Earnings assimilation of post-unification East German migrants in West Germany

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July 14, 2021

(Preliminary results – please do not cite)

We investigate the labor market assimilation of East Germans after they migrated to West Germany in the wake of reunification. This under-researched adjustment of the labor market is informative particularly when juxtaposed with the integration of international immigrants. We apply the approach proposed by Chiswick (1978) and estimate wage differentials and rates of assimilation based on data from the 1991-2017 waves of the German Socio-economic Panel. Following Rho and Sanders (2020), we consider impact of return migration to East Germany and selective non-participation in labor market upon arrival in West Germany. The results suggest that East Germans faced significant initial disadvantages in the wages in West Germany. Furthermore, we find no statistical evidence that these earnings gaps narrow over the years. Out-migration seems to have no effects on the assimilation rates estimates. However, those workers with higher attachment to employment did experience small but positive rates of assimilation over years after the migration. This suggests that out-migration leads to a downward bias in our initial results.

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1. Introduction

With the fall of the Berlin Wall, many East Germans left for West Germany for economic and/or personal reasons. The largest wave of migration from East to West occurred right after unification: between 1989 and 1991 more than 800,000 East Germans left for West Germany (Schwarze and Wagner 1992). The initial surge slowed down in the mid-1990s only to subsequently rise again reaching a second peak in 2001 (Figure 1).[1] By the end of 2001, the cumulative net East-West migration amounted to 1.3 million persons, constituting 7.5 % of the East German population prior to reunification (Brücker and Trübswetter, 2007). In West Germany, East German immigrants were exposed to a foreign economic system. They partly confronted labor market assimilation processes similar to those experienced by international migrants. East-West immigrants stand out as they can be perceived simultaneously as both internal, i.e., domestic, and external migrants, i.e., from a different country of origin. Therefore, this paper relates to both, international and internal labor market migration.

A vast literature studies international immigrants' labor market assimilation in traditional immigrant receiving nations. The most prominent studies on international immigrant economic integration include Chiswick (1978) , Card et al. (2000), Abramitzky et al. (2014) all for the case of the U.S., McDonald and Worswick (1998) for Canada, and McDonald and Worswick (1999) for Australia. Their findings suggest that immigrants initially earn less than their native-born peers. However, with increasing host country-specific experience their earnings rise rapidly. This narrows the gap and eventually allows them to exceed the earnings of native-born workers. Numerous further studies deal with potential biases in the estimation connected to cohort-specificity (Borjas 1985) or self-selection (Licht and Steiner 1994). Borjas (2015) accounts for the cohort effects and finds that for the U.S. earlier immigrants converged towards the native-born earnings with time, whereas the immigrants who entered the country after 1980s have a negligible rate of earnings convergence. For international migrants to the

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[1] A thorough collection of data on East-West migration flows since 1989 can be found in Heiland (2004).

U.S. Lubotsky (2007) and Rho and Sanders (2020) identify two additional sources of bias in cross-sectional studies that may arise through changes in the sample composition over time. The first source of bias concerns the selective out-migration. The direction of the bias depends on the earnings levels of the leavers. Higher earning immigrants leaving would most likely downwardly bias the assimilation estimates. The opposite can be expected for low-skilled out-migrants. A second reason for a potential bias in measuring earnings assimilation rates can be delayed labor market entry or generally non-permanent, unsteady labor market participation. As not all migrants, even those with higher skills, find an employment upon arrival or are constantly employed, lower earning immigrants could make it appear that immigrants experience no relative growth in earnings.

For Germany, which in comparison to the USA, Canada, or Australia, is not perceived as a traditional immigration country, comparable studies on immigrant assimilation (e.g., Dustmann (1993), Fertig and Schmidt (2001), Worbs (2003), and Zibrowius (2012)) find ambiguous results.[2] However, the majority finds a persistent immigrant earnings disadvantage on the German labor market. Additionally, while according to Card (2005) in the U.S. even children of the least educated immigrants close most of the education gap compared to children of natives, in Germany the educational gap remained large and significant (Riphahn, 2003).

Next to the international immigrants' labor market assimilation, there is a substantial literature on the migration decisions of East Germans after unification (e.g., Burda et al. (1998), Hunt (2006), Brücker and Trübswetter (2007), Fuchs-Schündeln and Schündeln (2009)). Furthermore, the regional East-West wage gap has been documented by Burda et al. (1998), Franz and Steiner (2000), Görzig et al. (2005), and more recently by Kluge and Weber (2018). However, the research on domestic East-West German migrants' labor market assimilation is quite limited. Two papers deal with the earnings differences, but do not concentrate on the

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[2] Okoampah (2016) delivers a thorough overview of the literature on international migrants' earnings assimilation.

assimilation over time. Additionally, the results are ambiguous. Gernandt and Pfeiffer (2009) find that in the period of 1992-2005, East German immigrants in West Germany earn the same wages as their West German counterparts. According to Smolny and Kirbach (2011), East German migrants in West Germany earn more than East Germans in East Germany but at the same time less than West German natives. Connected to these findings, Rainer and Siedler (2009) show the importance of social networks for the East Germans' earnings in West Germany. They find that East German immigrants are more likely to be employed and hold higher paying jobs when they have been socially connected to the West prior to moving.

According to human capital theory (Duleep and Regets, 1999) the initial disadvantage of foreigners in the host country labor market can be explained by an imperfect transferability of human capital. The subsequent rise of earnings in the post-migration years is often connected to migrants' lower opportunity cost of investment into host country specific human capital relative to natives. The transferability of skills gained in home countries and the ability to acquire new skills determine the pace of individual economic integration. The speed of this process mainly depends on the geographic, cultural, and linguistic distances between the sending and receiving countries, whereas geographic distance does not have to coincide with the other two factors (Sweetman and van Ours, 2015). In this context, East German migrants are unique due to the lack of cultural, geographic, and linguistic barriers between the sending and receiving regions in Germany. Therefore, their investment in host country specific human capital and the reduction of labor market disadvantages relative to native workers should require less effort compared to traditional immigrants. From this perspective, we expect faster integration in comparison to international migrant groups.

In contrast to previous studies, our contribution to the existing literature is twofold. First, we analyze the integration process of East Germans in West Germany by estimating the initial wage differential and the speed of adaptation of the East-West migrants employing the methodology by Chiswick (1978). Second, we juxtapose this process with the situation of two

international migrants groups: ethnic Germans of German descent (ethnic Germans) and other migrants. We compare the convergence of these three immigrant groups' earnings to those of the native West Germans.

Our research aims at answering following questions:

1. Are first generation East German immigrants' wages lower than those of West German natives in West Germany?

2. Has there been a convergence? If so, what is the rate of assimilation?

3. What is the effect of outmigration on the estimates?

4. What is the effect of non-permanent labor market participation on the estimates?

This paper is structured as follows. Section 2 presents the empirical approach. Section 3 discusses the underlying data and descriptive statistics. Preliminary results follow in section 4. Finally, section 5 concludes.

2. Empirical approach

Our empirical analysis is based on the seminal economic assimilation concept of Chiswick (1978) which focuses on individual-level outcomes and is itself a traditional Mincer (1974) type empirical estimating equation:

$$Y = \beta_0 + \beta_s S + \beta_e Exp + \beta_i Imm + \beta_m YIWG + \beta_x X + \epsilon \tag{1}$$

where *Y* is the labor market outcome, *S* is the schooling indicator measuring years of education (*YEDU*) and provided by SOEP, *Exp* is a vector of labor market experience in years. *Exp* is provided by the SOEP. However, due to large number of missing values, we replace it with the *age*/10 as an approximation in our regressions. To this conventional wage equation we add *Imm*, an immigrant indicator, and *YIWG (years in West Germany)*, the total number of years an immigrant spent in West Germany. The latter is equal to zero for native West Germans. For migrants, *YIWG* indicates the years of exposure to the post-unification West German labor

market. Its marginal effect (β_m) provides the ceteris paribus change in wages for each additional year spent in West Germany, i.e., the rate of assimilation beyond the return to *Exp*. *Imm* indicator captures average differences between natives and immigrants. *X* represents a set of control variables such as tenure, gender, and industry affiliation. We also take account of cohort effects (Borjas, 1985) by incorporating five cohort indicators, each representing a period of first arrival in West Germany. A list with variable explanations can be found in Table 1. β are coefficients to be estimated and ε is a random error for which we assume iid properties.

3. Data

The data are taken from the German Socio-Economic Panel (SOEP) v34 (SOEP, 2017; Wagner et al., 2008) covering the years 1991-2018. The SOEP is an annual nationally representative longitudinal panel survey of persons and private households. In 1990, observations from the German Democratic Republic (GDR) were added to the sample. Thus, 1990 is the earliest year of data on the German population who lived in East Germany before reunification. The data cover the period beginning right after the start of the transition from a centrally planned to a market economy and stretch until today.

We study the West German post-reunification labor market. We distinguish between four population groups of full-time employed male and female individuals between 21 and 65 years of age who live in West Germany at the time of interview, and for whom information on wages is available. The first three groups comprise first-generation migrants to West Germany who moved to West Germany at some point during the 1990s who were not younger than 21 at the point of migration. 1.5- and second-generation migrants are not part of our sample.[3] These choices aim to generate homogenous groups of workers regarding the origins of their sending country-specific human capital. In this way, we only include individuals who have spent most

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[3] While earlier studies analyzed first-generation immigrants, improved data availability allowed later contributions to include 1.5- and second-generation immigrants (Portes et al., 2009). We plan to extend the analysis to second-generation immigrants in the future research.

of their formative years outside of West Germany and thus the effects of human capital can be attributed mostly to the skills attained outside of West Germany.

In total, these three groups are composed as follows: 1. East German migrants, without any further international migration background, who reported to be living in the former German Democratic Republic in 1989. 2. Ethnic Germans i.e. ethnic Germans of German decent, who moved to West Germany primarily from the former East Bloc countries. 3. All other international migrants of the same age category and migration history. The fourth group is our reference group. It contains, Germans at the age of between 21 and 65 who lived in West Germany in the period between 1991 and 1999 and do so at the time of the interview. For all groups we retrieve the data up to 2018 of only those respondents who lived in West Germany during the 90s. The newly added samples after 2000 are not part of the analysis.[4]

All data are limited to individuals with information on wages at some point during the period of 1990-1999. This means that there are migrants whose moves to West Germany were not necessarily accompanied by an immediate employment in the first year after the move, but had a delay in labor market entry upon arrival.

As a measure of labor market outcome *Y,* we employ the natural logarithm of real gross hourly wage in 2015 Euro. The main target of interest is the coefficient estimate of explanatory variable *YIWG*. The estimate describes the rate of wage assimilation. We define *YIWG* as the cumulative number of years spent in West Germany at the time of observation. The information on individuals' residence combined with the longitudinal nature of the data allows us to calculate the duration of regional affiliation at every point in time. We allow for back and forth migration for East Germans and thus for more than one spell in the West. In contrast, for ethnic

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[4] For residents of East Berlin we record a move to West Germany only if they move to any of the original West German federal states excluding West Berlin. On the other hand, return migration of East Germans is recorded in case those who previously moved to West Germany return to any former East German federal states including all of Berlin (including West Berlin). Residents of West Berlin are otherwise not part of the analysis. We cannot identify place of work i.e. commuters in the entire survey period.

Germans (group 2) and other international migrants (group 3) we use the self-reported year of arrival variable *year of immigration*, provided by the SOEP to calculate *YIWG*.[5]

We estimate separate models for each migrant group. In all three cases, we compare the immigrants in West Germany to their native-born West German peers as the reference group, for whom *YIWG* takes on the value zero. Table 2 provides information on sample composition and its development over the considered survey years: the analysis sample is an unbalanced panel consisting of 50.994 person-year observations in total (Table 2). 1,516 of these panel observations belong to 188 individuals from East Germany, 1,254 to 201 ethnic Germans, and 1,444 to 280 other international migrants. 46,780 person-year observations are of 5,652 native West Germans.

Descriptive statistics

Table 3 presents summary statistics for the pooled sample of four population groups. Regarding mean hourly wages, East German migrants lag only slightly behind the West German natives, whereas, the ethnic Germans record the lowest wages (10.69 euro) among all four groups. We observe the same group hierarchy in the development of mean hourly wages over time (Figure 2). Among all migrant groups, the East Germans' mean wages are the closest to the native West German levels.[6]

Regarding the gender distribution, the East German sample has the highest proportion (35%) of female observation. East German migrants also lead in years of education with 13.58 years on average. As one would expect, given the design of the data and the historic background, the tenure with the current employer is the highest for native West Germans as they could work for the same employer before unification. However, compared to other two migrant groups, East Germans have the longest spells with the current employer. Ethnic Germans (group 2)

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[5] For international migrants we do not record breaks in the spell. Return migration and panel attrition are not distinguishable for the international migrants.

[6] The outliers at both ends in the means wages of international migrants are due to small number of observations.

constitute the eldest in our sample with on average of 44.03 years. In line with this, they also have the highest labor market experience. The East German labor market experience is only slightly lower than that of West German natives. Lastly, we compare the total amount of years spent in Germany for all immigrant groups: East Germans in our sample have spent on average almost one year less in West Germany than international migrants (groups 2 and 3). This can partly be explained by the fact that we cannot account for potential gaps on the German labor market in the biographies of those immigrant groups.

4. Earnings returns regression

Estimates of initial disadvantage in earnings

Figure 2 portrays the development of real average hourly wages for four population groups over time. For all groups in the sample the average wage rises throughout. At the same time, there is a slight evidence of convergence of East German migrants' average wages to West German average about 14 years after reunification. Figure 2 also suggests that this is the case neither for ethnic Germans nor for international migrants in our sample for whom average hourly wages over the years stay below the level of both other groups.[7]

Next, we take account of potential determinants of the earnings outcomes. Table 4 presents the pooled OLS estimates of the coefficient of the variable *Imm* from the equation 1 for each of the three immigrants groups. The coefficient estimates of *Imm*-indicators after taking account of year fixed effects portray initial earnings gaps between immigrants groups and native West Germans. In this initial specification, we exclude *YIWG*. Table 4 for all three groups shows that all immigrant groups initially face significantly lower earnings than their native peers. However, East German migrants start from a relatively less disadvantageous position

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[7] The spike in the average wages for the international migrants is most likely caused by the small sample size in the first three years (see Table 2, group 3).

than the ethnic Germans who on average earn 22.8% less than the native West Germans. International migrants with ceteris paribus only 12.2% less initial gross hourly wages than the native West Germans hold the least disadvantageous position in our sample. East Germans earn on average around 13.3% less than the West German natives. This value is consistent throughout the different model specifications.

Convergence in earnings over time

The rate of assimilation for both groups is inferred from the coefficient estimates of *YIWG*: Based on pooled data, with each year in West Germany, East German workers earnings diverge with an average rate of 0.1% (Table 5). This result is negative, small and statistically not significant. We conclude that there is no evidence of earnings convergence over the years in West Germany. Based on the respective estimate, the same applies for international migrants. Remarkably, ethnic German group records a higher rate of divergence (-0.6%) from the average native West German earnings. This result is significant at the 10% significance level.[8]

Following Borjas (1985) we also control for cohort specificities. The estimates for cohort coefficient parameters ($\beta_{C\_92\_93}$ - $\beta_{C\_98\_99}$) for East Germans and international migrants are jointly insignificant. Cohort effect based on F-Test can only be seen for ethnic German group. T-tests for individual cohorts reveal that East German arrival cohort of 1994-95 is associated with significantly lower wages. This is also valid for the same cohort of ethnic Germans. For international migrants the cohort of 1998-99 seems to be associated with significantly less wages.

Panel fixed effects estimates

Next, we exploit the panel structure of our data and estimate panel fixed effects models. Doing so allows us to account for potential unobserved heterogeneities and for possible changes in

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[8] Studies such as Chiswick (1978), include polynomials of years spent in host countries. In our case, non-linearity in the years spent in West Germany could not be confirmed. Thus, the squared term of *YIWG* has been omitted.

sample composition over the years (Lubotsky, 2007). Rho and Sanders (2020) find that cross-sectional estimates understate earnings growth for high –skilled foreign-born workers. This bias originates from both selective outmigration and selective employment. The longitudinal approach yields estimates that describe how the earnings of immigrants change with time in the host country for the sample of immigrants who are present throughout the period of analysis. The use of person fixed effects will adjust for the unobserved and observed immigrant characteristics at arrival that have a time-invariant influence on earnings (Kaushal et al. 2016).

Table 6 delivers the fixed effects estimates for *YIWG*. Several minor changes occur in comparison to pooled OLS estimates from Table 5. Though the rate of assimilation changes the sign and slightly increases in magnitude, it stays statistically insignificant. For ethnic Germans the previous result of divergence in relative earnings is confirmed both in terms of rise in magnitude and statistical significance.

Additionally, we estimate the specification proposed by Kaushal et al. 2016 who also study the trajectories of the labor market outcomes of immigrants using longitudinal data pooled across panels. They employ two alternative specifications. Firstly, they estimate

$$Y_{it} = \beta_{i0} + \beta_x X_{it} + \alpha_1 T_i + \alpha_2 Imm_t * T_t + \epsilon_{it} \tag{2}$$

where T_t is a trend variable denoting the number of years since the first interview. The coefficients of interest are as follows: α_1 that estimates the average annual growth in the labor market outcome for native-born persons and $\alpha_1 + \alpha_2$ that estimates the wage growth for immigrants. α_2 is the coefficient of economic assimilation and captures the difference in annual growth of the labor market outcome of immigrants and natives. α_2 coefficient is comparable to the coefficient on *YIWG* in equation (1). Secondly, to estimate if immigrant economic assimilation differs by length of residence in the host country, a modified version of (2) is estimated:

$$Y_{it} = \beta_{i0} + \beta_x X_{it} + \beta_1 T_i + \sum \beta_2 * YIWG_d * T_t + \epsilon_{it} \tag{3}$$

The difference between (2) and (3) is that the variable *Imm* is replaced with dummy variables $YIWG_d$ indicating years since immigration categories: 0-5, 6-10, 11-20, and >20 years. Individual fixed effects are denoted as β_{io}.

The estimation results of the alternative specifications of the assimilation equation for each immigrant group are presented in Table 7. The coefficient estimates for $\hat{\alpha}_1 + \hat{\alpha}_2$ in columns (1), (3) and (5) are in line with values of the coefficients of *YIWG* in Table 6 supporting the finding, that there is no significant assimilation of East German immigrant wages to West German averages. Columns (2), (4) and (6) deliver the estimates of equation (3). Due to non-linear design of *YIWG* we can additionally identify the heterogeneity in assimilation rates based on years spent in West Germany. Here, one can see that the assimilation estimate in column 1 can be attributed to years 6 to 10 spent on West Germany for East Germans (Column 2). This effect disappears with time spent in West Germany.

Ethnic Germans and international immigrants seem to diverge in the average earnings (Columns 3 and 5, Table 7). The heterogeneity in divergence periods can also be observed for these groups. For ethnic Germans and international immigrants most of the divergence in the earnings can be attributed to years 11-20 spent in West Germany.

Spell length and selective out-migration

Assimilation rates can be biased by factors such as non-participation or selective outmigration that may be caused by the change in the sample cohort. Return migration can be selective on immigrant economy performance in the host country, which may bias labor market trajectories based on cross-sectional analysis (Kaushal et al. 2016). In this section, we follow Rho and Sanders (2020) to examine the potential sources of distortion in the previous findings.

Table 8 displays the sample composition of those who ended their first spells in West Germany after less than 10, 8 and 5 years. The main question is whether the leavers constitute a selected group of persons with different distribution in education and skills in comparison to

stayers. High early out-migration of the most educated would bias the assimilation downwardly. If there is a selective outmigration of higher earning immigrants for all education groups, it can explain the low rates of immigrant assimilation.

Among East Germans, the average education is only marginally higher for those with shortest first spells. Among the early leavers, females are more represented than among those who stayed longer. For other immigrant groups years of education are relatively evenly distributed.

In order to identify the first source of bias, we once again estimate the specification from Table 5. Only now, we vary the immigrants' sample regarding the maximum length of the first spell in West Germany. Therefore, column (1) of Table 9 only considers immigrants who spent at least ten years in West Germany. Respectively, column (3) includes all immigrants with first spell lengths of at least five years. Incorporating the varying spell lengths, we conclude that in line with Table 9 we find no evidence of out-migration of selected groups of workers. The estimates for *YIWG* for all groups are robust to changes. There is no substantial change in estimated rates in neither magnitude, nor regarding the statistical significance. Out-migration is not a decisive factor for non-assimilation in our sample.

Labor market non-participation

Not all migrants find employment immediately upon arrival (Rho and Sanders, 2020). Nor are all immigrants employed uninterrupted during their stay abroad. These breaks in individuals' employment histories could hinder convergence of the least attached workers, downwardly bias overall estimates and thus make it appear that immigrants experience zero relative earnings growth. In this section, we examine the role of labor market attachment and selective participation in the labor market on the assimilation rates.

In addition to the methodology in Table 9, next to heterogeneous spell lengths in models (1), (2) and (3) we introduce a further restriction to the sample. We condition the estimates on permanent participation. The assimilation rates for East Germans become positive. For ethnic

Germans and international immigrants no such change is recorded. We conclude that for the first group constant labor market participation positively influences the rates of assimilation. This result is consistent with Rho and Sanders (2020) who find that the least attached to the labor market have lowest initial earnings.

5. Conclusion and discussion

In our (preliminary) paper we apply Chiswick's (1978) seminal approach to East Germans who moved to West Germany after reunification. Our results suggest that East Germans faced significant initial negative wage differential after moving to West Germany. This result contradicts previous literature by Smolny and Kirbach (2011). The initial wage discount of 13% compared to natives is substantial and comparable to international immigrants to West Germany. This is not in line with the part of human capital theory, which states that geographic, cultural, and linguistic distances affect assimilation. Given the special case of East and West Germany with numerous similarities (e.g., language, culture, and some institutions) this result is surprising. Furthermore, we find no statistical evidence that these earnings gaps narrow over the years. Out-migration of selective groups seems to have played no role for the lack of convergence in the earning relative to the native West Germans. At the same time, those workers with higher attachment to employment did experience small but positive rates of assimilation over years after the migration. This suggests that the changes in the composition of the sample due to out-migration lead to a downward bias in the estimates.

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6. Graphs and tables
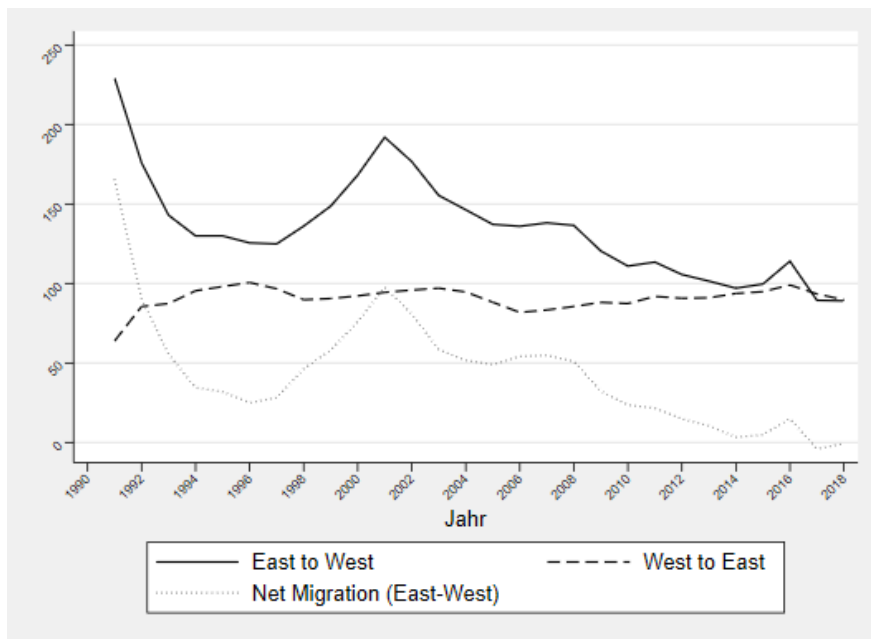
Figure 1: East-West, West-East and net migration in thousands, 1991-2018 (Statistisches Bundesamt, 2020).
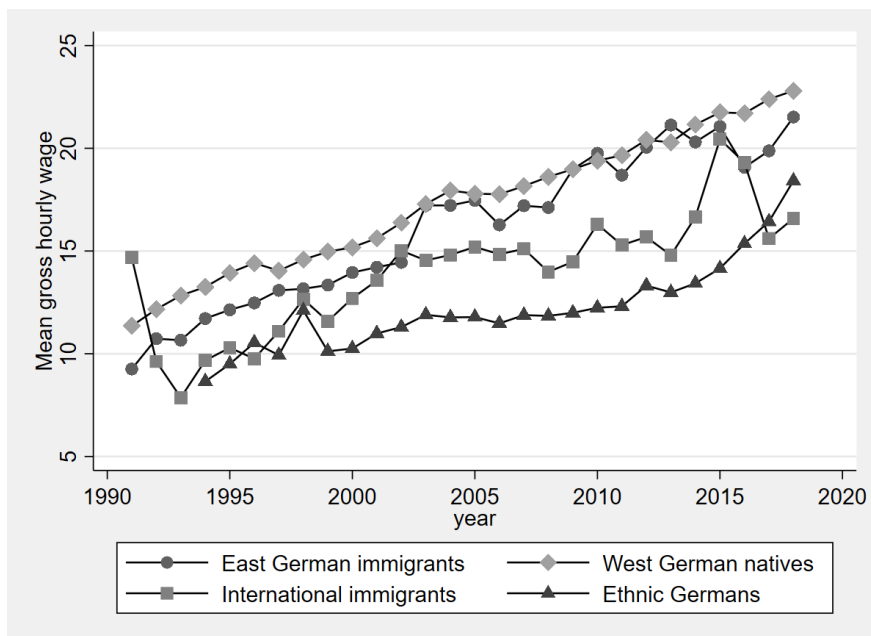
Figure 2 : Mean gross real hourly wages for four subsamples (*own calculations, SOEP v34*).

Table 1: Variable definitions

variable	definition
EAST_MIG	=1 if East German migrant living in West Germany, =0 otherwise
INT_MIG	=1 International migrant living in West Germany, =0 otherwise
YEDU	Years of education
EXP	Labor market experience in years
C_90_91	= 1 if arrival cohort before 1992, =0 otherwise
C_92_93	= 1 if arrival cohort 1992-1993, =0 otherwise
C_94_95	= 1 if arrival cohort 1994-1995, =0 otherwise
C_96_97	= 1 if arrival cohort 1996-1997, =0 otherwise
C_98_99	= 1 if arrival cohort 1998-1999, =0 otherwise
YIWG	Years in West Germany
FEM	=1 if female; =0 otherwise

Table 2: Sample composition over years

year	East mig. Group 1	Eth. Ger. Group 2	Int. mig. Group 3	Natives Group 4	Total
1991	20	0	4	2632	2656
1992	42	0	13	2530	2585
1993	52	0	20	2482	2554
1994	70	19	43	2421	2553
1995	84	53	89	2417	2643
1996	79	86	58	2324	2547
1997	82	58	78	2316	2534
1998	78	59	79	2572	2788
1999	86	58	74	2597	2815
2000	95	102	135	2392	2724
2001	81	102	118	2256	2557
2002	74	87	108	2092	2361
2003	67	75	96	2000	2238
2004	66	70	83	1856	2075
2005	62	70	70	1702	1904
2006	62	69	54	1534	1719
2007	57	58	52	1450	1617
2008	54	52	44	1336	1486
2009	48	48	41	1237	1374
2010	36	39	36	1097	1208
2011	36	31	33	1042	1142
2012	35	25	25	843	928
2013	33	25	22	764	844
2014	30	20	19	720	789
2015	24	16	15	636	691
2016	26	14	14	577	631
2017	20	11	11	512	554
2018	17	7	10	443	477
N × T	1516	1254	1444	46780	50994
N	188	201	280	5652	6321

Notes: Group 1 are East German immigrants observed in West Germany, Group 2 are ethnic Germans, Group 3 are international immigrants in West Germany, and Group 4 are native West Germans. All immigrant groups immigrated to West Germany between 1990 and 1999. All observations meet employment and age requirements. N represents the total number of different individuals; N x T represents the total number of person-year observations. Only individuals in full-time employment with positive wages, between the age 21 and 65 living in East Germany.

Table 3: Sample characteristics

	(1) East Germans mean	(2) Ethnic Germans mean	(3) Int. immigrants mean	(4) West Germans mean
Current gross hourly wage	15.28	11.44	13.45	15.91
Female	0.35	0.31	0.22	0.28
Years of education	13.58	10.78	11.06	12.37
Tenure with curr. firm	7.15	6.12	6.03	13.33
Age	41.31	44.03	39.02	42.40
Years of labor market experience	20.84	25.96	20.47	22.93
Total number of Years in West Germany (*YIWG*)	9.11	10.74	10.18	0
Observations	1516	1254	1444	46780

Notes: Sample characteristics of East-German migrants (group 1), ethnic Germans (group 2), other international immigrants (group 3) and West-German natives (group 4) from 1991-1999. Observations with positive wages. For native West Germans *YIWG* is set to zero. Source: own calculations based on SOEP, years 1991- 2018.

Table 4: Estimates of *imm*

	(1)	(2)	(3)
EAST_MIG	-0.133***		
	(0.032)		
ETHNIC_GER		-0.228***	
		(0.023)	
INT_MIG			-0.122***
			(0.035)
N*T	47657	47500	47628
N	4864	4898	4935
R-squared	0.318	0.317	0.311

Standard errors in parentheses (clustered by person); Pooled OLS estimates; Dependent variable: log real gross hourly wage; Controlled for female, yedu, age, age2, year; Base: male, native West German; Source: own calculations based on SOEP, years 1991- 2018. $^+ p < 0.10$, $^* p < 0.05$, $^{**} p < 0.01$, $^{***} p < 0.001$

Table 5: Rates of earnings assimilation - POLS

	(1) EAST_MIG	(2) ETHNIC_GER	(3) INT_MIG
YIWG	-0.000	-0.006*	-0.002
	(0.004)	(0.002)	(0.004)
N*T	47760	47495	47628
N	4873	4898	4935
R-squared	0.318	0.319	0.312

Standard errors in parentheses (clustered by person); Pooled OLS estimates; Dependent variable: log real gross hourly wage; Controlled for female, yedu, age, age2, age_at_mig, year; Base: male, native West German, YIWG = 0; Source: own calculations based on SOEP, years 1991- 2018. $^+ p < 0.10$, $^* p < 0.05$, $^{**} p < 0.01$, $^{***} p < 0.001$

Table 6: Rates of earnings assimilation - FE

	(1) EAST_MIG	(2) ETHNIC_GER	(3) INT_MIG
YIWG	0.005	-0.008**	-0.006
	(0.003)	(0.003)	(0.005)
N*T	47653	47495	47628
N	4863	4898	4935
R-squared	0.280	0.277	0.275

Standard errors in parentheses (clustered by person); FE estimates; Dependent variable: log real gross hourly wage; Controlled for female, yedu, age, age2, year; Base: male, native West German, YIWG = 0; Source: own calculations based on SOEP, years 1991- 2018. $^+ p < 0.10$, $^* p < 0.05$, $^{**} p < 0.01$, $^{***} p < 0.001$

Table 7: Kaushal et al. (2016) specifications

	EAST_MIG		ETHNIC_GER		INT_MIG	
	(1) EAST_MIG FE1	(2) EAST_MIG FE2	(3) ETHNIC_GER FE1	(4) ETHNIC_GER FE2	(5) INT_MIG FE1	(6) INT_MIG FE2
YSFI	0.045**	0.045**	0.047***	0.046***	0.045**	0.045**
	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)
YIWG(6-10)*YSFI		0.003$^+$		-0.002		0.001
		(0.002)		(0.004)		(0.004)
YIWG(11-20)*YSFI		0.001		-0.011***		-0.007$^+$
		(0.002)		(0.002)		(0.004)
YIWG(>21)*YSFI		0.002		-0.005$^+$		-0.006
		(0.002)		(0.003)		(0.005)
EASTMIG*YSFI	0.003					
	(0.003)					
ETHNIC_GER*YSFI			-0.010***			
			(0.003)			
INT_MIG*YSFI					-0.008$^+$	
					(0.005)	
N*T	47657	47657	47500	47500	47628	47628
N	4864	4864	4898	4898	4935	4935
R-squared	0.272	0.272	0.269	0.269	0.267	0.267

Standard errors in parentheses (clustered by person); See Kaushal et al. 2016; Fixed effects estimates; Dependent variable: log real gross hourly wage; Base category: male, native West German, YIWG = 0, Source: own calculations based on SOEP, years 1991- 2018. $^+ p < 0.10$, $^* p < 0.05$, $^{**} p < 0.01$, $^{***} p < 0.001$

Table 8: Sample mean characteristics of leavers

	East Germans			Ethnic Germans			Int. immigrants		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	<10y.	<8y.	<5y.	<10y.	<8y.	<5y.	<10y.	<8y.	<5y.
Current gross hourly wage	11.93	12.02	11.17	11.50	11.49	7.76	10.85	10.57	9.90
Female	0.28	0.26	0.33	0.24	0.20	0.15	0.17	0.22	0.20
Years of education	12.81	12.82	13.10	10.45	10.14	9.54	10.75	10.45	10.37
Tenure with curr. firm	4.07	4.17	5.96	2.35	2.13	1.34	3.17	2.97	2.59
Age	34.96	34.26	32.93	39.48	36.62	33.08	33.79	33.95	31.24
Years of labor market experience	15.82	14.97	13.83	20.63	19.20	14.82	15.99	16.31	14.64
YIWG	3.37	2.78	1.85	4.90	4.27	3.08	4.41	3.59	2.38
Observations	257	183	72	104	56	13	276	169	65

Notes: Sample characteristics of out-migrants after 10, 8 and 5 years. East-German migrants (group 1), ethnic Germans (group 2), other international immigrants (group 3) from 1991-1999. Observations with positive wages. Source: own calculations based on SOEP, years 1991- 2018.

Table 9: Selective out-migration

Spell	≥10y.	≥8y.	≥5y.
EAST_MIG	(1)	(2)	(3)
YIWG	-0.003	-0.001	-0.001
	(0.004)	(0.004)	(0.004)
N*T	47367	47430	47550
N	4789	4801	4826
R-squared	0.317	0.318	0.318
ETHNIC_GER			
YIWG	-0.006*	-0.006*	-0.006*
	(0.002)	(0.002)	(0.002)
N*T	47391	47439	47482
N	4858	4875	4890
R-squared	0.318	0.318	0.318
INT_MIG			
YIWG	-0.001	-0.001	-0.002
	(0.005)	(0.004)	(0.004)
N*T	47378	47472	47569
N	4851	4873	4909
R-squared	0.311	0.312	0.312

Standard errors in parentheses (clustered by person); Pooled OLS estimates; Dependent variable: log real gross hourly wage; Models 1, 2, 3: Return migration and positive wages; Controlled for yedu, age, age^2, year, cohorts, age at migration; Base: male, native West German, YIWG = 0; Source: own calculations based on SOEP, years 1991-2018. $+ p < 0.10$, $* p < 0.05$, $** p < 0.01$, $*** p < 0.001$

Table 10: Effects of labor market participation

Spell	≥10y.	≥8y.	≥5y.	all
EAST_MIG	(1)	(2)	(3)	(4)
YIWG	0.005	0.007	0.007	0.008
	(0.006)	(0.006)	(0.006)	(0.006)
N*T	21698	21743	21824	21883
N	1875	1881	1897	1923
R-squared	0.337	0.338	0.338	0.339
ETHNIC_GER				
YIWG	-0.005	-0.005	-0.005	-0.005
	(0.004)	(0.004)	(0.004)	(0.004)
N*T	21636	21653	21679	21687
N	1899	1907	1916	1920
R-squared	0.334	0.334	0.333	0.334
INT_MIG				
YIWG	0.000	0.001	-0.000	0.000
	(0.004)	(0.004)	(0.004)	(0.004)
N*T	21669	21726	21789	21839
N	1895	1908	1928	1948
R-squared	0.331	0.333	0.333	0.334

Standard errors in parentheses (clustered by person); Pooled OLS estimates; Dependent variable: log real gross hourly wage; Models 1,2,3: Return migration and positive wages in all periods in the West, Model 4:positive wages in all periods in the West; Controlled for yedu, age, age^2, year, cohorts, age at migration; Base category: male, native West German, YIWG = 0, Source: own calculations based on SOEP, years 1991- 2018. $^+ p < 0.10$, $^* p < 0.05$, $^{**} p < 0.01$, $^{***} p < 0.001$