Interregional Migration in Germany:
Characteristics and Effects for Regions and Migrants

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Abstract

German unification and the subsequent breakdown of economic activity in East Germany initiated enormous migration flows from East to West Germany. People from East Germany moved towards West Germany, where wages are higher and employment opportunities are more favourable. Our paper takes a somewhat broader perspective; it analyses migration flows between four macro regions, i.e. *East*, *North*, *South* and *West*. The focus is on characteristics of regions and migrants, selection of migrants into regions and effects of migration for regions and migrants.

The empirical results reveal significant differences between the regions and between migrants and stayers. Differences between *East* and the western regions are outstanding, but differences between *North* and *South* are noteworthy as well. Age and children in the household are more important determinants for migrants' selection into regions than schooling. Migrants are a positive selection in terms of schooling but a negative selection in terms of (un)employment. Finally, migration gains for moves from *East* towards the western regions are enormous.

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1 Introduction

Aggregate migration statistics reveal significant population movements in Germany. Different patterns across states and time can be identified. In particular, the opening of the border in November 1989 and the subsequent process of political and economic unification initiated substantial migration flows between East and West Germany. Figure A.1 in the appendix illustrates that East Germany has seen a net migration loss in every year since 1990. Until 2008 the East German population decreased by some 15 percent.[1] Most of these outflows resulted in West German inflows.

Our paper takes a somewhat broader perspective; it investigates interregional migration patterns in Germany between four macro regions. Figure A.2 in the appendix illustrates interregional migration flows for some of the German states, i.e. Sachsen (*East*), Niedersachsen (*North*), Baden-Württemberg (*South*) and Nordrhein-Westfalen (*West*). While the balance of Sachsen is negative except for a short period in the mid-nineties, each West German state exhibits a positive balance during the period from 1991 to 2008.[2] From the perspective of the origin states migration can be detrimental, if movers are positively self-selected. However, migration is not always beneficial for the destination state. Theory suggests that, if migration costs are negligible, regions that pay higher returns to human capital attract more skilled workers than regions that pay lower returns.[3] That is, from a regional perspective, winning or losing is mainly determined by the relative skill composition of migration flows.

The main focus of our paper is on the regions and on the people moving between those regions. The empirical analysis is based on data from the German Socio-Economic Panel (GSOEP). Our empirical strategy involves three major steps. First, we illustrate the differences between the regions based on stayers. We do this by estimating determinants of labour market performance, i.e. income, unemployment and employment. In addition, we identify socio-economic characteristics that distinguish migrants from stayers. Second, we investigate the selection of migrants into regions by estimating Probit models for the region of migrants' residence. The idea is to identify the kind of migrants a region attracts. The third step aims at

[1] See also Heiland (2004). Raffelhüschen (1992) is among the earliest and astonishingly accurate papers to forecast East-West migration flows. More recently, Alecke et al. (2010) analyse the interaction of migration flows and labor market variables; see also Mitze and Reinkowski (2010).

[2] Note that the relative size of the gross flows between the states exceeds those of the larger macro region.

[3] See for example Roy (1951), Borjas (1987), Borjas et al. (1992) and Greenwood (1997).

investigating the effects of migration for regions and migrants. For this purpose we estimate differences between stayers and migrants residing in a specific region. In addition, we estimate migrants' performance in the regions in terms of labour market performance. This should give us information about the importance of selection effects of migrants and migrants' gains or losses from migration.

The paper is structured as follows. After a short overview of the literature, section 2 discusses data and empirical specification and gives a first characterisation of regions and migration patterns. Section 3 focusses on differences between regions and between migrants and stayers. The results confirm enormous differences between East and West Germany, but differences between the West German regions are noteworthy as well. Concerning migration, it is especially the young and the well qualified that migrate. Section 4 investigates the selection of migrants into regions. The estimates do not reveal evidence that the highly qualified avoid *East*, despite the poor labour market performance of this region.[4] Highly qualified migrants select into *South*and avoid *North*. Section 5 presents estimates on the effects of migration for regions and migrants. The results reveal significant selection effects in terms of labour market performance and indicate enormous gains from migration for migrants. Section 6 concludes.

Migration in the German context has been studied from a variety of perspectives. The focus of the most dominant strand of literature is post unification migration from East to West Germany.[5] Burda (1993) is among the earliest articles to study East-West migration on the micro-level. Because actual migration data was scarce, Burda investigates migration intensions using the second wave of the East German sample of GSOEP (Spring 1991). The key finding is that it is the young people that are willing to migrate. There is also weak evidence that migration intentions and formal education are positively correlated. Büchel and Schwarze (1994) incorporate GSOEP data for the years from 1990 to 1993 and analyses actual migration. They find that many factors seem to simultaneously influence migration intensions and actual migration which confirms the findings of Burda (1993). More recent empirical papers including Hunt (2006) and Fuchs-Schündeln and Schündeln (2009) based on GSOEP data and Brücker and Trübswetter (2007) based on IAB employment data also find that East-West migrants are more skilled than non-migrants. Finally, Smolny and Kirbach (2011) based on GSOEP data show that the conditional income of prospective migrants in East Germany is lower as compared with corresponding

[4]The exact definition of the regions is depicted in figure 1.

[5]Wolff (2006) provides an extensive review of the relevant literature.

stayers in the East. The results are interpreted as evidence for a negative selection effect.

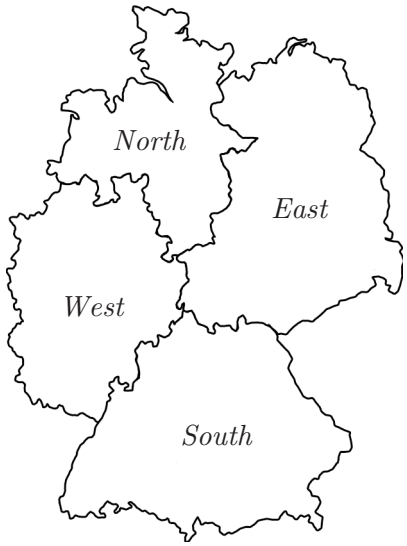
Interregional migration within Germany detached from the East-West context has only recently become a subject of study in the literature.[6] Based on GSOEP data, Hunt (2004) analyses the determinants of migration between federal states in West Germany. She finds that same-employer migrants as well as long-distance migrants are a positive selection in terms of income, as compared with stayers. A negative selection effect is found for short-distance and return migration. Hunt interprets this result as evidence of a positive relation between moving costs and self-selection of migrants. Arntz (2010) takes the perspective of regions by estimating destination choice patterns of migrants. Using IAB employment data the main finding is that the skill composition of internal migration is mainly determined by wage differentials. Furthermore unemployment rates cannot explain destination choice of employed migrants. Unemployed migrants, however, tend to avoid regions with high unemployment rates. Another finding is that skill-level and migration distance are positively related, i.e. better qualified migrants face lower migration cost than less-skilled migrants. Busch and Weigert (2010) find that 30 percent of graduates leave the federal state where they completed their studies within 10 years after graduation. Their analysis based on GSOEP data again confirms that migrants are younger than stayers.

2 Data and empirical specification

Our empirical analysis distinguishes four macro regions i.e. *East*, *North*, *South* and *West* according to figure 1. Table 1 presents some aggregate data to characterise the regions. In terms of population, *West* is the largest region, *North* is the smallest. The highest average wages are observed for *South*and *West*, and there is a remarkable wage gap of about 25 percent between East Germany and the western regions. The employment rate is highest in *South* and lowest in *East*, the data for *North* and *West* hardly differ from the German average (total). The average unemployment rate of *East* is about twice as high as compared with the West German regions. To sum up, although differences between western regions are rather small as compared with those to East Germany, *South* is the most prosperous region.

[6] For international studies on migration, see for example Axelsson and Westerlund (1998), Zhao (1999), Maza and Villaverde (2004) and Ghatak et al. (2008).

Figure 1: German regions



North: Schleswig-Holstein, Hamburg, Bremen, Niedersachsen

East: Mecklenburg-Vorpommern, Sachsen, Sachsen-Anhalt, Thüringen, Brandenburg, Berlin

West: Nordrhein-Westfalen, Hessen, Rheinland-Pfalz, Saarland

South: Bayern, Baden-Württemberg

Table 1: Aggregate statistics, averages 1991–2008

	East	*North*	*South*	*West*	Total
population	17 285	12 992	22 615	29 005	81 897
labour force	8 870	6 699	12 173	14 687	42 429
wages	20 371	24 880	26 128	26 035	24 760
share of employed	42.4	47.0	50.8	46.4	47.1
share of unemployed	15.8	8.9	5.5	8.3	9.2

population and labour force (employed and unemployed) in 1000
wages (gross wages per employee) in € per year
shares of employed in percent of population
shares of unemployed in percent of the labour force
Sources: Statistical Offices of the States, Federal Labour Agency

The data for our empirical analysis stem from the German Socio-Economic Panel (GSOEP).[7] GSOEP is a representative survey of private households and persons in Germany and is carried out since 1984. On average about 12 000 individuals in 6 000 households are interviewed annually on a broad range of questions. The survey was started in West Germany and extended to cover the former German Democratic Republic with German unification in 1990.[8]

Moves within Germany are covered by annual tracking of households and individuals changing addresses between waves. Our identification of stayers and migrants is based on the data from 1990 to 2008. To ensure consistency of our sample we do not work with extensions of GSOEP after 1990 and restrict our data set to the West German sample A and the East German sample C, i.e. we exclude sample B (foreigners in Germany) as well. Since we focus on labour market effects we exclude individuals older than 65 as well. Finally, the empirical analysis of income determination and (un)employment excludes the 1990 wave of GSOEP; it refers to the time before Economic, Monetary and Social Union, and labor market indicators of respondents in East Germany are difficult to interpret for this year.[9]

In order to identify stayers and migrants, we employ the information on the federal state of residence (Bundesland) which is observed at the household level. At this, we merge states into the four macro regions *East*, *North*, *South* and *West* according to figure 1. As shown in table 2, we identify a total of 137 996 observations (13 782 persons) as stayers, if a person has never reported a change of region during the observation period 1990–2008. Accordingly, we identify a total of 10 459 observations (950 persons) as migrants, if a person has changed the region of residence at least once. It should be noted that people from East Germany are largely over-sampled in GSOEP.

Table 2 also shows that the highest percentage of migrants (as compared with stayers) is located in *North*. Figure 2 illustrates this in more detail. The share of migrants relative to stayers in *North* has more or less steadily increased over time. Looking at the regional distribution of migrants further illustrates the development. In the first years after unification a large share of migrants were living in *East*; in

[7] The GSOEP data are provided by the German Institute of Economic Research (DIW Berlin) (Wagner et al., 2007).

[8] The first wave of East German data was already collected in June 1990, i.e. prior to official Economic, Monetary and Social Union on 1 July 1990.

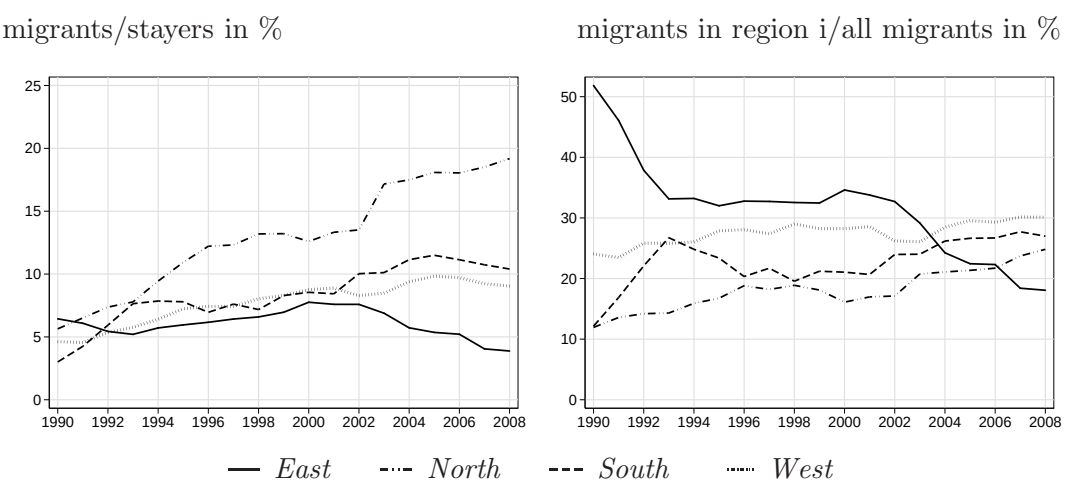
[9] For example, there are no observations of registered unemployment in East Germany in the 1990 data.

Table 2: Observations in GSOEP, 1990–2008

	East	*North*	*South*	*West*	Total
stayers	54 345	15 431	29 717	38 503	137 996
migrants	3 320	1 887	2 376	2 876	10 459
share of migrants in %	6.1	12.2	8.0	7.5	7.6

German Socio-Economic Panel, sample A (West Germany) and C (East Germany)

Figure 2: Migrants in regions



Source: GSOEP 1990–2008, sample A and C

the more recent years the share has decreased towards less than 20 percent. In consequence, the fraction of migrants in the other regions, especially in *North*, is fluctuating around a more or less steeply increasing trend.

Our empirical analysis consists of three steps. In a first step we focus on characteristics of regions and migrants. For this purpose we estimate earnings functions for stayers based on a small set of explanatory variables, i.e. schooling, experience, working time and sex, pooled for all observations with dummy variables for regions and waves. As additional indicators of labour market performance, we estimate Probit models for unemployment and employment. Finally, we estimate differences between migrants and stayers, again with the pooled data for all regions with dummies for regions and waves.[10] Explanatory variables are socio-economic indicators

[10]In addition, we construct a correction for the number of available observation in our sample for each person. Persons with only a few observations (e.g. young persons) exhibit a smaller chance to

such as schooling, sex, age and family status.

In a second step, we analyse the selection of migrants into regions. For this purpose we restrict our estimation sample to migrants and estimate their region of residence via Probit models. We interpret the migrants as the mobile part of the population who choose a region of residence. Those estimates will give some information about the kind of migrants a region attracts.

Finally, we analyse effects of migration for regions and migrants based on the composition of migrants and stayers within a region. For this purpose we define sub-samples for each region which consist of stayers and those sub-group of migrants who have stayed in this region at least once. Again we estimate Probit models for migrants vs. stayers; in addition we estimate the labour market performance of those migrants according to region-specific earnings functions and corresponding Probit models for employment and unemployment. Those estimates will give us information about the importance of selection effects of migrants and reveal insights on migrants' gains or losses from migration.

3 Characteristics of regions and migrants

As a starting point, we report differences between the regions and between migrants and stayers. Table 3 presents some descriptive statistics for the regions; they refer to stayers.[11] The sample includes all persons aged 17–65 and the waves from 1991 until 2008, the data for income and working time are based on the smaller sample of the employed. The average income differential between stayers in *East* and stayers in the western regions (i.e. *North*, *South* and *West*) is about 25 percent. The average working time does not largely differ across *North*, *South* and *West*, the figure for East Germany is about 4 hours higher.

The figures for employment reveal only small differences between *East* and the western regions; remarkable is the higher employment rate in *South*. In terms of unemployment, the twice as high rate in *East* is outstanding, especially as compared with the particular low rate in *South*. Noteworthy is also the better formal qualification level of stayers in *East*, age and experience hardly differ between the regions. As a general characterisation of the regions, the labour market performance in *East* is

be identified as migrants as compared with persons in GSOEP for the whole sample period.

[11] Table A.1 in the appendix reports detailed descriptive statistics for migrants residing in the regions.

Table 3: Characteristics of stayers and migrants

	East	*North*	*South*	*West*	total	migrants
income	1 600	2 159	2 189	2 264	1 976	2 209
working time	41.7	37.9	37.7	37.7	39.3	40.3
employed	62.2	62.8	65.2	63.6	63.3	61.8
unemployed	14.8	6.0	3.8	5.0	8.7	8.5
schooling	12.2	11.6	11.6	11.8	11.9	12.8
experience	23.6	24.0	22.9	23.9	23.6	15.2
age	41.8	41.7	40.5	41.6	41.5	34.1
women	51.0	50.2	51.1	50.9	50.9	52.7
married	64.4	62.0	63.0	64.3	63.8	44.8
children	38.7	35.4	40.0	37.0	38.1	38.8

Income is gross monthly labour income in € in the month preceding the interview, working time is self reported and refers to weekly hours, both variables refer to the reduced sample of the employed.

Employment refers to full time or regular part-time employment, unemployment is based on the question regarding officially registered unemployment, both questions refer to the time of the interview, reported are the percentages in total population aged 17–65 in percent.

Schooling includes general schooling, vocational and other training and university education, years of schooling refer to the time necessary to achieve the corresponding qualification level, experience is derived from age and years of schooling.

Women, married and children (under the age of 16 in the household) are dummy variables, reported are the shares in percent.

The data in the table, except those in the right-hand column,
refer to stayers in the respective region.

Source: GSOEP, sample A and C, 1991–2008

still poor, while *South* is the most successful region.

The two right-hand columns of table 3 depict differences between migrants and stayers. In general, the income of migrants is higher than those of stayers, however, the working time is longer as well. The employment rate of migrants is lower, but the difference in terms of unemployment is small. Noteworthy is the higher formal qualification level of migrants, and migrants are much younger than stayers. Finally, the share of female migrants is above 50 percent.

Table 4 presents the results of regression analysis of the indicators of labour market performance of stayers in the regions and the differences between migrants and stayers.[12] We consider labour market performance in three dimensions, i.e. earnings, employment and unemployment. The starting point of the analysis is a standard earnings function with a small set of explanatory variables, i.e. working time, experience, schooling and sex. We employ the pooled data of stayers in order to characterise the regions by region-specific coefficients (the reference region is *West*). A complete set of dummy variables for the waves is included as well. For employment, unemployment and migration we estimate corresponding Probit models for the total population aged 17 to 65. For those estimates we exclude working time, substitute experience with age and add two dummy variables for family status, i.e. for married persons and for children under the age of 16 in the household.

The results firstly reveal highly significant estimates for the earnings function. Working time exhibits an about proportional effect on income, experience affects income with a maximum effect at about 30 years, the returns to schooling are slightly below 9 percent and the gender wage gap is about 20 percent. Secondly, schooling and experience exhibit highly significant effects on unemployment as well. The effect of schooling is quite large; note that the difference between the lowest formal qualification level and an university degree is about 10 years of schooling. The effect of experience implies the maximum probability of unemployment at about 27 years. The conditional probability for women is slightly higher as compared with men. Thirdly, schooling exhibits a highly significant effect on the employment probability as well. For age we employ a more flexible higher order polynomial specification which yields a rather flat profile for the age-group from 30 to 50 years. As expected, gender and family status are strong predictors of employment status as well.

[12] Results of a corresponding analysis carried out for each region separately are reported in tables A.2, A.3 and A.4 in the appendix. This analysis reveals significant differences in income and (un)employment determination across regions. However, a detailed discussion is beyond the scope of this paper.

Table 4: Income, (un)employment and migration

	log income	unemployed	employed	migrants
log working time	0.9938			
	(235.7)			
experience	0.0615	0.0214		
	(105.5)	(12.9)		
experience^2	-0.0010	-0.0004		
	(-83.1)	(-12.3)		
schooling	0.0876	-0.0865	0.0875	0.0829
	(128.8)	(-33.1)	(47.3)	(41.0)
women	-0.2012	0.0322	-0.6173	0.0460
	(-57.0)	(3.1)	(-75.7)	(4.4)
East	-0.4306	0.6554	-0.0433	-0.1220
	(-104.6)	(48.9)	(-4.4)	(-9.2)
North	-0.0246	0.0863	-0.0053	0.2640
	(-4.3)	(4.3)	(-0.4)	(15.9)
South	0.0266	-0.1394	0.0959	0.0255
	(5.7)	(-7.7)	(8.3)	(1.7)
age			1.8397	-0.0496
			(38.8)	(-15.5)
age^2			-0.0652	0.0003
			(-35.0)	(7.5)
age^3			0.0010	
			(33.5)	
age^4			-0.0000	
			(-33.9)	
married			0.0517	-0.1235
			(5.0)	(-9.2)
children			-0.3092	-0.0276
			(-29.9)	(-2.2)
mean	7.3602	0.0867	0.6331	0.0705
Observations	78 442	128 562	128 562	148 455

t-statistics in parentheses, reference region is *West*, wave dummies included

The results for the region-specific dummy variables are meaningful as well. Outstanding is the large conditional income differential between stayers in *East* and stayers in the western regions, in combination with the much higher conditional probability of unemployment. However, the differences between the 'poor' *North* and the 'prosperous' *South* are noteworthy as well, in terms of income as well as in terms of unemployment and employment. The reference region *West* can be placed in between the most successful region *South* and the least successful western region *North*, not only geographically but also in terms of labour market performance.

The right-hand column of table 4 depicts the results of the Probit model for migrants vs. stayers. The results reveal that especially the young and the better qualified tend to migrate.[13] The probability to migrate for women is slightly higher than those for men, and being married and living with children in the household is associated with a significantly lower probability. This hints towards higher migration costs of families. Finally, the coefficients of the dummy variables for the regions reveal significant higher migration propensities for those living in *North* as compared with especially *East*.

To sum up, the analysis confirms strong effects of schooling and age on labour market performance. It also confirms significant differences between the regions and between migrants and stayers. *East* exhibits by far the poorest labour market performance, despite the higher formal qualification level and the longer working time of stayers in this region. The differences between the western regions are smaller than those between East and West Germany, but the differences between *South* and *North* are noteworthy as well. In terms of migration it is especially the young and the well qualified that migrate.

4 Selection of migrants into regions

After having established some general characteristics of regions and differences between migrants and stayers, we now focus on the selection of migrants into regions. The idea is to identify specific characteristics which affect the probability that a migrant stays in a specific region. The results will give us some information about

[13] The propensity to migrate decreases for the whole observed range for age, the implied minimum is at about 80 years. This is in line with findings in the literature, see e.g. Hunt (2006) and Fuchs-Schündeln and Schündeln (2009).

Table 5: Selection of migrants into regions

	East	*North*	*South*	*West*	Migrants
schooling	-0.0001	-0.0192	0.0218	-0.0029	0.0800
	(-0.0)	(-3.5)	(4.3)	(-0.6)	(39.8)
women	-0.0576	0.0735	-0.0331	0.0355	0.0450
	(-2.2)	(2.5)	(-1.2)	(1.3)	(4.3)
age	-0.1096	0.0397	0.0049	0.0898	-0.0451
	(-13.7)	(4.4)	(0.6)	(10.8)	(-14.1)
age^2	0.0014	-0.0005	-0.0000	-0.0011	0.0002
	(13.6)	(-4.4)	(-0.4)	(-10.8)	(6.1)
married	-0.3028	0.1877	0.0551	0.1154	-0.1160
	(-8.8)	(5.0)	(1.6)	(3.4)	(-8.7)
children	0.4536	-0.3019	0.0552	-0.3049	-0.0477
	(14.6)	(-8.6)	(1.7)	(-9.7)	(-3.9)
mean	0.3174	0.1804	0.2272	0.2750	0.0705
Observations	10 459	10 459	10 459	10 459	148 455

t-statistics in parentheses, dummy variables for the waves, GSOEP 1990–2008

the kind of migrants a region attracts.[14] For this analysis we restrict our sample to migrants. The current region of residence is the dependent variable, the explanatory variables are those characteristics which we have employed for the Probit model for migrants vs. stayers above.[15] Table 5 shows the results. For comparison, the results for the model of migrants vs. stayers for the full sample are depicted as well.[16]

Starting with schooling the results do not provide evidence that migrants that select themselves into *East* differ significantly in terms of formal qualification levels, as compared with migrants selected into the three western regions. Also, migrants that reside in *West* are neither a positive nor a negative selection in terms of qualification. Finally, *North* seems to attract significantly less skilled migrants, while migrants

[14]This could partially be interpreted as migrants' choice of region. However, it is affected by the origin of the migrant as well.

[15]We are aware that separately estimating four models is less efficient than a simultaneous estimation. In addition, a nested model for migrants vs. stayers in a first step and selection of region as a second step might yield superior results. However, estimation of a simultaneous model increases the risk of mis-specification.

[16]The coefficients slightly differ from those reported in table 4, because here we exclude the regional dummies.

that select themselves into *South* are significantly better qualified. However, one should hold in mind that those results refer to migrants only; in terms of the total population, schooling increases the propensity to migrate (see the right hand column of table 5).

The effect for women is only marginally significant. The estimates provide weak evidence that women are less likely to stay in *East*, while the probability for *North* is slightly higher. The results for a selection into *South* and *West* are not significant. In terms of age profiles the differences are striking. While we do not find a significant age effect for *South*, the results for *East* indicate an U-shape profile and a corresponding inverse U-shape profile for *North* and *West*.[17] One possible interpretation for those results is that younger people leave *East* towards the western regions and return later, when they are older.

Finally, the results with respect to family status are interesting as well. Married migrants are less likely to stay in *East*, the effect of marriage for staying in *North* and *West* is significantly positive. The coefficients for living in a household with children under 16 years reveal the opposite results. They indicate that families with children exhibit a clear positive preference for *East* and a corresponding clear negative preference for *North* and *West*. One interpretation (with some policy conclusions) could be that the much better child care facilities in *East* attract migrants into this region (Riedel, 2007).

To sum up, the empirical analysis of migrants' selection into regions yields some interesting results. Firstly, the estimates do not indicate that the highly qualified avoid the *East* despite the poor labour market performance of this region; the highly qualified migrants select into *South* and avoid *North*. Secondly, the age profiles suggest that migrants leave *East* while they are younger and return later when they are older; the age profiles for *North* and *West* correspond inversely. Finally, the estimates indicate that migrants with children exhibit a strong preference for living in *East*.

5 Effects of migration on regions and migrants

Having established specific characteristics for migrants' selection into regions, we now analyse effects of migration on regions and migrants. In a first set of estimates

[17] In addition, the extrema of the corresponding age profiles are very similar at about 39/40 years. The average age of migrants in the sample is about 34 years (see table 3).

Table 6: Migrants vs. stayers in regions

	East	*North*	*South*	*West*
schooling	0.0536	0.0898	0.1221	0.0787
	(14.2)	(17.0)	(29.2)	(21.7)
women	0.0199	0.0925	0.0563	0.0643
	(1.1)	(3.4)	(2.5)	(3.2)
age	-0.0682	-0.0369	-0.0447	-0.0215
	(-12.8)	(-4.4)	(-6.4)	(-3.4)
age^2	0.0005	0.0001	0.0003	-0.0001
	(7.9)	(1.3)	(3.4)	(-1.0)
married	-0.2567	-0.0127	-0.1224	-0.0358
	(-11.1)	(-0.4)	(-4.2)	(-1.4)
children	0.0520	-0.1803	0.0263	-0.1453
	(2.5)	(-5.4)	(1.0)	(-6.2)
observations	57664	17318	32093	41376
mean	0.0576	0.1090	0.0740	0.0695

endogenous variable: migrants vs. stayers in region i
t-statistics in parentheses, wave dummies included (not reported)

we focus on the socio-economic characteristics that distinguish migrants from stayers in the regions. The results should give us information on how migrants compare with stayers in the region, i.e. whether migrants increase the average human capital endowment of the region. For this purpose we define regional samples consisting of stayers and migrants staying in the respective region and estimate Probit models for migrants vs. stayers.[18] Table 6 depicts the results.

A first remarkable result is that for all regions the differences between stayers and migrants staying in the respective region are quite similar. Migrants exhibit a higher formal qualification level, are more often female and less often married, and they are younger than stayers. However, when looking at the regional estimates in more detail, some differences attract attention as well. Firstly, the estimated coefficients on schooling are smallest in *East* and largest in *South*. This fits together with the higher formal qualification level of stayers in the *East* and the selection of the better qualified migrants into the *South*. It indicates that the observed inflow of migrants

[18] The analyses largely correspond to those in table 4. However, the estimates here refer to regional samples.

into *South* increases the human capital endowment of this region; the observed outflow of migrants from *East*, on the other hand, might hamper the development of this region less than feared.

In terms of the age structure the difference between stayers and migrants is largest for *East*. This is in line with the argument that young persons leave this region while older persons remain. Finally, the coefficients for the dummy variables for children under the age of 16 years in the household underline the results of migrants' selection into regions (see table 5). Migrant households with children choose or prefer to stay in *East* which might increase the future prospects of this region. The opposite effect holds for *North* and *West*.

The final step of our analysis involves the estimation of the relative labour market performance of migrants staying in a region. For this purpose we construct special regional samples with stayers and those migrants who have stayed in the respective region at least once. We then estimate regional earnings functions and Probit models for unemployment and employment and include dummy variables for migrants for each region. The coefficients of the dummy variables for migrants staying in the respective region should give us some information on whether those migrants differ from stayers in terms of unobserved labour market relevant capabilities. It corresponds to the estimation of the selection effect.[19] The coefficients of the dummy variables for migrants staying in one of the other regions should give us information on the labour market performance of those migrants in other regions. The difference of those coefficients is interpreted as the return to migration for the migrants.

Table 7 reports the results for the coefficients of the dummy variables, the coefficients of the other explanatory variables largely correspond to those for the regional samples of stayers in tables A.2, A.3 and A.4 in the appendix. The reference are stayers in the respective region. The coefficients on the main diagonals refer to migrants residing within the respective region. The other coefficients refer to migrants residing in one of the other regions.

Concerning earnings in *East*, the upper left coefficient in table 7 reveals that migrants residing in *East* receive an income that is about 7 percent higher as compared with those of stayers in *East*. This indicates a positive selection effect in terms of unobserved earnings capabilities.[20] If those migrants stay in one of the other regions

[19] The selection effect is relevant for the region as well; it contains information about unobserved characteristics of those migrants a region attracts.

[20] See also Brücker and Trübswetter (2007).

Table 7: Income and (un)employment of migrants

dep. variable: log income	*East*	*North*	*South*	*West*
migrant in *East*	0.0732	-0.2245	-0.4727	-0.2869
	(6.3)	(-11.0)	(-26.6)	(-15.8)
migrant in *North*	0.3088	0.0095	-0.0645	0.0249
	(17.2)	(0.6)	(-2.0)	(1.1)
migrant in *South*	0.2985	-0.0169	-0.0753	0.0274
	(18.3)	(-0.5)	(-6.3)	(1.5)
migrant in *West*	0.2945	0.0146	0.0129	-0.0226
	(20.2)	(0.6)	(0.6)	(-2.1)
observations	34667	11207	20391	25477

dep. variable: unemployment	*East*	*North*	*South*	*West*
migrant in *East*	0.0248	0.4464	0.8452	0.6079
	(0.8)	(7.8)	(17.1)	(11.7)
migrant in *North*	-0.3230	0.1442	0.0776	0.1883
	(-5.4)	(2.9)	(0.6)	(2.4)
migrant in *South*	-0.4311	0.0479	0.2817	0.1127
	(-7.4)	(0.4)	(6.1)	(1.6)
migrant in *West*	-0.3474	-0.0106	0.3888	0.2327
	(-6.9)	(-0.1)	(5.5)	(5.9)
observations	57219	18188	32308	41436

dep. variable: employment	*East*	*North*	*South*	*West*
migrant in *East*	-0.1757	-0.0970	-0.2861	-0.2710
	(-6.5)	(-2.1)	(-6.6)	(-6.1)
migrant in *North*	0.1465	0.0372	0.1186	-0.1495
	(3.2)	(1.0)	(1.3)	(-2.7)
migrant in *South*	0.1256	-0.3031	-0.1451	-0.2877
	(3.0)	(-4.0)	(-4.7)	(-6.2)
migrant in *West*	0.0431	-0.1426	-0.2426	-0.0600
	(1.1)	(-2.4)	(-4.7)	(-2.0)
Observations	57219	18188	32308	41436

t statistics in parentheses, reference are stayers in the respective region

(migrant in *North*, *South* or *West*), their income is about 30 percent higher as those of a stayer in *East*. Hence, these estimates indicate that leaving *East* and staying in one of the western regions would result in wage gains of more than 20 percent.

The results for the other regions reveal a remarkable negative selection effect for migrants residing in *South*. Their income is about 7.5 percent lower than those of comparable stayers. However, if they would reside in *East*, their income would be drastically lower. Finally, the selection effect for migrants in *West* is negative as well, and, as compared with stayers in the western regions, migrants residing in *East* always face enormous income losses.

Concerning conditional risk of (registered) unemployment, migrants residing in *East* hardly differ from stayers in this region, the selection effect is not significant. However, living in one of the western regions would reduce their unemployment risk enormously. For the western regions the selection effect of migrants is significant and positive, i.e. they face a higher probability of unemployment as compared with stayers in the respective region. The selection effect is particularly high for migrants residing in *South* and in *West*. However, again their unemployment risk is much higher when residing in *East*.

The results for the conditional (full of regular part-time) employment probability are depicted in the bottom rows of table 7. They indicate that migrants are a negative selection especially in *East* and *South*, i.e. they exhibit lower employment rates as compared with corresponding stayers. The results emphasize again the differences between *East* and the western regions in terms of effects of migration for migrants; however they also indicate that the conditional probability of employment for migrants is generally lower than those of comparable stayers.

To sum up, the results reported in this section reveal that migrants in all regions, as compared with corresponding stayers, are a positive selection in terms of formal qualification levels. In terms of earnings capabilities the results are mixed, and in terms of unemployment and employment the effect is negative. Migrants face a higher probability of unemployment and a lower probability of employment as compared with corresponding stayers. The results with regard to effects for regions reveal that migrants in *South* (and to a lesser extent in *West*) are a negative selection of the population in terms of conditional labour market success. This contrasts with the results of the selection of migrants into regions which revealed that especially well qualified migrants choose this region. The results for effects of migration for migrants underline the different labour market performance in *East* as compared

with the western regions. The estimates suggest enormous potential migration gains for moves from *East* to *South*, *North* and *West*.

6 Conclusion

More that 20 years after German unification large differences in terms of income and unemployment between East and West Germany still persist. Those differences initiated large migration flows between those regions and provoked analyses focussing on characteristics of migrants and effects of migration. Interregional movements of migrants can contribute to regional convergence processes but may also contribute to diverging developments. The 'brain drain' of East Germany after unification, i.e. the outflow of a significant number of highly qualified and young migrants, is feared to be a factor hampering regional convergence.

Our analyses reveal that the effects of migration for regions are more complicated. It investigates interregional migration patterns in Germany between four macro regions. The focus is on regions and on the people moving between those regions. We investigate characteristics on regions and migrants, the selection of migrants into regions and the effects of migration for regions and migrants.

The results firstly confirm significant differences between the regions and between migrants and stayers. *East* exhibits by far the poorest labour market performance, despite the higher formal qualification level and the longer working time in this region. The differences between the western regions are smaller than those between East and West Germany, but the differences between the poor *North* and the prosperous *South* are noteworthy as well. In terms of migration it is especially the young and the well qualified that migrate. This would hint towards a diverging development.

However, in terms of migrants' selection into regions, the estimates do not provide evidence that the highly qualified avoid the *East*, despite the poor labour market performance of this region. In addition, the estimated age profiles suggest that migrants leave *East* while they are younger and return later when they are older; the age profiles for *North* and *West* correspond inversely. Finally, the estimates indicate that migrants with children exhibit a strong preference for living in *East*.

The results for effects of migration for regions underline that migrants in all regions, as compared with corresponding stayers, are a positive selection in terms of formal

qualification levels. However, in terms of earnings capabilities the results are mixed, and in terms of unemployment and employment the effect is negative. Migrants face a higher probability of unemployment and a lower probability of employment as compared with corresponding stayers. The results with regard to specific regions reveal that especially migrants in *South* are a negative selection of the population in terms of conditional labour market success. This contrasts with the selection of the best qualified migrants into this region. Finally, the results for effects of migration for migrants suggest enormous migration gains for moves from *East* to *South*, *North* and *West*.

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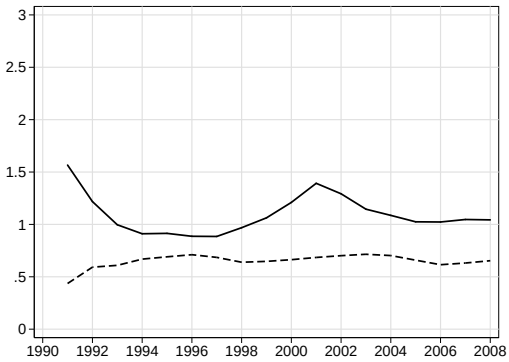
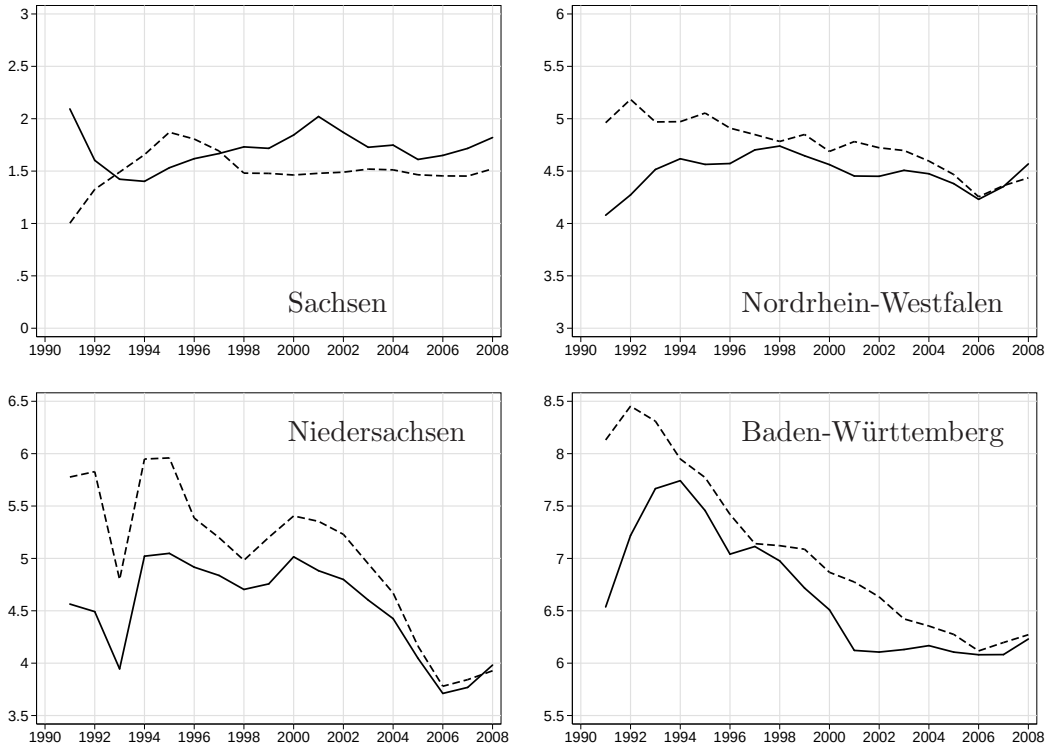
Figure A.1: East Germany



— outflows and --- inflows in percent of population

Source: Federal Statistical Office

Figure A.2: Inter-state migration



— outflows and --- inflows in percent of population

Source: Statistical Offices of the States

Table A.1: Characteristics of stayers and migrants

		East	*North*	*South*	*West*	total
income	stayers	1 600	2 159	2 189	2 264	1 976
	migrants	1 854	2 218	2 387	2 448	2 209
working time	stayers	41.7	37.9	37.7	37.7	39.3
	migrants	42.0	38.6	39.8	39.9	40.3
employed	stayers	62.2	62.8	65.2	63.6	63.3
	migrants	52.2	67.9	64.0	66.6	61.8
unemployed	stayers	14.8	6.0	3.8	5.0	8.7
	migrants	13.2	6.9	5.6	6.8	8.5
schooling	stayers	12.2	11.6	11.6	11.8	11.9
	migrants	12.5	12.8	13.2	13.0	12.8
experience	stayers	23.6	24.0	22.9	23.9	23.6
	migrants	13.5	16.3	15.8	16.0	15.2
age	stayers	41.8	41.7	40.5	41.6	41.45
	migrants	31.9	35.0	35.0	35.0	34.05
women	stayers	51.0	50.2	51.1	50.9	50.9
	migrants	52.1	55.1	51.5	53.0	52.7
married	stayers	64.4	62.0	63.0	64.3	63.8
	migrants	35.6	49.3	49.4	48.2	44.8
children	stayers	38.7	35.4	40.0	37.0	38.1
	migrants	43.5	33.5	41.9	34.7	38.8

Source: GSOEP, samples A and C, 1991–2008

Table A.2: Income across regions (stayers)

dep. variable: log income	*East*	*North*	*South*	*West*
log working time	0.7693	1.0242	1.0311	1.0659
	(90.2)	(84.8)	(134.2)	(151.4)
experience	0.0592	0.0665	0.0601	0.0695
	(62.3)	(36.1)	(51.3)	(65.5)
experience^2	-0.0010	-0.0011	-0.0010	-0.0012
	(-49.3)	(-28.8)	(-41.5)	(-51.3)
schooling	0.0902	0.0889	0.0883	0.0841
	(79.3)	(41.7)	(63.4)	(72.3)
women	-0.1201	-0.2605	-0.2803	-0.2288
	(-22.0)	(-23.2)	(-37.8)	(-34.9)
observations	30251	8783	17449	21959
mean	7.1966	7.4309	7.4538	7.4831

Table A.3: Unemployment across regions (stayers)

dep. variable: unemployment	*East*	*North*	*South*	*West*
experience	0.0396	0.0033	0.0024	-0.0070
	(17.7)	(0.6)	(0.5)	(-2.0)
experience^2	-0.0008	-0.0001	0.0000	0.0001
	(-16.9)	(-1.4)	(0.3)	(1.9)
schooling	-0.0992	-0.1094	-0.0421	-0.0865
	(-27.6)	(-12.2)	(-6.3)	(-15.7)
women	0.1241	-0.1087	-0.0493	-0.0925
	(8.9)	(-3.2)	(-1.7)	(-4.1)
observations	50432	14403	27755	35972
means	0.1475	0.0600	0.0379	0.0499

Table A.4: Employment across regions (stayers)

dep. variable: employment	*East*	*North*	*South*	*West*
schooling	0.1152	0.0831	0.0332	0.0912
	(36.5)	(14.9)	(8.5)	(27.0)
women	-0.3789	-0.6761	-0.8403	-0.7850
	(-29.1)	(-28.3)	(-46.7)	(-49.9)
age	1.9231	1.8626	1.8321	1.8528
	(24.6)	(13.2)	(18.7)	(19.7)
age^2	-0.0689	-0.0671	-0.0647	-0.0648
	(-22.5)	(-12.2)	(-16.7)	(-17.7)
age^3	0.0011	0.0011	0.0010	0.0010
	(21.6)	(11.8)	(15.9)	(16.9)
age^4	-0.0000	-0.0000	-0.0000	-0.0000
	(-22.0)	(-12.0)	(-16.0)	(-17.1)
married	0.2635	0.1350	-0.2093	-0.0711
	(16.0)	(4.7)	(-9.1)	(-3.6)
children	-0.2345	-0.3991	-0.3485	-0.3559
	(-13.8)	(-12.8)	(-15.6)	(-18.0)
observations	50432	14403	27755	35972
means	0.6223	0.6282	0.6516	0.6357