Determinants and Income Effects of Commuting and Migration
An empirical analysis for Germany after Unification

Daniel Siepe and Werner Smolny

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Abstract

After German unification large income differentials between East and West Germany led to massive commuting and migration flows. In this paper we analyze commuting and migration empirically by looking for determinants and effects on income using data from the German Socio-Economic Panel. We examine differences between east-west as well as west-east movements.

We find that east-west commuters receive wage gains of about 15 percent and east-west migrants of about 20 percent when taking selection effects into account. The income effects for mobile Westerners are different. For west-east commuters the returns are slightly negative. West-east migration leads to a positive income effect in the nineties, whereas the returns are negative in more recent years.

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Address: Institute of Economic Policy
Ludwig Erhard Chair
University of Ulm
89069 Ulm, GERMANY
Tel.: (49) 731 50 24264, Fax: (49) 731 50 24262
e-mail: Daniel.Siepe@uni-ulm.de

1 Introduction

In November 1989 the fall of the Berlin Wall was the starting point of German unification which took place in 1990. At first, the unification process led to a severe breakdown of the East German economy. Despite the following rapid catching-up process starting in 1991, significant economic differences between East and West Germany persist until today. For example, the average income of West Germans was more than twice that of East German employees in 1991 and in 2009 the wage differential still amounts to about 25 percent.[1]

With regard to the wage differential, Easterners seemingly have the possibility to increase their income by working in West Germany. Therefore the high number of mobile Easterners working in the West does not come as a surprise. These mobile persons can further be divided into two groups. Commuters take a job in the West but stay resided in the East whereas migrants move completely by changing their place of residence.

Several papers have examined migration flows from East to West Germany and focused on two main issues. On the one hand, aspired by the Roy model of migration selection, the determinants of migration were examined.[2] On the other hand, wage gains for migrants were analyzed. Hunt (1999) finds median wage gains for east-west migrants in 1990 and 1991 of over 50 percent, whereas the gains in later years are significantly lower. Zaiceva (2006) shows that there is no long-run effect on income for migrants. Finally, Smolny and Kirbach (2011) find wage gains of almost 40 percent for migrants from East Germany in a panel estimation from 1993 to 2008. Although migration flows from West to East Germany are not negligible, the literature is rather silent about this issue. Beck (2004) gives an overview of several socio-economic characteristics of movers from West to East Germany.

A small number of papers has investigated commuting between East and West Germany. Pischke et al. (1994) examine characteristics of east-west commuters in the first year after German reunification. Granato et al. (2009) analyze commuting

[1] See Statistische Ämter der Länder (2010).

[2] See Roy (1951), Burda (1993), Hunt (2006) and Brücker and Trübswetter (2007).

and migration flows with respect to human capital. Finally, Zaiceva (2006) finds long-run returns for east-west commuters of about 40 percent.

In this paper we take a broader look at movements between East and West Germany. We look at commuters and migrants and analyze determinants as well as returns to movements. By taking west-east as well as east-west movements into account, we are able to compare the determinants and income effects of movements in both parts of Germany. In addition, we take possible changes in the structure of movements into account by distinguishing between an early phase from 1995 to 2001 and a more recent period from 2002 to 2008.

The paper is organized as follows. Section 2 presents aggregated data for movements between East and West Germany and discusses the data used in our analysis. The empirical specifications are presented at the end of the section. Our analysis consists of two steps. Section 3 presents descriptive statistics as well as estimates for the probability of being an active commuter or migrant. The statistics and results of the probit estimations reveal several differences between commuters and migrants as well as between Easterners and Westerners. We find that education has a positive impact on the probability to commute or migrate for Westerners, whereas education hardly has an effect for Easterners. Younger and male persons are significantly more likely to be mobile in both parts of Germany. Another major difference between Westerners and Easterners is the effect of children. While living with children is an important barrier for Easterners to migrate to the West, the probability for Westerners to migrate to the East is remarkably higher when living with a child.

Section 4 investigates the income effects of movements. Our starting point is the estimation of earnings functions in East and West Germany based on stayers. By estimating the place of commuters and migrants in the earnings functions, we analyze the returns to movements taking selection effects into account. The estimation results show that East German commuters receive wage gains of about 15 percent while working in West Germany. West German commuters are positively selected but their income is lower while they are actively commuting. Migrants from East and West Germany do not differ from stayers in the corresponding part of Germany. However, the returns to migration are different. East-west migrants receive wage

increases of about 20 percent. For west-east migrants the returns to migration are positive in the nineties and negative in recent years after 2002. The last section summarizes the main findings and discusses policy implications.

2 Data and empirical specification

Figure A.1 in the appendix shows migration flows in Germany.[3] The number of migrants from East to West Germany fell constantly from a high level after unification in the early nineties but rose again from 1997 to 2001 with a peak of about 192,000 migrants. Afterwards the number of east-west migrants decreased again and, from 2005 on, fluctuated around 137,000 per year.[4] In contrast, the corresponding number of West German migrants increased during the early nineties and peaked in 1996 with over 100,000 migrants. Afterwards it decreased and fluctuated around 90,000 west-east migrants per year.

Figure A.2 in the appendix presents data from the German Bundesagentur für Arbeit for east-west and west-east commuters.[5] From 1999 to 2001 the number of Easterners commuting to West Germany increased from 250,000 to nearly 350,000. Afterwards the amount of east-west commuters fluctuated around 340,000. In contrast, the number of west-east commuters remained rather constant over the period from 1999 to 2009. It fluctuated around 50,000 commuters per year but shows a slightly increasing trend after 2005.[6]

For our empirical investigation we use micro data 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 which in October 1990 became a part of the Federal Republic of Germany.

[3] Berlin is excluded.

[4] See Hunt (2006), Statistisches Bundesamt (2009).

[5] Data from Bundesagentur für Arbeit for commuting between the federal states is available from 1999 onwards only.

[6] See Haas and Hamann (2008), Statistik der Bundesagentur für Arbeit (2010).

Our empirical analysis distinguishes between stayers, commuters and migrants. Stayers are defined as those respondents who reported a place of residence in either East or West Germany before unification in 1989 and during the whole period from 1990 to 2008 (stayer in East respectively stayer in West). In addition, stayers never reported to commute between East and West Germany.

East-west commuters similarly reported a place of residence in East Germany before unification and during the whole period after unification. Furthermore, east-west commuters reported a place of employment in one of the ten West German states or West-Berlin at least once.[7] West-east commuters are defined accordingly. They reported a place of residence in West Germany before unification and during all years from 1990 to 2008. Additionally, they stated a place of employment in one of the five East German states or East-Berlin at least once. For each year we differentiate between east-west commuters working in East Germany (inactive commuters) and east-west commuters working in West Germany (active commuters). Accordingly, we refer to west-east commuters working in West Germany as inactive commuters and to west-east commuters working in East Germany as active commuters.

East-west migrants stated East Germany as place of residence before unification. Contrary to stayers and commuters, they reported West Germany or West-Berlin as place of residence at least once and never declared to commute. West-east migrants are defined accordingly. We also distinguish between active and inactive migrants for each year. Active migrants are living in the part of Germany which was not their place of residence before unification. Correspondingly, inactive migrants are still or again living in the same part of Germany as in 1989.

In our analysis we only employ data from the West German sample A and the East German sample C. In addition, several respondents are excluded from our analysis. At first, we eliminate respondents who reported to live or work abroad at least once. Secondly, we exclude commuters who later on migrated and vice versa. Finally, we include only persons who stated to work full or regularly part time with less than 70 hours of weekly working time.

[7] We do not distinguish between every day and weekend commuters.

The empirical analysis concentrates on a sample ranging from 1995 to 2008 which is divided into two subsamples from 1995 to 2001 and from 2002 to 2008. The starting point in 1995 was chosen because the questionnaires for the East and West German sample differed. There are two reasons for dividing the sample period after 2001. Firstly, we assume that the commuting and migration behavior changed over time as there maybe different reasons causing commuting and migration in the nineties and in more recent years. Secondly, the order of questions in the GSOEP questionnaire changed from 2001 to 2002. This explains the noteworthy increase of the number of commuters observed in the data.[8]

In section 3 we estimate a probit model for each of the two subsamples in order to see which variables influence the decision to commute. We include dummies for sex, children under 16 living in the household and marriage. In addition, we use age and a variable for human capital (schooling). The schooling variable refers to the years necessary to obtain the corresponding highest level of education. By using this variable, the differing East and West German graduations can be better compared.

The empirical analysis in section 4 consists of two steps. Firstly, we estimate earnings functions for East and West German stayers. Again we use schooling and sex as explanatory variables. In addition, we include work experience[9] and the logarithm of weekly working hours. We separate the sample period from 1995 to 2008 in two subsamples ranging from 1995 to 2001 and from 2002 to 2008. This should give some information on differences of wage determination in East and West Germany and in the varying subsamples. Moreover, we estimate the earnings function for all stayers and include a dummy variable for East Germany. The effect of this dummy variable is interpreted as the conditional wage gap between East and West Germany.

Secondly, we calculate the effect of movements – active and inactive – in East and West Germany by including dummy variables for active and inactive commuters and migrants in the earnings functions. The estimation for the dummy variable for

[8] From 2001 to 2002 the number of East German commuters rises by more than 28 % and the number of West German commuters by 144 %.

[9] Work experience is derived from age and years of schooling:
$experience = age - schooling - 6$.

inactive commuters and migrants is interpreted as the selection effect with respect to unobserved earnings capabilities. The differences between inactive and active commuters and migrants are interpreted as the effect of commuting respectively migration.

3 Characteristics of commuters and migrants

The upper rows of table 1 show the means of characteristics of eastern stayers, commuters and migrants in the two subsamples. In both subsamples the income of East German stayers is below the income of inactive commuters which itself is clearly below that of active commuters. The income differential between East German stayers and active east-west commuters widens slightly. The income of inactive migrants from the East is below that of stayers. In contrast, active east-west migrants have remarkably higher earnings than inactive migrants and stayers.

The corresponding figures for West German stayers, commuters and migrants are depicted in the bottom rows of the table. Although the number of observations for stayers in the West is approximately two times that of stayers in the East, the number of observations for western migrants and commuters is clearly below the corresponding figures for Easterners.

The income differential between West German and East German stayers stands at nearly 40 percent in both subsamples. During the whole sample period west-east commuters earn more than West German stayers but while active west-east commuters have higher earnings than inactive commuters in the first subsample, their income is below that of inactive commuters in the second subsample. Active west-east migrants have the highest income although it is considerably lower in the second subsample. In contrast, the average earnings of inactive west-east migrants are remarkably higher.

The table also reveals that east-west commuters and migrants are significantly younger than stayers with inactive migrants being the youngest group. They are between eight and ten years younger than east stayers. West German stayers are on

Table 1: Characteristics of stayers, commuters and migrants

	income		no. of obs.		age		schooling	
East Germany	95-01	02-08	95-01	02-08	95-01	02-08	95-01	02-08
stayer in East	1696	1993	8590	6305	41.6	43.4	12.7	13.0
inactive commuter	1757	2109	1220	946	38.5	42.2	12.5	12.9
active commuter	1923	2301	597	741	38.7	39.4	12.6	12.6
inactive migrant	1538	1829	225	99	33.4	34.0	12.0	12.6
active migrant	2038	2275	550	709	35.7	37.3	12.6	12.9
West Germany								
stayer in West	2349	2751	17145	13327	40.4	42.3	12.1	12.4
inactive commuter	2937	3324	969	899	38.6	41.9	13.1	13.5
active commuter	3180	3016	120	248	39.6	40.5	13.2	13.7
inactive migrant	2347	3946	96	52	38.8	41.9	12.6	14.2
active migrant	4841	4341	37	62	34.4	38.9	15.0	15.2

Monthly income in €, age and schooling in years, samples 1995-2001 and 2002-2008.
Source: GSOEP, Sample A and C, full or regular part time employees only.

average approximately one year younger than stayers in the East. As in East Germany, commuters and migrants are younger than stayers. However, the differences between inactive migrants and commuters are not as pronounced as in the East. In the West active migrants clearly form the youngest group.

Concerning formal qualification levels (schooling) in East Germany, no significant differences can be found between stayers and commuters. The qualification level of migrants is only slightly below that of stayers as well. The formal qualification level of stayers in the West is slightly lower compared to stayers in the East. The average duration of schooling received by west-east commuters is more than one year longer than that of stayers. The formal qualification level of active migrants is almost three

years above that of stayers.

Table A.1 in the appendix presents more socio-economic characteristics. The average working time per week of East German stayers is about one to two hours below that of active and inactive east-west commuters. In contrast, active east-west migrants work significantly less. The average working time per week of West German stayers is clearly below that of East German stayers. Active as well as inactive west-east commuters work over one hour more than western stayers and active west-east migrants even work on average seven hours more.

The share of women in the labor force of East German stayers is above 50 percent, but their share in the east-west commuter population accounts only to about one third. The group of east-west migrants, as east stayers, consists of more than 50 percent women. The share of women in the western labor force is 10 percentage points below the corresponding figure for the East and stands at 42 percent on average. Regarding active west-east commuters, the share of women changes considerably between the two subsamples. In the first subsample the share of women is 11 percentage points below and in the second subsample it is 11 percentage points above the corresponding number for western stayers. With regard to western stayers women are clearly underrepresented in the west-east migrant population.

The variables concerning the family status – married and children – show a large variability. East-west commuters are more often unmarried but have more often children than east stayers. However, the differences are rather small. In addition, east-west migrants are much less often married than eastern stayers. Active and inactive migrants from the East differ strongly concerning children. While inactive east-west migrants have on average more often children than east stayers, active migrants have significantly less often children.

The share of married persons and persons with a child living in the same household is more stable over time in the West than in the East. The share of married western stayers is slightly above the corresponding share for west-east commuters but clearly above the share of married west-east migrants with inactive migrants being the group with the lowest share of married persons. Concerning children, the share of

active west-east commuters who live with a child fluctuates around the corresponding number for western stayers. The highest share of people living with a child can be found in the population of active west-east migrants.

We will now focus on the determinants of commuting and migration. The basic probit model for our analysis is shown in equation (1)

$$p = \Phi(X\beta + FE + \epsilon), \tag{1}$$

with p the probability for active commuting respectively migration, Φ the cumulative distribution function of the standard normal distribution, X a vector of explanatory variables, β a coefficient vector, FE fixed effects for the years and ϵ an error term. Besides the dummy variables *married*, *child* and *sex* the variables *schooling* and *age* are used as explanatory variables in X. The estimation results are depicted in table 2.

The results for East Germany (columns (1) to (4)) show that only age and gender have a significant influence on commuting during the first subsample ranging from 1995 to 2001. As expected, age has a negative effect on commuting suggesting that younger persons are more likely to commute. In addition, men are more likely to commute than women. It is also noteworthy that, after controlling for the other variables, formal qualification levels do not influence the probability to commute.

In the second subsample age and gender have the same effects on commuting as in the first one. Moreover, marriage has a positive effect on commuting. A possible explanation for this is that married persons are forced to search for better paid jobs in West Germany as they have to support their families. Regarding schooling, the effect on east-west commuting in the second subsample is negative. However, it is not clear if less educated workers are more likely to commute to the West because of higher wages or the threat of unemployment in the East.

In the first subsample young and male Easterners are more likely to migrate. Additionally, marriage has a positive but living with children has a negative effect on migration. Again, the influence of schooling is not significant. In the second subsample only age and children are significant, both with a negative effect. Living with children seems to be an important barrier for migration.

Table 2: Panel data probit estimates

dependent variable: active commuter/migrant

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	East commuters		East migrants		West commuters		West migrants	
	95-01	02-08	95-01	02-08	95-01	02-08	95-01	02-08
schooling	.001	-.016	.009	.006	.050	.060	.122	.121
	(0.1)	(-1.8)	(1.0)	(0.6)	(4.3)	(7.2)	(6.6)	(7.7)
sex	-.348	-.397	-.069	.048	-.170	.179	-.174	-.449
	(-8.3)	(-9.5)	(-1.7)	(1.1)	(-2.3)	(3.4)	(-1.5)	(-3.9)
age	-.015	-.025	-.034	-.034	-.004	-.007	-.026	-.017
	(-5.9)	(-10.1)	(-13.4)	(-13.9)	(-1.2)	(-2.7)	(-3.3)	(-2.8)
married	-.010	.194	.101	.008	-.019	.014	-.281	-.345
	(-0.2)	(3.7)	(1.9)	(0.2)	(-0.2)	(0.2)	(-1.9)	(-2.8)
child	-.031	-.078	-.305	-.340	.045	.102	.322	.436
	(-0.7)	(-1.6)	(-6.5)	(-7.0)	(0.6)	(-1.7)	(2.3)	(3.7)
observations	10105	7514	10115	7517	19144	14909	19068	14731
mean dep.var.	.058	.096	.059	.096	.006	.016	.002	.004
L. likelihood	-2179.4	-2260.4	-2143.4	-2224.3	-681.5	-1201.4	-251.4	-361.0

z-statistics in parentheses; samples 1995-2001 and 2002-2008,

fixed effects for the waves (not reported); schooling and age in years,

dummy variables for women, married and children under 16 living in the same household

The estimates for West Germany are shown in columns (5) to (8). In West Germany age and the family status variables are not significant for commuting in the first sample period and men are more likely to commute than women. It is noteworthy that, in contrast to East Germany, schooling has a positive impact on commuting.

In the years from 2002 to 2008 all variables except marriage are significant. Age and living with children influence the probability to commute negatively. The influence of gender has changed. Now women are more likely to commute. The effect of schooling on commuting is again positive. All in all, this is the major difference between active east-west and west-east commuters. While west-east commuting is positively affected by the formal qualification level the opposite holds true for east-west commuting.

The estimation results for migrants from the West are depicted in columns (7) and (8) of table 2. They are quite similar for both subsamples. The probability to migrate from the West to the East is negatively affected by age and positively by formal qualification levels. Compared to west-east commuters, the effect of marriage is significant and negative but living with children affects the probability to be an active migrant positively. Men are more likely to migrate in both subsamples, however this effect is only significant in the second subsample.

Altogether, young and male persons are more likely to be mobile between East and West Germany. The major difference is related to the formal qualification level. While commuting and migrating from West to East Germany is positively affected by years of schooling, the corresponding effect for east-west commuters and migrants is insignificant or even negative. Regarding migrants, another major difference is obvious. While living with children is a high barrier for Easterners to migrate, it increases the probability to be an active migrant significantly for Westerners. This phenomenon may be explained by the more numerous day care facilities in the East.[10]

[10] See Statistische Ämter des Bundes und der Länder (2011).

4 Income effects of commuting and migration

After the general characterization of commuters and migrants in the previous section we will now use earnings functions in order to estimate the income effects of commuting and migration. The basic earnings function is shown in equation (2)

$$log(w) = X\beta + FE + \epsilon, \tag{2}$$

with w the nominal monthly gross income, X a vector of explanatory variables, β a coefficient vector, FE fixed effects for the years and ϵ an error term. The vector of variables consists of *schooling*, *women*, *experience*, $experience^2$ and the logarithm of *working time*. Table 3 depicts the results of the panel data analysis for stayers referring to equation 2.

Columns (1) and (2) refer to East German stayers in the two subsamples. The returns to schooling are 7.6 percent per year in the first and 8.7 percent in the second period.[11] The gender wage gap amounts to only 12 percent in the first and is even lower in the second subsample. The age-income profiles are similar but the effect of work experience is higher in the second subsample. Finally, the estimates reveal that the impact of weekly working time on income is remarkably higher in the period ranging from 2002 to 2008. Nevertheless, the effect is clearly less than proportional.

Columns (3) and (4) present the estimates for the West German earnings function. They reveal that differences between the subsamples in the West are rather small. The impact of schooling is higher, whereas the gender wage gap is slightly smaller in the second period. The age-income profile hardly changes. The effect of weekly working time is remarkably higher in the second subsample.

Compared to the East earnings function, returns to schooling are smaller in the West, especially in the second subsample. In contrast, the impact of working experience is more pronounced in the West. Remarkable differences affect the gender wage gap and the returns to weekly working time. The gender wage gap amounts to more than 25 percent in the West which is more than two times the corresponding eastern

[11] Percentages refer to differences of logarithmic values.

Table 3: Earnings functions for stayers

dependent variable: log. nominal monthly gross income

	(1)	(2)	(1)	(2)	(5)	(6)
	stayers in East		stayers in West		all stayers	
	95-01	02-08	95-01	02-08	95-01	02-08
schooling	.076	.087	.071	.074	.072	.077
	(44.0)	(37.9)	(59.7)	(54.2)	(72.1)	(65.0)
women	-.119	-.089	-.278	-.264	-.222	-.203
	(-14.5)	(-7.9)	(-41.6)	(-33.1)	(-41.9)	(-30.9)
experience	.022	.030	.041	.041	.035	.038
	(13.5)	(13.9)	(35.9)	(29.7)	(36.8)	(32.4)
experience^2	-.0004	-.0005	-.0007	-.0006	-.0006	-.0006
	(-10.8)	(-11.5)	(-30.0)	(-23.4)	(-30.7)	(-25.9)
working time	.525	.816	.897	.975	.832	.962
	(34.4)	(36.5)	(103.3)	(92.0)	(109.7)	(99.9)
East German stayer					-.384	-.389
					(-72.2)	(-60.0)
observations	8590	6305	17145	13327	25735	19632
s.d. dep.var.	.450	.530	.613	.642	.577	.622
SEE	.365	.421	.389	.402	.389	.413
$\overline{R}^2$	.343	.370	.599	.607	.547	.560

t-statistics in parentheses; samples 1995-2001 and 2002-2008,

fixed effects for the waves (not reported); schooling and experience in years,

log. weekly hours, dummy variable for women.

number. In addition, the returns to an increase in weekly working hours are nearly proportional in the West in the second subsample but they are clearly less than proportional in the East.

These estimates provide deeper insight in the determination of wages in both parts of Germany. All the variables are important for the determination of income. The results for the human capital variables are twofold. On the one hand, returns to schooling are remarkably higher in the East but on the other hand, the impact of work experience is higher in the West. A possible interpretation for this finding is that working experience in the centrally planned economy of the German Democratic Republic is less valuable than working in the free market economy of the Federal Republic of Germany, whereas general schooling is rather independent from the economic system. This could also explain the higher returns to experience in the East in the second subsample.

The differences concerning the gender wage gap and the effect of working time are striking. As women were stronger involved in the labor market in the old system, the smaller gender wage gap in the East is not surprising. The smaller effect of working time on income could be attributed to the labor market situation which was worse in the East than in the West, especially during the first decade after unification. In such a situation employees might work overtime unpaid in order to keep their jobs.[12]

Columns (5) and (6) show the results for the earnings function for all stayers extended with a dummy variable for East German stayers. Not surprisingly, all estimates lie well in between the estimates for East and West Germany. The results reveal a constant wage gap between East and West Germany of about 40 percent in both subsamples.

We will now focus on income effects of movements for commuters and migrants from East and West Germany. Hence, the stayer populations used above are extended by commuters respectively migrants. In addition, dummy variables for active and inactive commuters respectively migrants are included in the earnings functions. Table 4 presents the estimation results. As the calculated coefficients for income

[12] See Smolny and Kirbach (2011).

determinants are hardly differing from the estimated earnings functions for stayers, we only report the results for the dummy variables.[13] The results for East Germany are depicted in columns (1) and (2). They reveal insignificant coefficients for the inactive commuter dummy in both subsamples. This indicates that east-west commuters do not differ significantly from stayers in the East regarding unobserved earnings capabilities. Since east-west commuters presumably should be more mobile than stayers while living and working in eastern Germany this finding is rather surprising. On the contrary, active commuters receive considerable wage gains. It is especially noteworthy that average wage gains are more pronounced in the second subsample. While the income gain for east-west commuters is estimated between 12 and 13 percent in the first, it amounts to 17.5 percent in the second subsample.

Including dummy variables for east-west migrants gives the results depicted in columns (1) and (2) at the bottom of table 4. According to the estimation results east-west migrants hardly differ from stayers with regard to unobserved earnings capabilities. Average wage gains for active migrants account to about 20 percent and are thus higher as the corresponding number for commuters in both subsamples.

Columns (3) and (4) depict the results for mobile employees from West Germany. Commuters (in the top rows) are positively selected with respect to unobserved earnings capabilities in both subsamples and the selection effect remains constant over time. While working in the West, their income is on average about 9 percent higher than that of stayers. The returns to active west-east commuting are slightly negative.

The returns to migration differ for west-east migrants in the two subsamples. According to the estimates west-east migrants tend to be negatively selected in the first and positively selected in the second subsample. However, the coefficients are not significant. The effect of active migration is considerably different in the subsamples. From 1995 to 2001 active west-east migrants receive wage gains of about 16 percent whereas the income of active migrants is 15 percent lower than that of inactive migrants from 2002 to 2008.

[13] The complete results can be found in tables A.2 and A.3 the appendix.

Table 4: Income effects of movements

dependent variable: log. nominal monthly gross income

	(1)	(2)	(3)	(4)
	East		West	
	95-01	02-08	95-01	02-08
inactive commuter	.011	.007	.093	.092
	(1.0)	(0.5)	(7.3)	(6.6)
active commuter	.138	.182	.070	.028
	(8.9)	(11.2)	(2.0)	(1.1)
observations	10407	7992	18234	14474
s.d. dep.var.	.446	.529	.616	.645
SEE	.362	.415	.388	.403
$\overline{R}^2$	.342	.387	.604	.611
inactive migrant	.006	.031	-.015	.054
	(0.2)	(0.7)	(-0.4)	(1.0)
active migrant	.209	.229	.145	-.098
	(12.8)	(13.6)	(2.3)	(-1.9)
observations	9365	7113	17278	13441
s.d. dep.var.	.457	.534	.613	.643
SEE	.367	.417	.389	.404
$\overline{R}^2$	.355	.392	.599	.605

t-statistics in parentheses; samples 1995-2001 and 2002-2008, control variables: schooling, experience in years, log. weekly hours, dummy variable for women and fixed effects for the waves (not reported); dummy variables for active and inactive commuters/migrants.

Remarkable differences can be found when comparing the results for East and West Germany. While east-west commuters are not selected regarding unobserved earnings capabilities, a positive selection effect can be found in West Germany. In addition, the effect of active commuting differs. On the one hand, active east-west commuters receive sizeable wage gains which are even higher in recent years. On the other hand, active west-east commuters have an income which is lower than that of inactive commuters and only slightly above that of western stayers.

Migrants from the East hardly differ from stayers in the East and the wage increase during their stay in the West is higher than the corresponding number for east-west commuters. In addition, there is no selection effect for west-east migrants. Income of active migrants from the West is affected very differently in the two periods. With regard to the results of inactive migrants the wage of active migrants is on average 16 percent higher in the first and 15 percent lower in the second subsample.

Altogether, mobile persons from East Germany receive considerable wage gains of about 12 to 17.5 percent for commuters and about 20 percent for migrants. It is noteworthy that these effects are considerably smaller than the estimated conditional wage gap between East and West Germany of about 40 percent. The interpretation of the wage gains for mobile Easterners is straight forward. As wages in West Germany are higher than in the East, commuting or migrating to a higher income region should improve the personal income. The differences between commuters and migrants can either be attributed to unobserved earnings capabilities or to a discrimination effect.

The findings for mobile employees from the West are puzzling as commuting is accompanied by constant or even lower wages. A view at the GSOEP-data reveals that a considerable share of commuters stays with the same employer before, during and after actively commuting. In addition, commuting from West to East is also mostly temporary for commuters who reported a change of employer. This indicates that commuting is mainly a transitional solution maybe to avoid unemployment in the West. These aspects could explain the decrease in wages of active west-east commuters.

The interpretation for the differing income effects of active west-east migration is more difficult. As table 1 shows, the average income of active west-east migrants is considerably higher in the first subsample. This indicates that the composition of the active migrant population changed considerably between the nineties and more recent years. An explanation for the negative returns to migration in the second subsample can be found by looking at the probit estimates in section 3. They show that living with children increases the probability to become an active west-east migrant. Potentially, the numerous day care facilities encourage young families to migrate to the East. In addition, the lower price level in the East leads to higher real wages although the nominal wage is lower than in West Germany. Perhaps, the described increase of the real wage is considered by migrants.

5 Conclusion

Despite a general adjustment of living conditions in East and West Germany sizeable economic differences persist. Especially the poor labor market situation in the East and income differentials between East and West Germany are commonly discussed. These differences lead to enormous commuting and migration flows. We asked for differences between stayers, commuters and migrants in socio-economic characteristics and for income effects for mobile employees.

Firstly, our analysis revealed that the probability to commute or migrate is negatively affected by age, and male employees are more likely to be mobile than women. A remarkable difference between East and West Germany is the differing effect of schooling. In the West a higher qualification leads to a higher probability of being mobile, while the impact of schooling is either insignificant or negative in the East. The influence of family status variables differs remarkably concerning migrants. While being married supports and living with children hampers migration for Easterners, the opposite holds true in the West.

Secondly, the estimation of earnings functions gave insight to wage determination in both parts of Germany. The results show that East German human capital acquired by schooling is at least as valuable as western human capital. In contrast, West

German human capital acquired by working experience is more valuable. Further differences are the smaller gender wage gap and the less than proportional returns to working time in the East. Moreover, the average wage gap between East and West Germany is constant over time and amounts to about 40 percent.

Finally, the income effects of active mobility and selection effects were examined. The results are again remarkably different for East and West Germany. East-west commuters and migrants do not differ significantly from stayers in the East. The same holds true for west-east migrants with respect to stayers in the West. In contrast, west-east commuters are positively selected. Furthermore, active commuters and migrants from the East receive considerable wage gains between 12 and 20 percent. Westerners can not increase their income by commuting taking selection effects into account. The returns to migration are remarkably different in the nineties and in more recent years. In the first period the income of active west-east migrants is 16 percent higher than that of inactive migrants. However, the opposite holds true for the second subsample, as the income of active migrants is 15 percent lower than that of inactive migrants.

A major goal of economic policy is the convergence of living conditions in East and West Germany. With respect to policy implications we argue that east-west commuting should be encouraged. This could lead to an increase of purchasing power in East Germany as commuters from the East receive significant wage gains. A self-evident proposal is the upgrading of the infrastructure in the region of the former German border in order to facilitate commuting. Another possibility arises out of the determinants of migration. The results show that living with children has a positive impact on the probability to migrate from West to East Germany. Presumably, this result reflects the numerous day care facilities in the East. Therefore it should be possible to attract more younger parents to move to the East.

Further work could focus on the effects of an increase of purchasing power through higher wages of commuters and a more detailed examination of the determinants of west-east commuters and migrants.

References

- Beck, G., (2004). Wandern gegen den Strom: West-Ost Migration in Deutschland. In: Swiaczny, F. and S. Haug (eds.). Bevölkerungsgeographische Forschung zur Migration und Integration. Bundesinstitut für Bevölkerungsforschung beim Statistischen Bundesamt, Wiesbaden.

- Brücker, H. and P. Trübswetter, (2007). Do the best go west? An analysis of the self-selection of employed East-West migrants in Germany. Empirica 34, p. 371-395.

- Burda, M.C., (1993). The determinants of East-West German migration. Some first results. European Economic Review 37, p. 452-461.

- Granato, N., Haas, A., Hamann, S. and A. Niebuhr, (2009). Arbeitskräftemobilität in Deutschland - Qualifikationsspezifische Befunde regionaler Wanderungs- und Pendlerströme. Raumforschung und Raumordnung 67, p. 21-33.

- Haas, A. and S. Hamann, (2008). Pendeln - ein zunehmender Trend, vor allem bei Hochqualifizierten. IAB-Kurzbericht 6/2008.

- Hunt, J., (1999). Post-Unification wage growth in East Germany. NBER Working Paper 6878.

- Hunt, J., (2006). Staunching Emigration from East Germany: Age and the Determinants of Migration. Journal of the European Economic Association 4, p. 1014-1037.

- Pischke, J.-S., Staat, M. and S. Vögele, (1994). Arbeitslosigkeit, Löhne oder Weiterbildung: Warum pendeln Ostdeutsche in den Westen? In: König, H. und V. Steiner (eds.). Arbeitsmarktdynamik und Unternehmensentwicklung in Ostdeutschland. Baden Baden, Nomos Verlag.

- Roy, A. D., (1951). Some Thoughts on the Distribution of Earnings. Oxford Economic Papers 3, pp. 135-146.

- Smolny, W., and M. Kirbach, (2011). Wage differentials between East and West Germany: are they related to the location or to the people? Applied Economics Letters, forthcoming.

- Statistik der Bundesagentur für Arbeit, (2010). Pendlerstatistik, Sozialversicherungspflichtig Beschäftigte nach Ländern.

- Statistische Ämter der Länder, (2010). Volkswirtschaftliche Gesamtrechnungen der Länder.

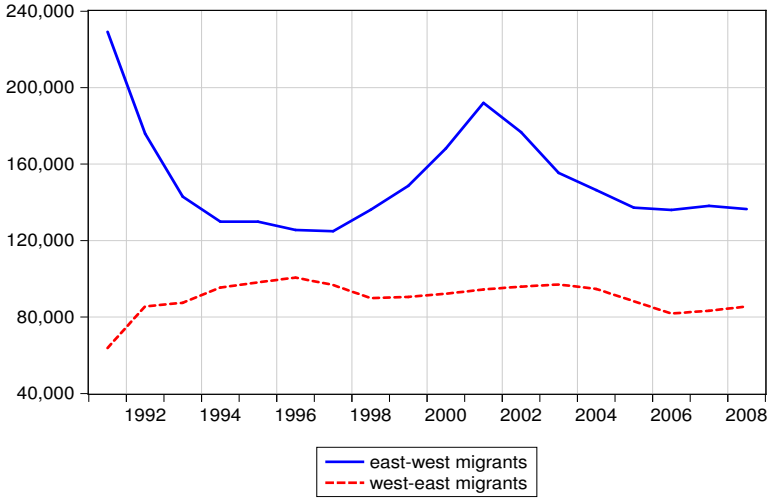
- Statistische Ämter des Bundes und der Länder (eds.), (2011). Kindertagesbetreuung regional 2010 - Ein Vergleich aller 412 Kreise in Deutschland. Wiesbaden 2011.

- Statistisches Bundesamt, (2009). Wanderungssaldo von Ost- nach Westdeutschland ändert sich wenig. Pressemitteilung No. 375.

- Zaiceva, A., (2006). Self-Selection and the Returns to Geographic Mobility: What Can Be Learned from the German Reunification "Experiment". IZA Discussion Paper 2524.

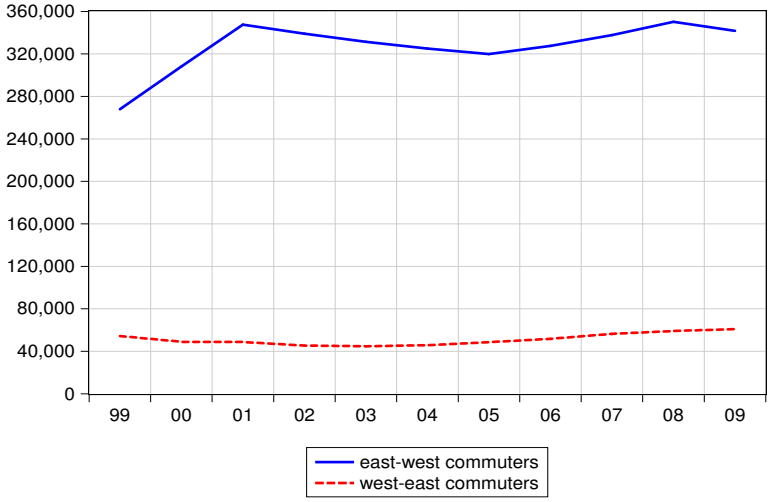
Appendix

Figure A.1: Interregional migration in Germany



Source: Statistisches Bundesamt.

Figure A.2: Interregional commuting in Germany



Source: Statistik der Bundesagentur für Arbeit.

Table A.1: Characteristics of stayers, commuters and migrants

	hours		women		married		child	
East Germany	95-01	02-08	95-01	02-08	95-01	02-08	95-01	02-08
stayer in East	42.4	41.6	0.51	0.54	0.74	0.65	0.44	0.34
inactive commuter	44.4	43.4	0.32	0.35	0.69	0.66	0.52	0.34
active commuter	43.7	43.5	0.33	0.34	0.68	0.63	0.47	0.39
inactive migrant	43.8	41.6	0.55	0.53	0.36	0.45	0.43	0.54
active migrant	40.4	39.7	0.50	0.57	0.58	0.48	0.37	0.27
West Germany								
stayer in West	39.0	39.1	0.41	0.43	0.63	0.63	0.39	0.38
inactive commuter	40.9	40.8	0.37	0.41	0.60	0.58	0.42	0.38
active commuter	42.6	40.3	0.30	0.54	0.62	0.58	0.43	0.33
inactive migrant	42.2	46.4	0.32	0.31	0.35	0.37	0.16	0.38
active migrant	46.0	46.9	0.32	0.19	0.49	0.54	0.49	0.60

Weekly hours, share of women, married persons and persons living with a child under 16, samples 1995-2001 and 2002-2008.

Source: GSOEP, Sample A and C, full or regular part time employees only.

Table A.2: Earnings functions for East Germany

dependent variable: log. nominal monthly gross income

	(1)	(2)	(3)	(4)
	stayers and commuters		stayers and migrants	
	95-01	02-08	95-01	02-08
schooling	.074	.087	.077	.085
	(47.3)	(43.0)	(46.2)	(39.9)
women	-.133	-.108	-.124	-.095
	(-17.8)	(-10.9)	(-15.7)	(-9.0)
experience	.023	.033	.021	.032
	(15.4)	(17.9)	(13.5)	(16.1)
experience^2	-.0004	-.0006	-.0004	-.0006
	(-12.6)	(-15.4)	(-10.8)	(-13.6)
working time	.500	.782	.552	.838
	(36.8)	(40.8)	(37.3)	(42.4)
inactive commuter	.011	.007		
	(1.0)	(0.5)		
active commuter	.138	.182		
	(8.9)	(11.2)		
inactive migrant			.006	.031
			(0.2)	(0.7)
active migrant			.209	.229
			(12.8)	(13.6)
observations	10407	7992	9365	7113
s.d. dep.var.	.446	.529	.457	.534
SEE	.362	.415	.367	.417
$\overline{R}^2$	.342	.387	.355	.392

t-statistics in parentheses; samples 1995-2001 and 2002-2008,
fixed effects for the waves (not reported); schooling and experience in years,
log. weekly hours, dummy variables for women and commuters/migrants.

Table A.3: Earnings functions for West Germany

dependent variable: log. nominal monthly gross income

	(1)	(2)	(3)	(4)
	stayers and commuters		stayers and migrants	
	95-01	02-08	95-01	02-08
schooling	.070	.074	.071	.075
	(61.5)	(56.2)	(60.0)	(54.8)
women	-.275	-.259	-.277	-.264
	(-42.4)	(-33.9)	(-41.6)	(-33.0)
experience	.042	.043	.041	.041
	(37.5)	(32.8)	(36.2)	(29.9)
experience^2	-.0007	-.0007	-.0007	-.0006
	(-31.3)	(-26.2)	(-30.2)	(-23.6)
working time	.904	.974	.899	.974
	(107.5)	(96.4)	(103.7)	(91.7)
inactive commuter	.093	.092		
	(7.3)	(6.6)		
active commuter	.070	.028		
	(2.0)	(1.1)		
inactive migrant			-.015	.054
			(-0.4)	(1.0)
active migrant			.145	-.098
			(2.3)	(-1.9)
observations	18234	14474	17278	13441
s.d. dep.var.	.616	.645	.613	.643
SEE	.388	.403	.389	.404
$\overline{R}^2$	.604	.611	.599	.605

t-statistics in parentheses; samples 1995-2001 and 2002-2008,
fixed effects for the waves (not reported); schooling and experience in years,
log. weekly hours, dummy variables for women and commuters/migrants.