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East-West Migration in Germany -

An Analysis of Wage Differentials

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1. Introduction

1.1 General background

2009 is the year in which Germany celebrates the 20th anniversary of the fall of the Berlin Wall and the subsequent reunification of East and West Germany. While the events in the fall of 1989 meant a dramatic positive change in the lives of millions of people in Germany and ended the 40-year long separation of the German people in two different states, they also had a major impact on the economic and social situation in both the East and the West.

After the fall of the Berlin Wall and the following reunification of East Germany and West Germany the country experienced an enormous flow of East-West migration within its new boundaries. Until the end of 2001 Germany had experienced a cumulative East-West net migration of 1.3 million East Germans (Brücker, Trübswetter, 2007). This is equivalent to 7.5% of the original population of East Germany having migrated to the West. The major part of this migration took place before the announcement of the currency union (July 1st, 1990) and East-West migration dropped sharply after this event. However, there was an increase in migration again after 1996. Migration took place mainly due to the huge wage differential between East and West Germany and the different levels of equality in the earnings distributions, but also the poor environmental quality in the East and the different perceptions of lifestyle played a role in people's decision to move to the West. Migrating was though also costly since it incorporated the direct moving costs but also indirect costs e.g. due to the lack of full transferability of human capital. Migration is usually seen to be beneficial for the receiving region since migrants are often positively selected. The direction of the effect on the sending region is however not always clear and in the case of Germany there has been extensive research on this question.

The extent of German East-West migration has had a major impact on the economic performance of Eastern Germany. The percentage of economically active individuals among the migrants was significantly higher than among the total East German population. Those approx. 900,000 East Germans who migrated to the West between 1989 and 1992 accounted for 5% of the East German population and a staggering 10% of the labour force (Burda, 1993). The lack of skilled workers and the breakdown of large parts of the former socialized economy have had a significant impact on the employment situation in the East. In 2007 the unemployment rate in East Germany was 15%, compared to 7,5% in the West (Bundesagentur für Arbeit).

Analyzing the structure of East-West migration and the characteristics of East-West migrants is an important step to formulating appropriate policies for stopping a potential „brain-drain" and for supporting the economic catch-up process in East Germany.

1.2 Aim

The aim of this study is to analyse differences in the returns to educational, professional and personal characteristics of individuals who migrated from East Germany to the West compared to those having stayed in the East and those having lived in West Germany at the time of the fall of the Berlin Wall. The study will also analyse differences in the average characteristics of these three groups.

1.3 Data and Methods

In this study data from the Socio-Economic Panel (SOEP) of the German Institute for Economic Reserach (Deutsches Insititut für Wirtschaftsforschung, DIW) will be used. The data covers information on earnings, human capital and personal characteristics of individuals in East and West Germany. The dataset will be analysed using descriptive statistics and a regression analysis.

1.4 Structure of the Study

The study will be strucutred as follows. The second chapter gives an introduction to previous research, both in the field of international migration as well as East-West migration in Germany. Chapter 3 describes the theoretical framework of the study, introducing the Human Capital Theory and the Theories of Migration. An exact description of the data used in this study and the descriptive statistics of the population groups studied will be provided in Chapter 4. Chapter 5 contains an explanation of the methodology used for obtaining the regression results that will be presented in Chapter 6. Chapter 7 provides an analysis of the regression results for the different subsamples in this study. A conclusion of the findings will be presented in Chapter 8.

2. Previous Research

This chapter gives an overview of previously conducted research on migration and the earnings profiles as well as characteristics of migrants. First a summary of some important studies on international migration will be provided, followed by a review of the research on East-West migration in Germany.

2.1 Some Previous Research on (International) Migration

Much of the economic research in the field of the economics of migration is based on the findings of the paper *"Some thoughts on the distribution of earnings"* by A.D. Roy (1951). In this study Roy analyses the influence of the earnings distribution of different occupations (fishery and hunting) and of the productivity of individuals on the choice of occupation. While the analysis is based on the differences between two different sectors of one economy the model can also be applied to the case of two different economies (countries) and the migration flow between these two economies that have different earnings distributions. The self-selection of immigrants is often based on such a difference in the earnings distributions and Roy's model is hence used in much of the research on international migration flows.

In his article *"Self-selection and the earnings of immigrants"* George J. Borjas (1987) analyses the self-selection and earnings profiles of immigrants to the US between 1970 and 1980. One of the main findings of the article is that in order for the immigration flow to be positively self-selected two conditions have to be fulfilled: " (...) there is a strong positive correlation between the earnings a worker may expect in the home country and the earnings the same worker may expect in the United States"[1] and that "the United States has a more unequal income distribution than the home country"[2].

The article „*European Migration: Push and Pull*" by Zimmermann (1994) studies the major migration flows in postwar Europe and tries to examine whether push or pull migration dominated. Zimmermann comes to the conlusion that „With the exception of the 1960s most labor migration periods were dominated by push migration"[3]. He also finds that the size of the labour market and real relative wages have had a positive influence on migration while unemployment was negatively correlated with immigration.

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[1] *Borjas (1987, p. 551)*
[2] *Borjas (1987, p. 552)*
[3] *Zimmermann (1994, p. 95)*

2.2 Previous Reasearch on East-West Migration in Germany

While most of the research on the economics of international migration has been done on data from the United States due to the good availability of micro data, the establishment of the Socio-Economic Panel by the German Institute for Economic Research has contributed to the growing number of papers published on migration to and from (as well as within) Germany in recent years. In this context especially the research on German East-West migration is quite extensive and there is a number of papers that have been published since the reunification. Among the most relevant ones to the research question of this thesis are the six research papers that will presented in the following section.

Burda in his paper "*The determinants of East-West German migration*" (1993) does an early analysis of the factors influencing migration decisions and tries to draw policy conclusions. He finds a strong age bias in east-west migration with young people being more likely than the old to migrate to the West. One additional year of age " (…) decreases the odds ratio of a positive (yes) response by 0.035-0.05"[4]. He also finds a u-shaped correlation between town size and migration propensies with individuals from small towns and the largest cities being more likely to migrate to the West.

Burda, Härdle, Müller and Werwatz (1998) in their paper "*Semiparametric analysis of German east-west migration intentions: facts and theory*" analyse propensities to migrate using microdata from the German Socio-Economic Panel. In their linear model they use a number of explanatory variables, such as sex, family, unemployment and education, trying to find results in accordance with different migration theories such as the option-value-of-waiting theory. They find a "significant non-linear relationship between migration intensity and household income which appears non-monotonic"[5]. The use of a semiparametric fit model yields a u-shaped effect of income on migration in the range where the mass of the income distribution lies. Individuals with low and rather high incomes are more likely to migrate than individuals in the mid-income range. Only for individuals with incomes in the upper tail of the income distribution does the propensity to migrate fall again.

The paper *"Do the best go west? An analysis of the self-selection of employed East-West migrants in Germany"* by Brücker and Trübswetter (2007) uses an extension of the Roy model to explain the persisting positive self-selection after the increase in the inequality of earnings in East Germany. One of the findings made by Brücker and Trübswetter is that the average skill level of East-West migrants is lower than that of stayers and that there is a

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[4] *Burda (1993, p. 458)*
[5] *Burda, Härdle, Müller and Werwatz (1998, p.533)*

negative correlation between age and migration propensities. They also identify the driving forces behind still persistent East-West migration.

The paper "*Labor migration in Europe, experiences from Germany after unification*" by Raffelhüschen (1992) attempts to predict future developments by analysing the first years of the migration stream after the reunification and to derive policy implications both for Germany and Europe (facing a similar situation due to the opening of its labour market to Eastern Europe). The paper "*How unification and immigration affected the German income distribution*" by Grabka, Schwarze and Wagner (1999) analyses the reverse causal connection as the other papers, namely the effect of the reunification and East-West migraion on the German income distribution. They find that the degree of inequality of the "post-government income" (i.e. disposable income) is still smaller in East Germany after the reunification than it is in West Germany, but that East-West migration reduced overall German inequality. While the "pre-government" income inequality in East Germany has risen quite a bit the measure of post-government income inequality has not seen as big a rise. This shows that there has been an "influence of government in mitigating private market outcomes"[6]. They therefore conclude that the governmental policy aiming at reducing the income gap and at lessening the rise in pre-governmental inequality was successful.

Werwatz and Helmchen (1996) in their paper "*What can we learn from intentions data about future behavior – the case of East-Germany after reunification*" try to calculate upper and lower bounds for future behaviour by analysing data on German migration intentions from the SOEP. They come to the conclusion that "estimates based on intentions data can provide a very useful tool for predicting future behaviour"[7].

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[6] *Grabka et al. (1999), p. 876*
[7] *Werwatz and Helmchen (1996), p. 13*

3. Theoretical Framework

This chapter gives an overview of the economic theories relevant to this study, namely the Human Capital Theory and the Theory of Earnings as well as the Theories of Labour Migration.

3.1 Human Capital Theory and the Theory of Earnings

The Theory of Human Capital and the related Human Capital Earnings Function were developed by Gary Becker and Jacob Mincer.

According to the Human Capital Theory the income of individuals depends on the stock of human capital they possess. Human capital is usually acquired through education (schooling) and work experience (as well as on-the-job training). The years of schooling and the degrees earned from educational institutions are regarded as a measure of knowledge, skills and abilities (which all have an influence on productivity). These higher skills and knowledge enable individuals to do more complicated jobs and work more efficiently for which they are compensated with higher wages. When making the decision on how much education to invest in, individuals discount the future benefits of higher education and compare them with the costs of obtaining this education (including the foregone earnings). Education can however also be seen as a "signal" that individuals send to potential employers. According to the signaling theory education is used by individuals to set themselves apart from other job applicants since a higher level of education can be seen as a signal for higher productivity (Spence, 1973). Individuals sending out a signal will also have higher earnings as a return to their signal (and investment in the signal).

Work experience is also directly linked to earnings, through the higher skills relevant to the job market that individuals with more years of work experience possess. Some of these skills and knowledge can be general while others might be firm-specific. The general skills (e.g. using standard computer programmes) can be easily transferred from one job to the next and are likely to influence the level of earnings when switching to a new job. Firm-specific skills can often only be partly transferred to a new employment. Those skills and knowledge relevant to a certain sector of the economy that could be used in a new job can be transferred by the employee and hence will increase the wage he or she recieves. Other skills and knowledges might be company-specific and can hence not be transferred. The acquirement of this type of on-the-job training can be seen as an investment that is made by the employer (through lower productivity in the initial period in a new job) in order for the employee to perform in the job. Firm-specific knowledge and skills will be lost when changing jobs and

have to be newly acquired in every new job. General work experience as well as the time spent in the current job are hence expected to be positively related with income.

The basic human capital earnings function is formulated in the following way:

$$Y = \beta_1 + \beta_2 S + \beta_3 E + \beta_4 E^2$$

Y stands for income, usually measured as the natural logarithm of the hourly income since the normalized unit makes comparison easy. Income is modelled as a function of schooling (S), experience (E), the squared value of experience (E^2) and a constant term. Schooling is usually measured either as years of attended schooling or as a categorical variable of different possible attained degrees. The level of experience measures the previous work experience of an individual. The value of this variable is often difficult to measure correctly since it is often unclear when exactly a person started to work formally and breaks from labour market work and part-time employment complicate a clear measurement. When there is no good data available for this variable, labour market experience is often approximated by "potential experience", calculated by subtracting the years of education (plus those years before a person started school) from the current age of an individual. The squared value of experience is included in the formula to capture the effect of diminishing returns to experience.

The coefficients of the variables in the earnings function can be interpreted in the following way:

β_1 measures the income an individual with only base-level education and zero years of work experience would get

β_2 measures the return to schooling, i.e. how much more income (in percent) an individual gets for every additional year of schooling

β_3 measures the return to experience, i.e. how much more income (in percent) an individual gets for every additional year of experience (minus the effect of the squared value of experience)

β_4 measures the size of the diminishing return to experience

The human capital earnings functions is seen as fitting most datasets on labour market data and is hence widely used in studies on earnings profiles.

3.2 Theories of Labour Migration

The Theories of Labour Migration can be divided into two main categories, the Neoclassical Theories of Migration and the Option-value-of-waiting Theories. The main difference between the two theories lies in the assumptions about the time frame in which a migration decision can be taken.

The so-called Neoclassical Theories of Migration explain migration as being caused by differences between sending and receiving countries or regions on the micro- as well as the macro-level of the economy. On the macro-level migration is seen as an effect of differences in the supply and demand of labour caused by different endowments of regions with capital and labour. From a micro-economic perspective migration occurs if individuals expect an economic gain from migrating. "Workers calculate the value of the employment opportunities available in each of the alternative labour markets, net out the costs of making the move, and choose whichever option maximizes the net present value of lifetime earnings"[8]. If the expected net return to migration is positive, then it is beneficial for an individual to migrate. One of the disadvantages of this model is that it assumes individuals to be risk-neutral. This assumption is likely to be too strong and not be true for most individuals, thereby overestimating the number of migrants.

The Neoclassical Theories of Migration assume that migrants are self-selected, meaning that they try to optimize their expected life-time income and that the migration decision is a voluntary one. In this context it is interesting to examine what characteristics the migrants have and whether it is rather the high-skilled individuals that migrate or those that have a low level of skills relevant to the labour market. The former case is called positive self-selection while the latter is called negative self-selection of migrants.

In order to test whether positive or negative self-selection prevails the Roy model is usually used. According to this model it is the difference in the income distribution in the sending and receiving countries (or regions) that determine whether high or low skilled individuals migrate. It is the comparative advantage of individuals that drives self-selection. If the income distribution in the sending country is more equal than in the receiving country, individuals from the upper tail of the income distribution are more likely to migrate (provided that the correlation between incomes in both countries is positive). The original Roy model does not include pecuniary and non-pecuniary costs of moving, which is one of its weaknesses. Including moving costs that usually do not increase proportionally with wages (thereby making it "cheaper" for individuals with high incomes to migrate) might yield results

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[8] *Borjas (2005), p. 315*

opposite to those obtained from the standard Roy model. According to the extended Roy model individuals decide to migrate if the (expected) differential between the incomes received in the host and the home country net of migration costs is positive.

An additional model used for research on migration decisions is the option-value-of-waiting theory, which unlike traditional migration models does not see migration as a now or never decision but rather includes the option of migrating at a later point of time. This more dynamic model of migration is characterized by its main assumptions being: "(1) a fixed cost which is to some extent unrecoverable, (2) underlying uninsurable uncertainty which is revealed over time and (3) an option to wait, that is, to postpone the decision and the fixed cost incurred to some later date"[9]. The main advantage of the option-value-of-waiting theory is that it accounts for uncertainty and its partial revelation over time, a factor that a high portion of migration decisions is subject to. Migration today (in this model) means not only incurring the fixed costs of migration but also forgoing future incomes in the home country and the "opportunity to postpone migration on the basis of new, currently unanticipated information"[10]. The so-called option-value-of-waiting in this model is simply the opportunity cost of migrating today. Migrating later gives individuals the chance to base their decision on more information revealed over time and to save the fixed costs of the waiting interval. According to Burda (1993) this theory can "account for persistent wage differentials such as those observed in Germany"[11] since individuals seem to not migrate immediately as a response to higher expected earnings in West Germany.

What makes East-West migration in Germany different from the usually studied migration between two different countries is that there are no language barriers, there are small differences in country-specific human capital and that there is a relatively low level of discrimination.

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[9] *Burda (1993), p. 454*
[10] *Burda, Härdle, Müller and Werwatz (1998), p.534*
[11] *Burda (1993), p. 456*

4. Data and Descriptive Statistics

This chapter provides an explanation for the source and the structure of the data used in this study. Chapter 4.1 will give a brief overview of the Socio-Economic Panel and the data samples used. The exact datasets and variables used in the econometric analysis in this study will be explained in Chapter 4.2 while Chapter 4.3 evaluates the descriptive characteristics of the datasets.

4.1 Data Source and Structure of the SOEP

The data used in this study comes from the Socio-Economic Panel (SOEP) of the German Institute of Economic Research (Deutsches Institut für Wirtschaftsforschung, DIW). The SOEP is a longitudinal survey of persons and private households in the Federal Republic of Germany. Covering a vast range of micro-data information the panel study aims at enabling the evaluation of the stability and change of living conditions in Germany.

The set of core questions being asked on a yearly basis cover the fields of [12]

- "Population and demography"
- "Education, training and qualification"
- "Labour market and occupational dynamics"
- "Earnings, income and social security"
- "Housing"
- "Health"
- "Household production"
- "Basic orientation and satisfaction with life in general and certain aspects of life"

Additionally to this every year one of these fields is given special attention by adding more detailed questions to obtain more in-depth information.

The data of the SOEP is obtained through interviews with all members aged 16 and above of the selected households. This is usually done through face-to-face interviews. Additionally to that one of the household members is asked to fill in a questionnaire on household information such as "housing, housing costs, and different sources of income (e.g. social transfers like social assistance or housing allowances)"[13]. This additional questionnaire also covers information on household members younger than 16 (such as school attendance).

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[12] *SOEP Desktop Companion, p. 16*
[13] *SOEP Desktop Companion, p. 21*

All individuals who were interviewed in the very first wave of the survey (1983) and their children, whenever born, are part of the survey in the following years and hence interviewed once a year. Individuals who leave a household to either join another household or to „found" their own household are followed, but under the new household identifier number. The number of individuals within a tracked household can increase through birth or residential mobility. Household mobility within the territory of the FRG is tracked.

If individuals or households cannot be successfully interviewed in two consecutive years they drop out of the sample (for households this is only the case if all members of the household cannot be interviewed). Temporary drop-out (for one year) is possible and individuals and households are continued to be tracked.

The survey was started in 1984 in the FRG, with the data set for the first year being based on a first sample drawn in 1983. Six months after the fall of the Berlin Wall, in June 1990, the sample was extended to the former German Democratic Republic.

The SOEP covers 7 population samples of which two will be used in this study, sample A "Residents in the FRG" and sample C "Residents in the GDR". The former "covers persons in private households with a household head who does not belong to the main foreigner groups of „guestworkers" (i.e. household heads who are Turkish, Greek, Yugoslavian, Spanish or Italian)"[14]. In the starting year, 1984, "it covered 4,528 households with a sampling probability of about 0.0002"[15]. Sample C "covers persons in private households where the household head was a GDR citizen"[16]. The starting sample (1990) covered 2,179 households which meant a sampling probability of about 0.0004.

4.2 Data Files and Variables used in this Study

The SOEP offers extensions to the data derived from the questionnaires, namely longitudinal data files that can be used for panel studies and "generated" cross-sectional files. In this study two of these files will be used: PPFAD and WPGEN. PPFAD is a longitudinal person-level file that "includes all members of all households ever contacted in the SOEP including respondents, children, and even those who never gave an interview"[17]. Individuals in this file can be identified through the unique individual identifier and through the household identifier number for the household they live in. The individual identifier will be used for matching PPFAD with additional longitudinal files and variables. PPFAD is especially useful for this study since it identifies for each year of the study in which region (East or West Germany) an

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[14] *SOEP Desktop Companion, p. 19*
[15] *SOEP Desktop Companion, p. 19*
[16] *SOEP Desktop Companion, p. 19*

individual lives. Table A1 in the appendix shows the entire list of variables contained in PPFAD.

WPGEN is a "generated" cross-sectional file. Generated in this context means that it contains variables with re-organized information from different survey questions that decreases the computing effort for the users of the survey. Data from the files WPGEN and PPFAD is matched through the unique individual identifier PERSNR. WPGEN contains cross-sectional information for the year 2006, mainly on education, occupation and labour market income. Table A2 in the appendix shows the complete list of variables in WPGEN.

In this study the number of variables will however be reduced somewhat from those contained in WPGEN and PPFAD. The following variables will be used in this study:

AGE	Age
SEX	Sex *(dummy variable, 2 possible codes: 0, male and 1, female)*
LOC1989	Location in 1989 *(2 possible codes: East Germany or West Germany)*
G...W SAMPREG	Location in 1990 through 2006 *(2 possible outcomes: East Germany and West Germany)*
WFAMSTD	Marital status in survey year 2006 *(dummy variable, 2 possible codes: 0, married; 1, single, divorced or widowed)*
CASMIN1	Casmin educational classification in 2006 *(dummy variable, 2 possible codes: 1, maturity certificate; 0, other eduational level)*
CASMIN2	Casmin educational classification in 2006 *(dummy variable, 2 possible codes: 1, tertiary education; 0, lower educational level)*
EXPFT06	Actual labour market experience (in years)
EXPFTSQ	Squared value of the actual labour market experience
EMPLST06	Employment status in 2006 *(dummy variable, 2 possible codes: 1, part-time employment; 0, other level of employment)*
EMPLST2	Employment status in 2006 *(dummy variable, 2 possible codes: 1, marginal employment or in vocational training; 0 higher level of employment)*
MIGRANT	Control variable for migrants *(Dummy variable, 2 possible codes: 0, West German or East German stayer; 1, migrant)*

| **STAYER** | Control variable for East-German stayers *(Dummy variable, 2 possible codes: 0, West German or East-West migrant; 1, East German stayer)* |
| **LN_LABGRO06** | Natural logarithm of the gross labour income in Euro in 2006 |

The combined datasets WPGEN and PPFAD contain 38,791 observations. The two datasets are merged with the person number being the key variable. However not all individuals in one dataset are also contained in the second one which reduces the number of observations to about 8000. Deleting those observations which lack data for one or more variable reduces the number of individuals to about 4500. These observations contain individuals having lived in West Germany in 1989 and still living there in 2006, individuals having lived in East Germany in both 1989 and 2006 as well as those individuals who migrated from East Germany to the West between 1989 and 2006. Individuals having moved from West Germany to the East will be ignored in this study, since the total number of observations showing this migration pattern is only 69. In order to analyse the personal, educational and professional characteristics of individuals the three aforementioned groups of individuals are separated. The dataset of West Germans contains 2,732 observations while the dataset of East German stayers contains 1,362 observations. The number of East Germans moving to the West between 1989 and 2006 is 217. These numbers are lower than those originally contained in the datasets since those individuals not having answered all relevant questions of the questionnaire in the year 2006 are dropped (missing observations arise either from unanswered parts of the questionnaire or from the questions not being relevant for the individual in question). Table A3 shows the dynamics of the movements between the original datasets A and C. The difference in the number of East-West migrants derives from the fact that not all individuals having migrated from the East to the West are contained in the generated datasets used in this study. Since the sample C (East Germans) contained a quite high number of observations (around 6,000) in 1990 that were selected in order to be representative of the East German population, one can assume that the dataset of "East-West migrants" is also representative of all Germans having moved from the East to the West between 1990 and 2006 despite its relatively small sample size.

4.3. Descriptive Statistics

In order to display differences in the average characteristics of individuals in the three datasets "West Germans", "East German stayers" and "East-West migrants", these datasets

will be analysed seperately.

Table 1: Gender statistics of the datasets

	West Germans	**East German stayers**	**East-West migrants**
Total number of individuals	2732	1362	217
Males	1471 (54%)	677 (50%)	88 (41%)
Females	1261 (46%)	685 (50%	129 (59%)

As one can see from Table 1, the ratio of women (0,59) among those migrating from the East to the West is higher than the ratio of women in the other datasets (0,46 and 0,50 for West Germans and East German stayers respectively). This is in line with previous research having showed that women were more likely to migrate to the West[18]. The reasons usually mentioned for this gender bias in migration is that women are better educated and more flexible and willing to move away from family and friends when having the chance of getting a better job.

The individuals in the three datasets have quite large differences in their average personal, educational and professional characteristics. Table 2. shows these differences, not taking account of the gender of individuals. A split in male and female individuals will be made subsequently.

Table 2: Characteristics of West Germans, East German stayers and East-West migrants

		East-West Migrants	**East German stayers**	**West Germans**
Income		2159 (1606)	1852 (1198)	2524 (1803)
Work experience		12.6 (11,0)	16.9 (11,7)	15.1 (11,4)
Education	Low	61%	63%	68%
	Medium	13%	8%	13%
	High	26%	29%	19%
Age		37.2 (11,4)	41.7 (11,9)	42.1 (11,4)
Marital	Married	47%	62%	62%

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[18] *Fuchs-Schündeln and Schündeln (2009)*

status	Single, divorced or widowed	53%	38%	38%
Employment status	Full-time employment	68%	71%	68%
	Part-time employment	18%	14%	18%
	Lower level of employment	14%	15%	14%
Average working hours		37,7 (12,9)	38,7 (13,8)	36,1 (15,1)

The descriptive statistics of the three datasets show some interesting differences in the average characteristics. The average income of East German stayers is the smallest of all 3 groups, which reflects the fact that there is a persistent, big income gap between the West and the East of Germany. Table 2 also shows that East-West migrants have lower incomes than West Germans, which can be explained by the differences in the other characteristics relevant to the labour market.

The differences in the Casmin (educational) classifications of the three datasets are large, with the biggest difference being between the percentages of East German stayers and West Germans belonging to the highest educational category. On average East German stayers have a significantly higher level of education than West Germans. The level of East German stayers having a high education level is 29% compared to 19% for West Germans while the 68% of the West Germans only have a low level of education (compared to 63% for East German stayers). This difference is likely to derive from the fact that education was regarded as very important in the GDR and the state strongly supported its citizens during their education. Hence the socialist system in the East is likely to have resulted in a higher level of average educational qualification. The difference in the educational levels of East-West migrants and East German stayers is relatively small. More of the East-West migrants have a medium level of education but the percentage of individuals with a high education level is however smaller than that of East German stayers. On average, the educational level of East-West migrants and East German stayers is hence quite similar. This however stands in

contrast to the findings of other studies and the public opinion on this topic. The reason why the educational qualification of East-West migrants is not, as is usually assumed, higher than that of those staying in the East, is that most of the migrants observed in this study migrated in the first 5 years following the re-unification. During this time migration was most likely driven by personal networks in the West rather than by positive self-selection, as has been the case in recent years.

The labour market experience of East-West migrants is lower than that of both East German stayers and West Germans. This is however just a result of the lower average age of migrants, which will be discussed later.

East German stayers have the highest level of actual working hours per week with the difference to West Germans being nearly 3 hours. This difference in working time might be due to the fact that average wages in the East are lower than in the West and the difference in wage is compensated by longer working hours. Additionally it could also be a reflection of cultural differences between the East and the West. In the GDR the supply of day care for children from a very young age on was very high and most women were able to work full-time while having children whereas in West Germany the more traditional role allocation within families is more usual. These differences in the labour market participation of women in East and West Germany are still persistent, as was shown by Beckmann and Kempf[19]. They found the labour market participation as well as the average working hours of women in East Germany to be considerably higher than those of women in West Germany. They explain this difference with the better support of working women in the East by their families as well as the government. The difference in the average working hours of East German stayers and East-West migrants is likely to arise due to the same reason. With women accounting for 59% of the East-West migrant sample the reduced level of working hours per week of migrants might be due to the decreased support by the family network as well as lower government support for daycare

The difference in the marital status of West Germans, East German stayers and East-West migrants is large. What is interesting in this context is that the percentages of individuals in the two categories is exactly the same for East German stayers and West Germans while only the marital structure of East-West migrants differs. 62% of the population having stayed at their orignial place are married and 38% are either single, divorced or widowed. The fact that the figures for East-West migrants differ considerably (only 47% are married and 53% are single divorced or widowed) is likely to reflect the fact that family structures have an

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[19] *Beckmann and Kempf (1996)*

influence on the migration decision of individuals. The higher percentage of individuals among the East-West migrants that are not married might be caused by the lower average age of migrants but could also reflect the self-selection of migrants with less family ties.

The average age of West Germans and East German stayers in the sample is nearly the same, with 42.1 and 41.7 years respectively. This is very close to the average age of the total German population which was calculated to 42[20] years in 2005 (which is one year earlier than the observations used in this study). The average age of the individuals in the sample of East-West migrants is 37.2 years which is considerably lower than that of East German stayers. This age differential is likely to be caused by the higher willingness of young people to move when having the prospect of a better employment due to fewer family ties and the higher chances of finding a job in the West as a result of their lower age.

Table 2 also reports the average employment statuses of East-West migrants, East German stayers and West Germans. Of the East-West migrants and West Germans 68% are full-time employees, 18% are part-time employees and 14% have a lower level of employment. This is likely to reflect the employment structure of the total working population in West Germany. Of the East German stayers 71% are full-time employees, 14% are part-time employees and 15% are employed on a lower basis. The difference to West German employees lies mainly in the percentage for full-time and part-time employment. It is likely to reflect the difference in labour market participation of women that has been discussed earlier in this chapter.

Table 3 shows the differences in the characteristics of men and women in the sample of East-West migrants compared to West Germans. While there is no big difference between the average income of women who migrated to the West from the East and West German women, the difference for men is about 400 Euros on average. This is an interesting observation, especially in the context of the average values for the other characteristics.

The question arising here is where this considerable difference in average income derives from, i.e. which of the other characteristics might be influential. The percentage of male East-West migrants having a high level of education is slightly higher than that of West Germans which would, according to the human capital theory, have a positive influence on their earnings. West German men however have a 3.2 years higher labour market experience, another factor being positively correlated with income. This difference in experience presumably has a direct effect of the higher average age of West German men. The earnings-

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[20] *Statistisches Bundesamt, p. 21*

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differential between male East-West migrants and West Germans is hence likely to be attributable to the difference in labour market experience.

Table 3: Differences in the characteristics of men and women

		Males		**Females**	
		East-West migrants	*West Germans*	*East-West migrants*	*West Germans*
Gross labour market income		2795 (2009)	3220 (1906)	1725 (1068)	1700 (1246)
Casmin educational classification	Low	65%	65%	59%	72%
	Medium	10%	12%	15%	14%
	High	25%	22%	26%	14%
Labour market experience		16.0 (10.9)	19.2 (11.7)	10.3 (10.6)	10.3 (9.0)
Average working hours/week		43.0 (10.3)	41.8 (12.9)	34.1 (13.3)	29.4 (14.7)
Age		39.3 (12.1)	24.6 (11.3)	35.7 (10.7)	41.4 (11.5)

The earnings differential between female East-West migrants and female West Germans is very small despite considerable differences in the average characteristics of the two groups. 72% of West German women have only a low level of education, compared to only 59% of the female East-West migrants. 26% of the latter group have a high level of education which is 12 percentage points more than the figure for West German women. The higher average level of education would, according to the human capital theory, have a positive influence on the earnings of female East-West migrants. The average labour market experience is the same for the two groups. West German women however have fewer working hours per week than female migrants. This could be due to the fact that they are more likely to have a better social network supporting them (e.g. taking care of their children). West German women are on average 6 years older than their East-West migrant counterparts but yet have the same level of labour market experience, meaning that female East-West migrants have taken fewer breaks in their labour market participation (e.g. maternity or childcare leave).

5. Methodology

Chapter 5 explains the basics of the econometric method used for the regression analyses being undertaken in the next chapter. It also explains the specification of the model and the reasons for the use of these specifications.

5.1 OLS Estimation

To estimate the (human capital) earnings equation the Ordinary Least Squares (OLS) method will be used. OLS is a widely used linear regression model for estimating the effect of the explanatory variables on the dependent variable, in this case on income. The statistical model can be specified in the following way[21]:

$$y_i = \beta_1 + \beta_2 x_{i2} + ... + \beta_K x_{iK} + \varepsilon_i$$

Y is the dependent variable and the x's are the independent or observed variables. The coefficients β are estimates of the effect of variation in the respective independent variables on the dependent variable. If the Gauss-Markov conditions, namely that

$$E\{\varepsilon_i\} = 0$$

$$\{\varepsilon_i,....,\varepsilon_N\} and \{x_i,.....,x_N\} \text{ are independent}$$

$$V\{\varepsilon_i\} = \sigma^2$$

$$\text{cov}\{\varepsilon_i,\varepsilon_j\} = 0$$

are fulfilled then the OLS estimator of the coefficients is the best linear unbiased estimator (BLUE) for β.

In this study the OLS method is used to estimate the effect of personal, educational and professional characteristics of East-West migrants, East German stayers and West Germans on their earnings.

5.2 Specification of the Model

5.2.1 General model

In this study two model specifications will be estimated. The first one will be estimated for the entire sample, containing East-West migrants, East German stayers and West Germans. The first specifiaction has the following form:

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[21] Verbeek, p. 14

$$\ln Y = \beta_0 + \beta_1 Cas\min 1 + \beta_2 Cas\min 2 + \beta_3 Expft06 + \beta_4 Expftsq$$
$$+ \beta_5 Sex + \beta_6 Wfamstd + \beta_7 Emplst1 + \beta_8 Emplst2 + \beta_9 Migrant + \beta_{10} Stayer$$

In this specification of the model the dependent variable, the monthly earnings, is expressed in a natural logarithmic form. This makes it possible to interpret the coefficients of the independent variables as percentage changes.

In this study the earnings function developed by Becker and Mincer is extended with additional explanatory variables in order to capture the effect of other characterisitcs of individuals on their earnings.

The constant term captures the „base income" that an individual would recieve if the value of all other variables was 0. A male West German married individual with just basic education, no labour market experience working full-time would recieve this income.

Since the regresssion is not tested for men and women seperately, due to the relatively small sample size, a dummy variable for gender is included (giving men a dummy value of 0 and women a dummy value of 1). Marital status is included in the regression model as a dummy variable in order to capture possible effects of the family status on income[22]. Two dummy variables for the employment status of individuals were included to capture the effect of part-time and marginal employment on the income. Education (as in the original earnings function developed by Becker and Mincer) is captured by the Casmin classification of the educational degree of the individuals in the sample. Since the original Casmin classification with 9 categories has been converted into a 3 category scale, there are two dummy variables included in the specified model. Casmin1 measures the effect of a medium level of education, corresponding to a high school diploma while Casmin2 measures the effect of a university education on income.

Experience is counted in years of work experience. The squared term of experience has been included in the model to measure the decreasing return to experience.

The aim of this regression analysis is to also detect a possible influence of being a migrant or of having stayed in East Germany after the re-unification on income. The dummy variable Migrant has a value of 1 for individuals having migrated from the East to the West and a value of 0 for all other individuals. The coefficient for this variable hence measures the payoff

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[22] *There has been different evidence on the existence of this effect and it has been critizised by Nakosteen and Zimmer (1987) that marital status should not be regarded as an exogenous variable but rather be determined within the model. Marital status is however included in the specified model of this study since it it based on cross-sectional data rather than panel data as is the case in the study by Nakosteen and Zimmer.*

to migrating. The dummy variable Stayer gives a value of 1 to East German stayers and a value of 0 to all other individuals. It measures the payoff to having stayed in the East.

5.2.2 Model specification for the subsamples

This study also aims to analyse the effect of several characteristics on the earnings of East-West migrants and to compare it with those for East German stayers and West Germans. In order to estimate these effects the model is specified in the following way:

$$\ln Y = \beta_0 + \beta_1 Cas\min 1 + \beta_2 Cas\min 2 + \beta_3 Expft06 + \beta_4 Expftsq$$
$$+ \beta_5 Sex + \beta_6 Wfamstd + \beta_7 Emplst1 + \beta_8 Emplst2$$

The regression is run for all 3 subsamples (East-West migrants, East German stayers and West Germans) seperately to be able to compare the different effects of individual characteristics on the earnings of aforementioned groups.

6. Results

This chapter presents the results obtained from the linear regressions. As explained in the previous chapter the regression was run on all three samples seperately and hence the results for East-West migrants, East German stayers and West Germans will be presented seperately.

6.1 Regression result for the general model

The regression done on the entire sample of East-West migrants, East German stayers and West Germans has a relatively high explanatory power, the adjusted R-squared value being 0.62.

Table 4: Regression result for the general model

```
. regress ln_labgro06 casmin1 casmin2 expft06 expftsq sex wfamstd emplst1 emplst2 migrant stayer
```

Source	SS	df	MS		Number of obs =	4418
					F(10, 4407) =	715.14
Model	2056.79889	10	205.679889		Prob > F =	0.0000
Residual	1267.48007	4407	.287606097		R-squared =	0.6187
					Adj R-squared =	0.6179
Total	3324.27896	4417	.752610134		Root MSE =	.53629

ln_labgro06	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
casmin1	.0165469	.0212739	0.78	0.437	-.0251606	.0582544
casmin2	.3885205	.0175968	22.08	0.000	.3540219	.4230191
expft06	.0328861	.0025779	12.76	0.000	.0278321	.0379401
expftsq	-.0005577	.000063	-8.85	0.000	-.0006813	-.0004341
sex	-.1936433	.0183018	-10.58	0.000	-.229524	-.1577626
wfamstd	.0149667	.0183725	0.81	0.415	-.0210527	.0509861
emplst1	-.5442909	.0252036	-21.60	0.000	-.5937027	-.4948791
emplst2	-1.392988	.0269507	-51.69	0.000	-1.445825	-1.340151
migrant	-.0739121	.0359333	-2.06	0.040	-.1443595	-.0034647
stayer	-.3134436	.0176111	-17.80	0.000	-.3479702	-.278917
_cons	7.546757	.0291918	258.52	0.000	7.489526	7.603987

All estimates are significant, except for the coefficients for Casmin1 and martial status. The non-significance and the low level of the estimate for Casmin1 (measuring the effect of a medium level (gymnasium) education) is likely to be driven by the results obtained for the sample of East German stayers that will be shown in the following sections.

The estimate for the dummy variable Casmin2 is 0.39, showing a positive effect of high level education on income. Individuals with a tertiary education earn, on average and all other variables being held constant, 39% more than individuals with a lower level of education. The human capital theory supports this finding of a positive return to education.

The estimates for experience and the squared value of experience calculated on the total sample are also in line with the human capital theory. There shows to be a positive, but

decreasing return to experience (the correlation-coefficients for Expft06 and Expftsq being 0.0329 and -0.0006 respectively).

The estimate for the dummy variable sex is -0.194 which indicates that women in the sample earn, on average and all other characteristics being held constant, 19% less than men.

The estimates for the dummies for part-time and marginal employment are -0.544 and -1.393 respectively. Part-time employees in the sample earn 54% less than full-time employees. This is due to the lower working hours of part-time employees. Individuals who are marginally employed earn 139% less than those who being employed full-time. In this sample this means that marginal employees earn less than the „base salary" (provided that the value of all other variables is zero and there is hence no positive return to any of the other characteristics).

The estimate for the dummy variable for migrants is significant (on the 95% level) and has a value of -0.07. East-West migrants in the sample earn, on average and all other variables being held constant, 7% less than stayers.

The estimate for the dummy for East-German stayers is significant on the 99% level and has a value of -0.31. East-German stayers in the sample earn, on average, 31% less than all other individuals with the exact same characteristics.

Having noted that there is a significant difference in the earnings of East-West migrants, East German stayers and West Germans this study further aims at analyzing potential differences in the returns to the observed characteristics for the three groups. This will be done in the following sections.

6.2 Regression result for East-West migrants

Table 5 presents the results of the OLS regression run on the sample of East-West migrants. The specified model has a relatively high explanatory power with an adjusted R-squared value of 0,60 and can hence be regarded as capturing more than half of the variation in income.

Table 5: Regression result for the sample of East-West migrants

```
. regress ln_labgro06 casmin1 casmin2 expft06 expftsq sex wfamstd emplst1 emplst2
```

Source	SS	df	MS					Number of obs =	217
								F(8, 208) =	41.68
Model	79.3633349	8	9.92041686					Prob > F =	0.0000
Residual	49.5118363	208	.238037675					R-squared =	0.6158
								Adj R-squared =	0.6010
Total	128.875171	216	.596644311					Root MSE =	.48789

ln_labgro06	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
casmin1	.0726542	.0819183	0.89	0.376	-.0888424	.2341508
casmin2	.3292868	.0689748	4.77	0.000	.1933074	.4652663
expft06	.018381	.0117267	1.57	0.119	-.0047374	.0414994
expftsq	-.0004162	.0003094	-1.35	0.180	-.0010261	.0001936
sex	-.1568652	.073357	-2.14	0.034	-.3014837	-.0122467
wfamstd	-.0721224	.0776302	-0.93	0.354	-.2251654	.0809205
emplst1	-.6217062	.093075	-6.68	0.000	-.8051974	-.4382149
emplst2	-1.329408	.1083769	-12.27	0.000	-1.543066	-1.11575
_cons	7.664197	.1210931	63.29	0.000	7.42547	7.902924

The coefficient for Casmin1 is not significant, which is likely to be due to the small sample size. The estimate does though have the sign one would expect according to the human capital theory, indicating that individuals with a medium level of education have a higher income than those with a low level.

The estimate for Casmin 2 is significant, even on the 99% level. It indicates that individuals with a high level of education, on average, have an income that is 33% higher than that of individuals with lower levels of education.

The estimates for experience and the squared value of experience are not significant, which again is likely to be caused by the small sample size. The estimated coefficients do however match the predictions of Mincer's earnings theory. Experience shows to have a positive correlation-coefficient while the squared value is negative correlated with earnings. This means that there is a positive but decreasing return to labour market experience.

The estimate for the dummy variable for sex is significant on the 95% level. The coefficient for this variable is -0.16, meaning that women in the sample earn, on average, 16% less then men, holding all other variables constant. This reflects the persistent gender bias in earnings in Germany, that amounts to 10-20% on average (Gender-Datenreport).

The estimate for the marital status dummy variable is insignificant

The estimates for the dummy variables Emplst1 and Emplst2 are both significant on the 99% level. Emplst1, measuring the effect of half-time employment on earnings, shows to have a coefficient of -0.62. Individuals in the sample who are part-time employees earn, on average and all other variables being held constant, 62% less than full-time employees. For Emplst2

the estimate is -1.33, meaning that individuals who are marginally employed or who are participating in on-the-job-training earn 133% less than individuals being employed on a higher level. This means that marginally employed individuals earn less than the the „base income" (provided that all other variables are equal to zero). Emplst1 and Emplst2 can be interpreted as mesuring the effect of working hours on income .

6.3 Regression result for East German stayers

The regression run on the sample of East German stayers shows a similar level of explanatory power, an adjusted R-squared value of 0,58.

Table 6: Regression result for the sample of East German stayers

```
. regress ln_labgro06 casmin1 casmin2 expft06 expftsq sex wfamstd emplst1 emplst2
```

Source	SS	df	MS		Number of obs =	1362
					F(8, 1353) =	232.77
Model	483.925987	8	60.4907484		Prob > F =	0.0000
Residual	351.613657	1353	.259877056		R-squared =	0.5792
					Adj R-squared =	0.5767
Total	835.539644	1361	.613915977		Root MSE =	.50978

ln_labgro06	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
casmin1	-.0264102	.0422033	-0.63	0.532	-.1092012	.0563808
casmin2	.3937599	.0291656	13.50	0.000	.3365453	.4509745
expft06	.0228873	.0046783	4.89	0.000	.0137099	.0320647
expftsq	-.0004233	.0001177	-3.60	0.000	-.0006542	-.0001925
sex	-.1726562	.0303585	-5.69	0.000	-.2322111	-.1131013
wfamstd	.0066124	.0336616	0.20	0.844	-.0594221	.072647
emplst1	-.3608596	.0445359	-8.10	0.000	-.4482264	-.2734927
emplst2	-1.282513	.0450853	-28.45	0.000	-1.370957	-1.194068
_cons	7.29779	.0501639	145.48	0.000	7.199383	7.396198

In the sample of East German stayers all coefficients are signifiant at the 99% level, except for the coefficient for Casmin1 and marital status. The correlation-coefficients for experience, sex and employment status have the same direction as in the sample of East-West migrants. The difference in the size of these correlations will be discussed in the next chapter.

The estimate for Casmin1 has a different sign than what would be expected according to the human capital theory. Since it is not significant it can be assumed that this unexpected sign of the estimate is caused by the small sample size and should hence not be analysed further in this study.

6.4 Regression result for West Germans

The regression on the sample of West Germans shows the highest explanatory power, having an adjusted R-squared value of 0,64. The diffference in the explanatory power of the three samples is likely to derive from the different sizes of the samples.

Table 7: Regression result for West Germans

```
. regress ln_labgro06 casmin1 casmin2 expft06 expftsq sex wfamstd emplst1 emplst2
```

Source	SS	df	MS		
Model	1428.8345	8	178.604312		
Residual	813.209649	2723	.298644748		
Total	2242.04415	2731	.820960874		

Number of obs =	2732
F(8, 2723) =	598.05
Prob > F =	0.0000
R-squared =	0.6373
Adj R-squared =	0.6362
Root MSE =	.54648

ln_labgro06	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
casmin1	.0219193	.0261003	0.84	0.401	-.0292591	.0730977
casmin2	.4070783	.0238077	17.10	0.000	.3603953	.4537613
expft06	.040268	.0032893	12.24	0.000	.0338181	.0467179
expftsq	-.0006541	.000078	-8.39	0.000	-.000807	-.0005012
sex	-.191496	.0248807	-7.70	0.000	-.2402829	-.1427092
wfamstd	.0110128	.0234294	0.47	0.638	-.0349284	.0569539
emplst1	-.5992521	.032838	-18.25	0.000	-.6636419	-.5348623
emplst2	-1.432935	.0357401	-40.09	0.000	-1.503016	-1.362855
_cons	7.485792	.0381851	196.04	0.000	7.410917	7.560667

As in the other two samples the estimates for Casmin1 and marital status are not significant. The signs of the correlation-coefficients of the different variables are the same as in the previous regression result. Chapter 7 will analyse the difference in the sizes of the coefficients of correlation.

7. Analysis

The regression model run on the entire sample of East-West migrants, East German stayers and West Germans showed some interesting results for the returns to certain characteristics. Of special interest are the estimates for the dummy variables for being a migrant and being an East German stayer. While East German stayers earn, on average, 31% less than West Germans the income differential between East-West migrants and West and East Germans amounts to only 7% according to the OLS estimation. The former income differential can be caused by differences in the unobserved characteristics of East and West Germans and by the persistent earnings differential in Germany. While the average earnings of East Germans and West Germans converged in the early and mid 90ies the discrepency has increased again since the early 2000s (Statistisches Bundesamt).

The income differential between East-West migrants and West Germans could be due to the incomplete transferability of human capital from East Germany to the West but could also be caused by unobserved differences between East-West migrants and non-migrants or by discrimination.

The analysis of the estimates obtained from the linear regression model specified in chapter 5.2.2 and run seperately on the three groups of East-West migrants, East German stayers and West Germans can detect and analyse potential differences in the returns to education and experience as well as the other characterisitcs. Through this analysis it might be possible to gain more information on the factors causing the observed income differntials between East-West migrants, East German stayers and West Germans. Table 8 summarizes the estimates for all variables and the three subsamples that were presented in chapter 6.

Table 8: Summary of the regression results

	East-West migrants	**East German stayers**	**West Germans**
Casmin1	0.073*	-0.026*	0.022*
Casmin2	0.329	0.394	0.407
Expft06	0.018*	0.023	0.040
Expftsq	-0.0004*	-0.0004	-0.0007
Sex	-0.157**	-0.173	-0.192
Wfamstd	-0.072*	0.007*	0.011*
Emplst1	-0.622	-0.361	-0.599
Emplst2	-1.329	-1.283	-1.433

Constant	7.664	7.298	7.486

* insignificant, ** significant only on the 95% level

7.1 Variables with a low level of significance

The dummy variable Casmin1, measuring the effect of a medium level education (general maturity level) on income, showed to be insignificant in all three samples. This insignificance is likely to be caused by the small sample sizes. The estimates for medium level education however do have the expected signs in the regressions run on the samples of West Germans and East-West migrants, indicating that there is a positive correlation between income and a higher level of education. The unexpectedly negative estimate for Casmin1 in the sample of East German stayers is likely to be due to the low sample size and will hence not be analysed further in this study.

Marital status shows to be insignificant in the regression analysis run on all three samples and will hence not be analysed in this study. The insignificance of the marital status dummy could be interpreted as supporting the findings by Narkosteen and Zimmer (1987) that marital status is an endogenous variable rather than exogenous.

7.2 Significant variables and differences between the three datasets

The estimate for the Casmin2 dummy variable (measuring the effect of tertiary education) is 0.329 for East-West migrants compared to 0.407 for West Germans and 0.394 for East German stayers. The return to tertiary education is slightly higher for individuals living in West Germany than for individuals living in the East. The fact that the return to eduation is significantly lower for East-West migrants than for West Germans can be explained by the incomplete tranferability of human capital from the East to the West. This incomplete transferability might be based either on discrimination or on the fact that some of the knowledge being represented by the educational level might not be relevant to the West German job market. The significantly lower return to (East German) education in West Germany compared to the East, makes it less attractive for highly educated East Germans to migrate to the West. The higher the level of educational degrees obtained, the lower would be the net benefit from migrating to the West, according to the findings of this study. This effect is called negative self-selection, meaning that the differences in the return to educational characterisitcs between the original and the host region lead to the group of migrants having a below-average level of education. The findings on the average educational classification of East-West migrants compared to East German stayers in chapter 4.3 support this hypothesis.

Table 2 showed that the percentage of individuals with a high level of education is lower for East-West migrants than for East German stayers while for medium level education it is the other way round. A similar finding was made by Burda in 1993 who analysed the migration intentions of East German individuals in the SOEP sample. He found individuals with an educational level of a general maturity certificate to be most willing to move to the West. The lower the level of education (starting from the general maturity level) of an individual was the less willing it was to migrate. The lowest preparedness to migrate was however found in the group of individuals holding a university degree. While the effect of the correlation of education and the willingness to migrate can be explained with the higher return to education in the West for individuals with a medium level of education (the estimates for this however not being significant), the low propensity to migrate of highly skilled individuals is likely to have more than one reason. Highly educated East German individuals have a higher return to their education in the East than in the West and hence have lower incentives to migrate. Individuals with a high level of education are less likely to become unemployed despite the high levels of unemployment in East Germany which reduces the likeliness of having to move to the West to be able to find a job. Also, highly educated individuals are likely to have been well positioned after the re-unification and have had good personal and professional networks that made it easier for them to stay (or work their way up) in good professional positions. A good example for this are the civil servants in the former German Democratic Republic of which many continued to be employed by the state after the re-unification. The high education might have also equipped individuals with better opportunities to take advantage of the new economic possibilities in a unified Germany and contribute to the development of the East German economy. It is however important to note that the sample size of the East-West migrants in this study is relatively small and it is hence difficult to draw general conclusions from the estimates for this group.

The strenght of the correlation of experience and income is also different for the three groups. While East-West migrants have a return to experience of 0.018 (the estimate is however not significant) and East German stayers of 0.023, the return to experience for West Germans is 0.040. Despite the insignificance (likely to be caused by the small sample size) of the estimate for East-West migrants it is worth analyzing the difference to the estimates for the other samples. The difference in the return to experience between East-West migrants and West Germans, who are employed in the same labour market (i.e. working in West Germany), is likely to arise from a difference in the relevance of East and West German work experience. It seems that work experience gained in East Germany is not completely transferable to the

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West German labour market. If one would assume a complete transferability of experience from the East to the West then the return to experience should be the same for East-West migrants and West Germans. The possible explanations for the observed difference are that either experience is indeed not entirely transferable from the East to the West or that the difference in the correlation-coefficients reflects differences in the unobserved characteristics of the experience of East-West migrants and West Germans.

The squared value of experience was included in the regression model to capture the effect of a decreasing return to experience. It shows that the West German labour market pays a higher return to experience than the East German labour market but that this return to experience decreases at a faster rate. The same is true for the return to experience for East-West migrants that is lower than that of West Germans but that decreases at a lower rate as a result of increasing experience.

The dummy variable for sex is negatively correlated with income for all three samples. The strenght of the correlation is however quite different for East-West migrants and East German stayers. The correlation-coefficient is -0.157 for East-West migrants while it is -0.173 for East German stayers and -0.192 for West Germans. Due to the small sample size of East-West migrants and the fact that the estimate for East-West migrants was only significant on the 95% level the size of the estimate will not be analysed further in this study. The data however shows evidence of a smaller wage gap between men and women in the East compared to the West of Germany. The higher equality of earnings of men and women in East Germany can be explained with the cultural differences regarding employment between the East and the West. In the former German Democratic Republic the vast majority of women (even those having children) worked full-time, thereby making female full-time employment a normalcy. In West Germany most women combined their role as mothers with working by taking up part-time jobs due to the lack of childare support by the state (Beckmann, Kempf, 1996). This led to the fact that women in East Germany were always an integral part of the work force while women in West Germany faced far bigger problems when joining the labour market. In the socialist system of the FGR wage discrimination on the base of gender was less common in than in West Germany and this difference is likely to have persisted the transformation to a capitalist system.

The coefficients for the dummy variables Emplst1 and Emplst2 that measure the effect of part-time and marginal employment on income are significant for all three samples. The estimate for Emplst1 is -0.361 for East German stayers compared to -0.622 for East-West migrants and -0.599 for West Germans. The estimates for East-West migrants and West

Germans are very similar, as would be expected due to the fact that these two groups are employed in the same labour market. There however seems to be a significant difference in the income differential between full-time and part-time employees in East and West Germany. This difference might be due to the lower average income level in East Germany. Since the average income level in the East is lower than in the West the potential for a high wage gap between full- and part-time employees is lower in the East.

For Emplst2 (measuring the effect of marginal employment on income) the differences in the estimates are not quite as big as for emplst1 but still significant. For East-West migrants the estimate is -1.329 and for West Germans it is -1.433 while for East German stayers it is -1.283.

8. Conclusions

This study analysed the personal, educational and professional characteristics and the earnings function of East-West migrants in Germany after the re-unification by comparing them to East German stayers and West Germans. This comparative analysis made it possible to draw conclusions on the average characteristics of migrants as well as possible motives for migrating from the East to the West.

The average income of East-West migrants in the sample showed to be significantly higher than that of East German stayers (2159 compared to 1852 Euros) but still lower than that of West Germans (2524 Euros). This result was confirmed by the regression analysis that was done on the entire data sample (containing East-West migrants, East German stayers and West Germans) and that contained dummy variables for migrants and stayers. The regression results showed evidence of the persistant income gap between East and West Germany and the fact that there seems to be a wage differential between East-West migrants and West Germans.

Individuals with an education corresponding to a general maturity certificate were overrepresented in the sample of East-West migrants while individuals with a tertiary education were underrepresented. This indicates that individuals with a low or with a very high educational level are less likely to migrate than individuals holding a medium level education (corresponding to a general maturity certificate). This fact was also reflected by the results of the regression analysis obtained for the returns to education for the three samples that showed the highest return to education for individuals with general maturity certificates.

The average labour market experience of East-West migrants was significantly lower than that of East German stayers and West Germans (12,6 years compared to 16,9 and 15,1 years respectively). The regression analysis showed that East German work experience was not completely transferable to West Germany and that the return to experience for migrants was significantly lower than that of West Germans. This led to a selection of migrants being significantly younger (a factor that is strongly correlated with experience) than stayers and to have less labour market experience.

In the sample of East-West migrants women were overrepresented and they also experienced less income discrimination due to their gender than women in the other two samples.

To sum up it can be said that East-West migrants were not randomly selected from the East German population and that East-West migration was caused by significant differences in the returns to human capital as well as the persistant income differential between the East and the West.

9. References

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10. Appendix

Table A1: List of variables in PPFAD

Variable Name	Meaning
HHNR	original household identifier (case) from wave 1
PERSNR	unique individual identifier
PSAMPLE	sample identifier
SEX	gender (longitudinally verified)
GEBJAHR	year of birth (4 digit) longitudinally verified
GEBMONAT	month of birth (2-digit) longitudinally verified
TODJAHR	year of death (4-digit)
TODINFO	source of information to compute year of death
EINTRITT	year in which individual entered the survey (4 digit)
AUSTRITT	year in which individual left the survey (4 digit)
ERSTBEFR	year in which first individual interview was conducted (4 digit)
LETZTBEF	year in which last individual interview was conducted (4 digit)
IMMIYEAR	year of immigration to Germany
GERMBORN	whether German born or not
LOC1989	location in 1989
CORIGIN	country of origin
AHHNR	household identifier 1984
BHHNR	household identifier 1985
CHHNR	household identifier 1986
$HHNR	household identifier ...
UHHNR	household identifier 2004
ANETTO	survey status 1984
BNETTO	survey status 1985
CNETTO	survey status 1986
$NETTO	survey status ...
UNETTO	survey status 2004
HSAMPREG	Region in which household lives (West or East Germany) 1991
ISAMPREG	Region in which household lives (West or East Germany) 1992
JSAMPREG	Region in which household lives (West or East Germany) 1993
$SAMPREG	Region in which household lives (West or East Germany) ...
USAMPREG	Region in which household lives (West or East Germany) 2004
APOP	Population Indicator 1984
BPOP	Population Indicator 1985
CPOP	Population Indicator 1986
$POP	Population Indicator ...
UPOP	Population Indicator 2004

Table A2: List of variables in the cross sectional file WPGEN

The table lists the variables in the cross sectional file SPGEN. I however contains the same variables as WPGEN. The difference between WPGEN and SPGEN is the year for which they contain data.

Variable Name	Meaning	ID or Status or Generated
HHNR	original household identifier (case) from wave 1	ID
HHNRAKT	current household identifier	ID
SHHNR	current household identifier	ID
PERSNR	unique individual identifier	ID
ERWTYP02	employment status	G
ERLJOB02	working in the original job?	S
BETR02	size of employer	S
OEFFD02	public sector	S
AUSB02	educational requirements of job	S
PARTZ02	kind of relationship to partner	G
PARTNR02	unique individual identifier of partner	G
NATION02	nationality	S
SPSBIL	highest school degree received	S
SPBBIL01	highest occupational degree received	S
SPBBIL02	university degree	S
SPBBIL03	no occupational degree	S
SPSBILA	highest school degree received abroad (Sample B)	S
SPBBILA	highest occ. degree received abroad (Sample B)	S
SPSBIL0	highest school degree (Sample C)	S
SPBBIL0	highest occ. degree received (Sample C)	S
SFAMSTD	marital status	S
SBILZEIT	institutional years necessary to receive current degree of education	G
SERWZEIT	years with current employer	G
STATZEIT	average actual work hours / week	S
SVEBZEIT	contracted work hours / week	S
SUEBSTD	overtime last week	S/G
LFS02	labor force status	S/G
IS8802	ISCO88-4-digit	S
ISEI02	ISEI-Status88 according to Ganzeboom	S
MPS02	Magnitude Prestige Scale (based on KLAS94)	S
NACE02	NACE industry codes	S
SIOPS02	Treiman Standard Int. Occ. Prestige Score	S
EGP02	Erikson and Goldthorpe Class Category	S
KLAS02	Classification of occupation (Statistical Office)	S
AUTONO02	Autonomous Decision Making at Work	G
STIB02	Job Type and Level	G
ISCED02	Highest Completed Schooling ISCED-1997	G
CASMIN02	Highest Completed Schooling CASMIN	G
MONTH02	Month Of Interview	G
MODE02	Interview Method	G
LABGRO02	Monthly Gross Labor Market Income	G
LABNET02	Monthly Net Labor Market Income	G
IMPGRO02	Impute flag: Gross Labor Market Income	G
IMPNET02	Impute flag: Net Labor Market Income	G

Table A3: Cross-tabulating $SAMPREG and PSAMPLE

Sample	A	B	C	D	E	F	G	Total
1990 (Wave G)								
West Germany	8717	3493	-	-	-	-	-	12210
East Germany	-	-	6044	-	-	-	-	6044
1991 (Wave H)								
West Germany	8667	3494	**44**	-	-	-	-	12205
East Germany	**0**	**0**	5639	-	-	-	-	5639
1992 (Wave I)								
West Germany	8526	3416	**138**	-	-	-	-	12080
East Germany	**2**	**0**	5347	-	-	-	-	5349
1993 (Wave J)								
West Germany	8450	3338	**186**	-	-	-	-	11974
East Germany	**8**	**0**	5090	-	-	-	-	5098
1994 (Wave K)								
West Germany	8336	3187	**227**	719	-	-	-	12469
East Germany	**11**	**0**	4954	-	-	-	-	4962
1995 (Wave L)								
West Germany	8254	2992	**280**	1592	-	-	-	13118
East Germany	**23**	**2**	4781	**3**	-	-	-	4809
1996 (Wave M)								
West Germany	8111	2896	**294**	1479	-	-	-	12780
East Germany	**27**	**2**	4682	**13**	-	-	-	4724
1997 (Wave N)								
West Germany	8009	2794	**311**	1407	-	-	-	12521
East Germany	**30**	**2**	4550	**23**	-	-	-	4605
1998 (Wave O)								
West Germany	7760	2618	**294**	1269	1959	-	-	13900
East Germany	**39**	**2**	4373	**19**	417	-	-	4850
1999 (Wave P)								
West Germany	7568	2519	**326**	1190	1663	-	-	13266
East Germany	**41**	**1**	4267	**23**	372	-	-	4704
2000 (Wave Q)								
West Germany	7311	2392	**436**	1149	1566	11275	-	24039
East Germany	**49**	**0**	4167	**27**	355	2608	-	7206
2001 (Wave R)								
West Germany	7165	2355	**364**	1077	1479	9301	-	21741
East Germany	**56**	**0**	4002	**27**	333	2209	-	6627
2002 (Wave S)								
West Germany	6946	2210	**359**	1032	1371	8502	2986	23406
East Germany	**62**	**0**	3813	**28**	310	2036	378	6627
2003 (Wave T)								
West Germany	6839	2116	**394**	1036	1325	7928	2247	21885
East Germany	**60**	**1**	3740	**26**	290	1986	282	6385
2004 (Wave U)								
West Germany	6655	2030	**441**	977	1292	7563	2151	22109
East Germany	**69**	**1**	3649	**26**	291	1890	269	6195