stopped completely.[11] Growth rates of the East German economy are no longer higher than

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[8]For a detailed discussion see Akerlof et al. (1991), Dornbusch and Wolf (1992) and Sinn and Sinn (1992).

[9]The CMEA (Council for Mutual Economic Assistance) was the economic association of the Eastern bloc countries.

[10]See Akerlof et al. (1991), Franz and Steiner (2000) and Hunt (2001) for a detailed discussion.

[11]See DIW, IWH and IfW (1999), Burda and Hunt (2001), DIW, IfW, IAB, IWH and ZEW (2003) and Smolny and Stiegler (2003).

Table 1: Wages, productivity and unemployment

	wages			productivity			unemployment		
	1991	1996	2002	1991	1996	2002	1991	1996	2002
West	26900	31408	33878	44533	52163	57220	5.1%	8.2%	7.4%
East	13156	23766	26240	15410	34833	40678	10.9%	15.3%	18.2%
difference	51.1%	24.3%	22.5%	65.4%	33.2%	28.9%	5.8%	7.1%	10.8%

Nominal wage costs in €, nominal labour productivity in €, official unemployment rate,
10 West German and 5 East German states, East and West Berlin are excluded.
Source: National Accounts of the States, Federal Labour Office

those in West Germany, and the level differentials of wages, productivity and un-employment rates persist. East German wages are about 25 percent below wages in West Germany, the productivity gap amounts to about 1/3, and the unemployment rate is about 10 percentage points above the also high rate in West Germany (see table 1). The adjustment process has come to a standstill, despite still large investment rates and ongoing help from the Federal Government.

3   Qualification and income

The micro data for the empirical analysis stem from the German Socio-Economic Panel (GSOEP). The GSOEP was started in 1984 as a longitudinal survey of private households and persons in the Federal Republic of Germany. In June 1990 it was extended to the territory of the German Democratic Republic. It provides annual data for about 9000 individuals in West Germany and about 4000 individuals in East Germany.[12] The average number of employees with a complete set of information on place of residence, income, working time, qualification etc. is about 4000 for West Germany and about 1500 for East Germany.

In the left panel of figure 1 the development of gross wage income per year derived from the GSOEP data (solid lines) is depicted together with the corresponding figure from National Accounts (dashed lines). Both lines give an consistent picture of the fading income adjustment in East Germany during the nineties, despite some differences in the level of those data for East and West Germany, respectively.[13] In the right-hand panel relative East-West income is depicted. In 1990 relative East German wages were about one third of West German wages, but the wage differential quickly became smaller until 1994/1995. Since 1996/1997 it is about 25 percent with hardly any adjustment afterwards.

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[12]For our empirical analysis we employ Sample A and B for West Germany and Sample C for East Germany. People living in East and West Berlin are excluded.
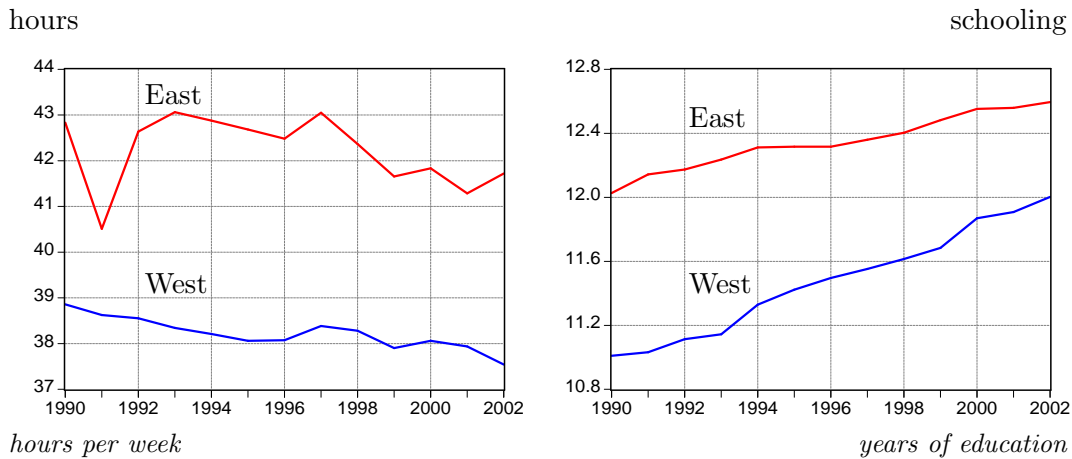
[13]The income definition of the GSOEP data does not correspond exactly to the National Accounts definitions.

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Figure 1: Income adjustment

income   relative income
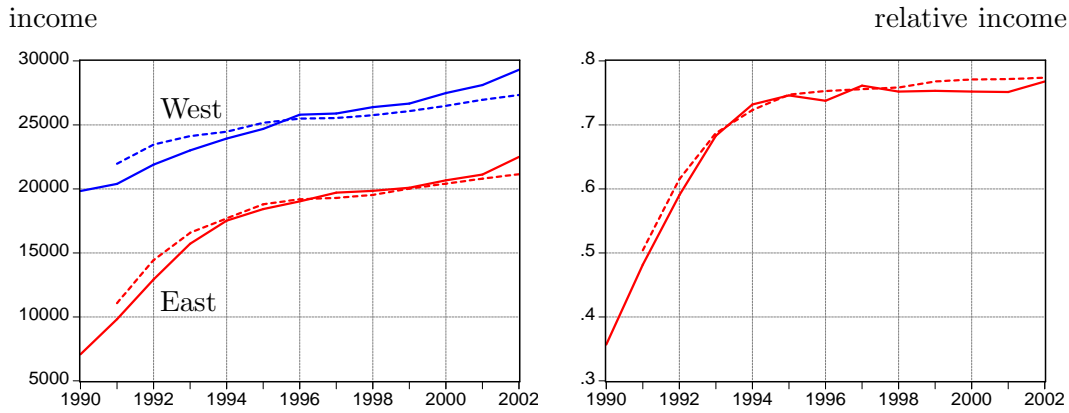
Nominal gross income per year in €, East and West Berlin are excluded.
Solid lines: GSOEP, dashed lines: National Accounts of the States

Figure 2: Determinants of wage income

hours   schooling

hours per week   *years of education*
Source: GSOEP, employees only

In figure 2 some data on observable determinants of wage income are depicted. The left-hand figure reveals that the average working time per week in East Germany is about 4 hours (10 percent) above the corresponding figure for West Germany. The development during the nineties shows the rather parallel reduction of the length of the work week in both parts of Germany; the outlier for East German working hours in 1991 is related to the extended use of short-time working. In the right-hand panel of the figure the development of the years of schooling is depicted. 'Schooling' includes general schooling, vocational and other training and university education.[14] Visible is the increasing trend of years of education, both in East and West Germany; remarkable is especially the higher formal qualification level in East Germany.

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[14]Years of schooling refer the time necessary to achieve the corresponding qualification level. The data for the figures and the tables refer to employees only.

Table 2: Determinants of wage income

		schooling	age	women	hours	income	σ_y
West	1990	11.01	37.69	0.391	38.86	3109	0.678
	1996	11.50	38.22	0.412	38.07	4044	0.712
	2002	12.00	39.80	0.442	37.54	4594	0.813
	average	11.45	38.38	0.415	38.24		
East	1990	12.03	38.84	0.471	42.83	1110	0.484
	1996	12.32	38.44	0.475	42.48	2983	0.582
	2002	12.59	40.11	0.475	41.72	3527	0.677
	average	12.32	38.68	0.469	42.25		

Schooling and age in years, share of women, weekly hours, monthly income per employee in DM, σ_y is the standard deviation of logarithmic income, averages 1990-2002 (13 years). Source: GSOEP, employees only

Putting these East-West differences in working time and formal education levels into perspective the 25 percent wage differential deserves some qualification. Employees in East Germany earn less than their counterparts in West Germany, despite their longer work week and their higher formal qualification level. Taken the usual estimates of the effects of schooling and working time at face value, the conditional wage differential between East and West Germany comes close to 40 percent.

In table 2 some of the data from the figures are depicted together with the average age of the employees and the share of women in the work force. The average age of the employees in East and West Germany hardly differs, but the panel population becomes older. The share of women in the West German work force increased, but did not achieve the higher share of females in East Germany. Remarkable is the increase of the variance of income during the nineties, especially in East Germany.[15]

4   East-West migration

The aim of the empirical analysis is the estimation of the effect of the location on the East-West wage differential. Basically we want to know what Easteners would have earned if they were located in West Germany. If this hypothetical income is close to the income they earned in East Germany, the differential would be related to the employees; if this income is close to the respective income of West Germans, the differential is related to the location. The wage differential cannot be estimated for East German employees in general, but we can estimate it for migrants. For (prospective) migrants we observe the income during their stay in East Germany as well as the income which they earned in West Germany.

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[15]See also the lower left-hand panel of figure A.1 in the appendix.

Table 3: Characteristics of migrants

	schooling			age			women		
	1990	1996	2002	1990	1996	2002	1990	1996	2002
always in East	12.01	12.38	12.61	39.37	39.72	40.68	48.76	50.24	50.43
migrant in East	12.19	11.37	13.67	31.97	28.31	31.25	54.03	50.00	33.33
migrant in West		12.73	12.60		33.49	34.22		50.48	54.94
always in West	10.98	11.42	11.90	37.83	38.49	40.18	39.30	41.26	44.00

Schooling and age in years, share of women　　　　　　　　*Source: GSOEP, employees only*

In table 3 some informations on stayers and movers are displayed. 'Stayers' are defined as those people who reported a place of residence in either East Germany (always in East) or West Germany (always in West) during the whole sample period 1990-2002. In addition, stayers in West Germany must stem from Sample A or B and stayers in East Germany must stem from Sample C of GSOEP. In addition, people living in East or West Berlin as well as East-West and West-East commuters are excluded.[16] This leaves on average about 1500 valid observations for East Germany and about 4000 valid observations for West Germany.

East-West migrants stem from the East German GSOEP Sample C and have reported a place of residence in one of the 10 West German states at least once. West-East migrants were excluded from the analysis.[17] On average about 150 valid observations per year for East-West migrants are available. For each year, we can distinguish East-West migrants staying in East Germany (migrant in East) and migrants staying in West Germany (migrant in West). In 1990 all East-West migrants in the sample reported a place of residence in East Germany, in 2002 more than 90 percent of those migrants are in West Germany. That means that for the first years the number of valid observations for migrants in West is small; for the more recent years, the number of valid observations for migrants in East is small.
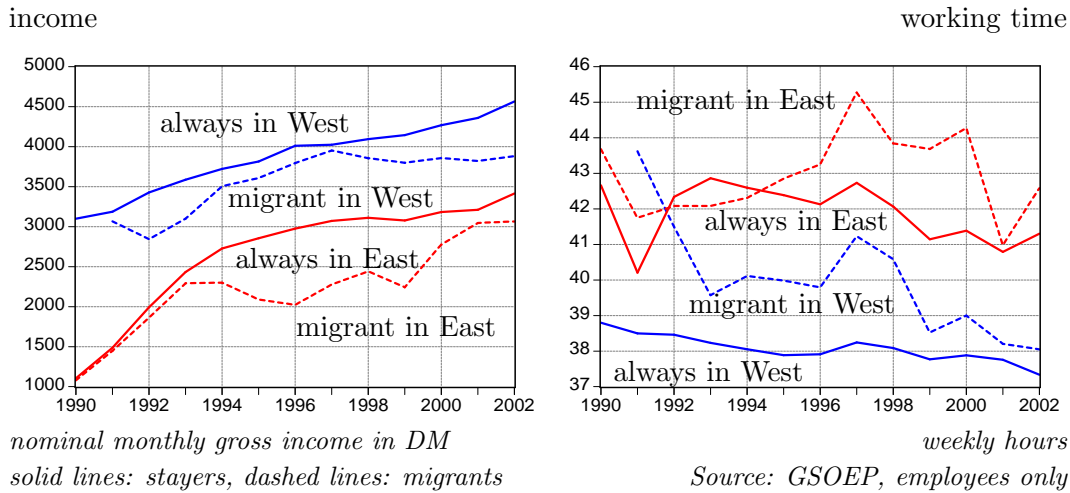
Table 3 firstly confirms the better formal qualification level and the higher share of women in the labour force for East German stayers. Migrants are slightly better qualified than East German stayers, but the difference is small. Note that for 2002 only a small number (#12) of valid observations for migrants in East is available. As expected, movers are much younger than stayers and more surprisingly, the share of female migrants is above 50 percent.

In figure 3 the development of the income of stayers and movers is displayed. Again stayers as well as movers in East and West Germany are distinguished. Basically the left-hand panel can already be interpreted as a first meaningful estimate of the effect of location on income. The working time of stayers and movers is displayed in the

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[16] Commuters to foreign countries were excluded as well.

[17] The number of West-East migrants in GSOEP is quite small.

Figure 3: Income and working time

income
working time

nominal monthly gross income in DM
weekly hours
solid lines: stayers, dashed lines: migrants
Source: GSOEP, employees only

right-hand panel of figure 3. The working time of migrants staying in East Germany corresponds largely to the working time of East German stayers; the working time of migrants staying in West Germany is higher than those of West German stayers in the early nineties, but more recently the difference is small.

Taken the figures at face value, we firstly observe that East-West migrants in West Germany receive a monthly income which is clearly above those of East German stayers and only slightly below those of West German stayers. Those differences are attributable to, on the one hand, a selection effect and, on the other hand, a location effect. Secondly, we observe that prospective migrants during their stay in East Germany receive an income which is below those of East German stayers. This difference is small for the early nineties but considerably higher in the second half of the nineties. This implies that the selection effect is negative, i.e. the movers are not – in terms of earnings capabilities – a positive selection of the East German population. Finally, calculating the locational effect as the difference of migrants' income in West and East Germany yields a figure which largely corresponds to the observed East-West wage differential.

However, this kind of analysis yields only a first view on the unconditional wage differential of East-West movers. A more clearcut picture can be achieved by taking observable characteristics (schooling, experience, working time etc.) of stayers and movers into account. Given the available panel information for observable determinants of income we can get a better estimate of the effect of location by exploiting this information in terms of a structural model.

Therefore we place the East-West migrants into a traditional earnings function for East German stayers. This yields firstly an estimate of the relative conditional income of those migrants still staying in East Germany. This corresponds to the estimation of the selection effect in terms of earnings capabilities. Secondly, we

estimate their place in the earnings function, while they live and work in West Germany. The difference of those estimates is interpreted as the effect of migration or the effect of the location. Since the earnings functions in East and West Germany might differ, a corresponding analysis is carried out for the West German earnings function.

5   Estimation results

In <u>table 4</u> the estimation results for the panel data analysis for the years 1993-2002 are depicted. Those estimates should give a general (average) picture of income determination in East and West Germany. For the panel data analysis the first years were excluded. The 1990 wave of GSOEP refers to the time before Economic, Monetary and Social Union, and the years 1991/1992 capture the period of massive downward adjustments of the labour force in East Germany and corresponding extensive active labour market programs. Detailed results for all 13 years 1990-2002 are reported in tables A.2 and A.3 and figure A.1 in the appendix. Those estimates give some information about the development of income effects during the sample period. However, since the estimation sample for each year is smaller, the year to year changes should be interpreted with care.

In columns (1) and (3) of table 4 the estimation results for stayers in East and West Germany are reported. Those results give a consistent, well determined and remarkable similar picture of the income determination in West and East Germany. For West Germany, columns (3), the estimated returns to schooling are 8.1 percent per year with a narrow 95 percent confidence band of $\pm$ 0.17 percentage points. The corresponding estimate for East Germany, column (1), is with 9.1 $\pm$ 0.33 percent significantly higher.[18] The wave-specific estimates reveal a slight increase of the returns to schooling in both, East and West Germany.

A remarkable difference is the rather small 9 percent gender wage gap in East Germany; the corresponding figure for West Germany is about 1/4. Remarkable are the nearly identical age-income profiles in East and West Germany as well.[19] The wave-specific estimates show that those profiles in East Germany were more flat in the early nineties; for the more recent years the differences are hardly visible. Finally, the estimates reveal clearly a less than proportional increase of monthly income with the working time for East Germany.[20] The estimates for West Germany point towards a proportional relation.

Taken together, the estimates show that those factors which are important for income determination in West Germany are equally relevant in East Germany. In addition, the estimates do not provide any evidence that the human capital of the East German employees is less valueable that those of West German employees. The age-income

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[18]Percentages refer to differences of logarithmic values.
[19]Experience is derived from age and years of schooling.
[20]Therefore we do not work with hourly wages.

Table 4: Panel data estimates

dependent variable: log. nominal monthly gross income

	(1)	(2)	(3)	(4)
	always East	always East and migrants	always West	always West and migrants
schooling	.091 (55.6)	.093 (59.1)	.080 (90.3)	.081 (92.52)
women	-.090 (-11.8)	-.099 (-13.5)	-.256 (-52.4)	-.252 (-52.5)
experience	.063 (47.7)	.062 (49,6)	.066 (89.7)	.065 (90.7)
experience^2	-.0011 (-37.8)	-.0011 (-39.1)	-.0011 (-72.7)	-.0011 (-73.3)
working time	.729 (60.6)	.778 (68.4)	1.006 (184.9)	1.008 (187.3)
migrant in East		-.070 (-2.9)		-.501 (-21.3)
migrant in West		.302 (22.2)		-.092 (-7.1)
observations	13812	15339	38219	39746
s.d. dep.var.	.605	.623	.738	.740
SEE	.433	.440	.433	.436
$\overline{R}^2$	.486	.500	.656	.654

t-statistics in parantheses, sample 1993-2002, fixed effects for the waves (not reported), schooling and experience in years, log. weekly hours, dummy variables for women and migrants, employees living in Berlin, commuters and West-East migrants excluded

profiles are nearly identical, and the returns to formal qualification are even higher in East as compared with West Germany. Remarkable differences are the smaller gender wage gap and the smaller effect of the working time.

In columns (2) and (4) East-West migrants were added to the estimation sample. In addition dummy variables were added to the model which should estimate the place of those migrants in the earnings function. Looking firstly at the results in terms of the East German earnings function, column (2), we found that migrants still staying in East Germany receive an income which is about 7 percent lower than the conditional income of East German stayers. This implies that the selection effect in terms of earnings capabilities is negative. The income of a migrant living and working in West Germany, on the other hand, is about 30 percent above those of a corresponding East German stayer. Repeating the exercise for the West German earnings function yields a similar result. Migrants in West Germany receive an income which is about 9 percent below the conditional income of West German
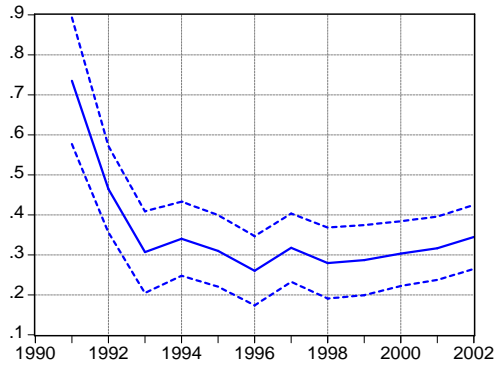
Figure 4: Effects of migration

East German income function
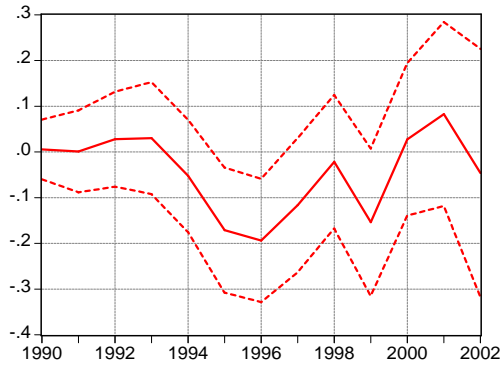
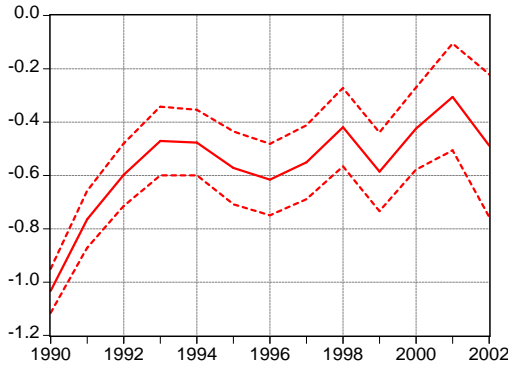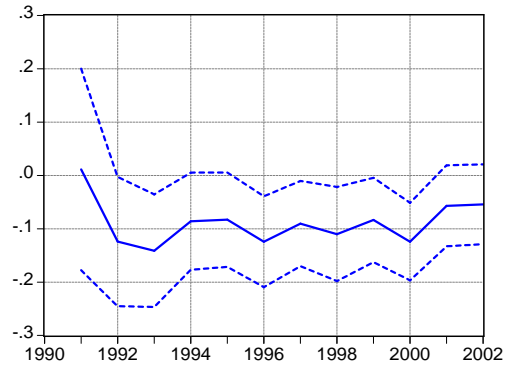income in East Germany   income in West Germany

West German income function

income in East Germany   income in West Germany

solid lines: wave-specific coefficient, dashed lines: ± 2 standard error bands

stayers. Placing those migrants still staying in East Germany into the West German earnings function yields an estimate of about 0.5.

The difference of those estimates is the effect of location. It corresponds largely to the conditional wage differential between East and West Germany of about 40 percent. The difference between the unconditional East-West income gap of about 25 percent and the conditional wage differential in terms of the earnings function is related to the better formal qualification and the considerably higher working time of the East German labour force. Note also that the working time of migrants living and working in East Germany is considerably higher than those of migrants living and working in West Germany.

In figure 4 the corresponding wave-specific estimates of the relative place of the migrants in the earnings functions are depicted. The solid lines are the wave-specific coefficients, and the dashed lines are the corresponding ± 2 standard error confidence

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bands.[21] Starting from the right-hand panels the estimated conditional income of migrants living in West Germany is about 30 percent above those of East German stayers and about 10 percent below those of West German employees. These differences are rather stable since 1993; in 1991/1992 the conditional East-West wage differential was much larger.

The conditional income of migrants still living in East Germany (left-hand panels) is below those of East German stayers for most of the sample period. As compared with West German employees, the relative conditional wage differential is about 0.5. Note that for the more recent years the number of available observations for migrants in East Germany becomes smaller; therefore the variance of the estimates is larger. In general the wave-specific estimates confirm the results of the panel data analysis.

6 Conclusion

Despite rapid economic integration, massive investment and on-going help from the Federal Government income differences between East and West Germany persist. Our paper looks at the sources of those wage differentials. Specifically, we ask whether those differences are related to the general locational conditions in East Germany or are related to the people living there. Our estimates indicate that it is the location which should be blamed, not the people. Our argument is based on the analysis of the income development of East-West migrants. Those migrants received their income in both, East and West Germany; therefore we are able to estimate the effect of the location.

The starting point of the analysis is the comparison of the average income of stayers and movers in East and West Germany. On average the unconditional income difference between East and West Germany is about 25 percent since the second half of the nineties. However, the formal qualification of the East German employees is better than those in West Germany; in addition, their working time in about 10 percent higher. Therefore the conditional wage differential is close to 40 percent.

Looking at migrants' income in West Germany we found significant wage gains. Their income is clearly above the average East German income and only slightly below West German income. However, movers typically differ from stayers, both in terms of observable and in terms of unobservable determinants of income. A first estimate of the selection effect is the relative income of movers before migration. The figures show that migrants' income in East Germany is below the average income of East German stayers, i.e. the selection effect is negative. Migrants are not – in terms of earnings capabilities – a positive selection of the East German employees. Calculating the effect of the location as the difference of migrants' income during their stays in West and East Germany, respectively, yields a figure close to the

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[21]The detailed estimaton results are reported in table A.2 and A.3 and figure A.1 in the appendix.

unconditional average wage gap of stayers.

More clearcut results could be achieved by taking observable determinants of income into account. For this purpose we estimated migrants' places in standard Becker/Mincer type of earnings functions. The results firstly confirm the negative selection effect of migrants, i.e. the conditional income of (prospective) migrants in East Germany is below those of corresponding East German stayers. Secondly, migrants living and working in West Germany received an income only slightly below those of corresponding West German stayers. Calculating the effect of the location as the difference of migrants' places in the earnings function during their stays in West and East Germany yield a figure close to the conditional average wage gap of stayers.

As a by-product our empirical analysis yields surprisingly similar estimates of earnings functions in East and West Germany. The age-income profiles are nearly identical, and the returns to schooling are even higher in East Germany. Remarkable differences are the smaller gender wage gap and the less than proportional increase of income with the working time. Interpreting those results in terms of policy conclusions indicates that the human capital of East German employees is even more valueable as compared with those of West German employees. In addition, the estimates indicate that the enormous migration flows from East to West Germany during the nineties did not imply a severe human capital loss of the East German economy.

Finally, in terms of sources of East-West wage differentials, our results indicate that differences of the locational conditions in East Germany are responsible, not differences of human capital equipment. Therefore, further research and policy measures should focus on differences of public and private capital, technological backwardness and inappropriate economic institutions.

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Appendix

Table A.1: Time table of German unification

May 1989	Removal of border controls in Hungary
August 1989	Mass migration of GDR-citizens via Hungary
September 1989	"Monday demonstrations" in Leipzig
November 9, 1989	*Opening of the German border*
January 12, 1990	Privat ownership of production facilities and joint ventures with foreigners permitted
May 5, 1990	Begin of 2+4 negotiations
May 18, 1990	Signing of the treaty about formation of an economic, monetary and social union
July 1, 1990	The treaty came into force
August 31, 1990	Signing of the unification treaty
September 12, 1990	Closing of the 2+4 treaty
October 3, 1990	*German unification*
October 14, 1990	Elections of East German state parliarments
December 2, 1990	Elections of the Federal Government

Table A.2: Wave-specific estimates: East Germany

dependent variable: log. nominal monthly gross income

year	school.	women	exp.	exp.^{2}	hours	migrant in West	migrant in East	obs.	$\overline{R}^2$
1990	.082 (26.9)	-.190 (-12.9)	.041 (18.4)	-.0007 (-15.1)	.608 (20.4)	-.005 (0.2)		2546	.444
1991	.073 (19.7)	-.219 (-13.3)	.041 (14.6)	-.0008 (-12.0)	.383 (15.5)	.001 (.03)	.735 (9.3)	1958	.406
1992	.084 (21.5)	-.138 (-7.7)	.050 (15.7)	-.0009 (-12.7)	.638 (16.4)	.028 (.5)	.464 (8.6)	1812	.433
1993	.094 (20.8)	-.129 (-6.4)	.046 (12.0)	-.0008 (-8.9)	.516 (14.5)	.030 (.5)	.307 (6.0)	1656	.408
1994	.087 (19.6)	-.096 (-4.7)	.057 (15.1)	-.0010 (-11.8)	.786 (20.6)	-.052 (-.8)	.340 (7.4)	1613	.477
1995	.780 (16.2)	-.122 (-5.5)	.058 (14.7)	.-0011 (-11.9)	.702 (20.2)	-.171 (-2.5)	.310 (6.9)	1680	.449
1996	.095 (20.3)	-.118 (-5.4)	.055 (14.7)	-.0010 (-11.4)	.717 (19.5)	-.194 (-2.9)	.260 (6.0)	1596	.480
1997	.087 (18.0)	-.090 (-3.9)	.065 (16.0)	-.0012 (-12.8)	.781 (18.3)	-.116 (-1.6)	.318 (7.44)	1548	.465
1998	.091 (18.3)	-.083 (-3.5)	.068 (17.0)	-.0012 (-13.8)	.772 (20.2)	-.022 (-.3)	.279 (6.3)	1456	.491
1999	.092 (17.7)	-.116 (-4.7)	.073 (17.6)	-.0013 (-14.4)	.650 (20.2)	-.154 (-1.9)	.287 (6.5)	1518	.483
2000	.103 (19.5)	-.101 (-4.1)	.070 (17.5)	-.0012 (-13.4)	.904 (25.0)	.028 (.3)	.303 (7.5)	1490	.555
2001	.100 (19.1)	-.093 (-3.7)	.064 (16.0)	-.0011 (-12.6)	.922 (28.7)	.083 (0.8)	.316 (8.0)	1438	.573
2002	.099 (18.2)	-.044 (-1.7)	.067 (15.5)	-.0011 (-11.9)	.970 (25.7)	-.046 (-.3)	.345 (8.6)	1344	.551

t-statistics in parantheses, schooling and experience in years, log. weekly hours, dummy variables for women and migrants, Berlin, commuters and West-East migrants excluded

Table A.3: Wave-specific estimates: West Germany

dependent variable: log. nominal monthly gross income

| year	school.	women	exp.	exp.^{2}	hours	migrant in West	migrant in East	obs.	$\overline{R}^2$
1990	.084 (30.6)	-.313 (-21.8)	.065 (31.1)	-.0011 (-24.5)	.758 (43.2)	-1.033 (-25.1)		4636	.584
1991	.080 (30.7)	-.283 (-20.3)	.063 (31.4)	-.0011 (-24.5)	.923 (55.3)	-.764 (-14.3)	.011 (.1)	4605	.624
1992	.075 (28.9)	-.301 (-21.9)	.062 (29.5)	-.0011 (-23.1)	.903 (55.1)	-.598 (-10.2)	-.124 (-2.0)	4424	.622
1993	.082 (31.3)	-.290 (-20.8)	.065 (30.8)	-.0011 (-24.8)	.938 (56.3)	-.471 (-7.3)	-.141 (-2.7)	4421	.630
1994	.076 (30.4)	-.256 (-18.8)	.067 (33.0)	-.0012 (-27.3)	1.000 (62.0)	-.477 (-7.8)	-.086 (-1.9)	4279	.661
1995	.079 (29.0)	-.284 (-19.2)	.067 (30.2)	.-0012 (-24.8)	.888 (54.9)	-.572 (-8.4)	.083 (-1.9)	4261	.629
1996	.076 (28.3)	-.234 (-15.9)	.066 (29.9)	-.0011 (-24.1)	1.03 (58.4)	-.616 (-9.2)	-.124 (-2.9)	4117	.639
1997	.073 (28.0)	-.238 (-16.5)	.066 (29.7)	-.0011 (-24.0)	1.045 (61.4)	-.551 (-7.9)	-.090 (-2.26)	4056	.660
1998	.083 (28.9)	-.244 (-15.6)	.067 (28.3)	-.0011 (-22.3)	.977 (55.8)	-.419 (-5.7)	-.110 (-2.5)	3825	.635
1999	.078 (28.5)	-.227 (-14.8)	.065 (28.3)	-.0011 (-22.7)	1.068 (62.8)	-.586 (-7.9)	-.084 (-2.1)	3902	.668
2000	.086 (31.0)	-.241 (-15.5)	.062 (26.7)	-.0010 (-21.2)	1.045 (61.7)	-.424 (-5.5)	-.124 (-3.4)	3832	.674
2001	.087 (28.4)	-.254 (-15.1)	.065 (25.9)	-.0011 (-20.7)	1.051 (60.4)	-.306 (-3.1)	-.057 (-1.5)	3654	.668
2002	.089 (28.3)	-.244 (-13.9)	.064 (24.5)	-.0011 (-20.0)	1.050 (58.5)	-.488 (-3.7)	-.054 (-1.4)	3399	.678

t-statistics in parantheses, schooling and experience in years, log. weekly hours, dummy variables for women and migrants, Berlin, commuters and West-East migrants excluded

Figure A.1: Wave-specific estimates

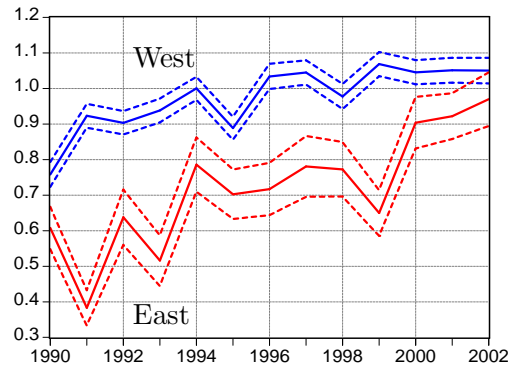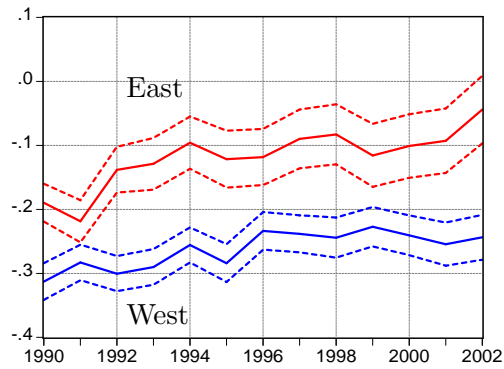Effects of schooling

West Germany

East Germany
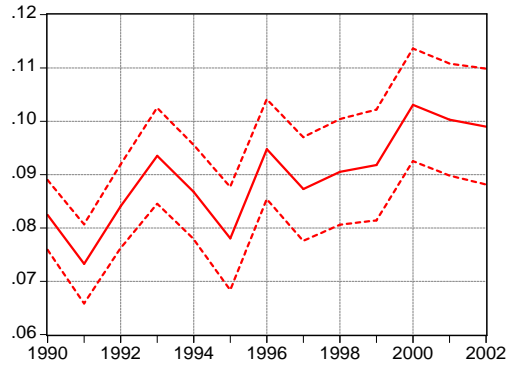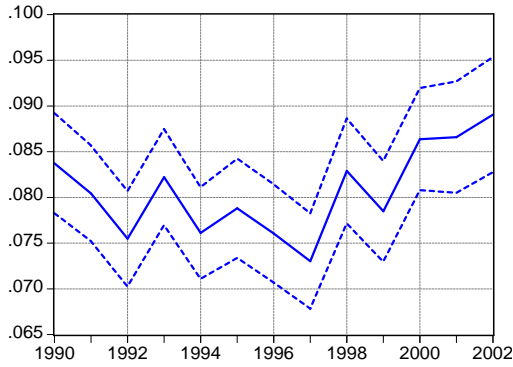
solid lines: wave-specific coefficient, dashed lines: ± 2 standard error bands

Gender wage gap and effects of working time

gender wage gap

working time

solid lines: wave-specific coefficient, dashed lines: ± 2 standard error bands

Summary statistics

standard deviation of log. income

standard error of equation