The Role of Unemployment and Job Change when Estimating the Returns to Migration

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Abstract

Estimating the returns to migration from East to West Germany, this paper focuses on pre-migration employment dynamics, earnings uncertainty, and job change in the source region. Migrants are found to be negatively selected with respect to labor market outcomes, with a large drop in earnings and employment during the last few months before migration. We find sizeable positive earnings and employment gains of migration both in comparison to staying or job change. The size of the gains varies considerably with pre-migration earnings and with the counterfactual considered. Future migrants have worse expectations for their labor market prospects in the East and migrants show a greater openness to mobility.

Keywords: migration, returns, selection, unemployment, moving costs.

JEL Classification: J61, R23, O15, P25

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1 Introduction

Key drivers of individual migration decisions are the economic returns to migration and the costs of migration. In many settings with high migration returns and low apparent migration costs, individuals nevertheless do not migrate in large numbers. We estimate the causal returns to migration in such a setting, namely migration from East to West Germany a few years after the immediate surge in migration between 1989 and 1991 following German reunification.[1] While a large part of the literature focusses on how the returns to skill and the uncertainty about labor market outcomes in the destination region affect migration (compare Borjas (1987) and related studies), this paper considers different counterfactual outcomes in the source region while scrutinizing the dynamic selection of migrants before migration.

As the core of the paper, we estimate average causal effects of migration for migrants both on employment and earnings, while accounting for the strong dip in employment and earnings during the last months before migration. Average returns to migration prove positive for all groups. The size of the returns crucially depends upon whether one considers staying or job change in the source region as counterfactual. Additionally, returns to migration strongly depend on the employment status and on the earnings level right before migration. Since average returns to migration are high for most groups, we also analyze moving costs as obstacles to migration. Our analysis shows that before migration, migrants do differ substantially from non-migrants with respect to non-monetary moving costs, namely regarding expectations about their economic future and their attitudes towards mobility.

For several reasons, migration from East to West Germany in the mid and late 1990s is an ideal setting for our empirical analysis. First, due to the long separation, the East and West German economies differed strongly with much better labor market chances

[1] Annual migration peaked at almost 400 thousand individuals in 1989 and 1990 (Burda and Hunt, 2001). However, gross migration quickly fell below 200 thousand from 1992 onward until 1999, and net migration was close to zero in the mid and late 1990s, despite a substantial remaining gap in labor market chances between West and East Germany and despite the absence of legal restrictions or language/cultural differences (Hunt (2006), Fuchs-Schündeln et al. (2010)).

in West Germany even though the two regions experienced some economic convergence in the years after reunification (Burda and Hunt (2001), Hunt (2006)). At the same time, differences in institutions, language or culture, which could be obstacles to migration, are largely absent. Second, East Germany underwent a substantial economic transition from a state-led economy towards a market economy, causing long-lasting economic instability, whereas the West German economy represented, in comparison, a stable and high-wage labor market, allowing us to focus our analysis on the influence of labor market developments in the source region. Third, the unexpected and profound changes introduced by the reunification process introduce a randomness into individual labor market histories helping us to identify the causal returns to migration. Becoming unemployed was likely to be less selective in East Germany than in developed Western countries at the time. Based on novel administrative panel data involving labor market outcomes before and after migration (BASiD), we focus on the second wave of migrants from East Germany after reunification, who were not leaving immediately during 1989 or 1990 and who migrated later in response to deteriorating labor market conditions.

As theoretical background regarding the determinants of migration decisions and the selection of migrants, a large literature relies on an augmented Roy model, as popularized by Borjas (1987).[2] The basic Roy model predicts positive (negative) selection of migrants, depending upon whether the returns to skill are higher (lower) in the destination region compared to the source region. Based on this, the descriptive evidence showing larger wage inequality and larger returns to skills in West Germany compared to East Germany (Krueger and Pischke (1995), Burda and Hunt (2001), Fuchs-Schündeln et al. (2010)) would suggest that East-to-West migrants were positively selected. However, such aggregate measures do not necessarily reflect the individual migrant's returns. Moreover, the model does not include uncertainty about labor market outcomes in the source region and ignores the central role that unemployment can play in migration de-

[2]Empirical tests of different variants of this model can be found in, among others, Borjas et al. (1992), Hunt and Mueller (2004), Chiquiar and Hanson (2005), Kaestner and Malamud (2014), Parey et al. (2017), Bartolucci et al. (2018). Brücker and Trübswetter (2007) use the model as a framework to analyse the selection of East German migrants to West Germany.

cisions. We analyze whether and to what extent these factors affect migration returns, thus being drivers of the migration decision.[3]

Our empirical analysis estimates the average effect of treatment (≡ migration) on the treated (≡ migrants) based on detailed administrative panel data (BASiD) at the monthly frequency.[4] The data show a distinct pre-migration dip in earnings and employment a few months before migration, mostly driven by a substantial increase in the unemployment rate of prospective migrants. To capture this development, we carefully align migrants and our control group with respect to the timing of migration. To allow for the different counterfactual labor market developments in East Germany, we define two different control groups. We thus estimate two different treatments based on two different control groups. The first treatment is *migration-vs-staying*, where stayers are individuals who stay in East Germany and who do not find a new job in the same year, i.e. who remain unemployed or stay in their job. The second treatment is *migration-vs-job-change*, where job changers are individuals who find a new job in East Germany during the same year (similar to Ham et al. (2011)). We show that the subsequent employment effects of a temporally aligned job change/job finding in East Germany lead to substantially and consistently lower returns to migration for migration-vs-job-change compared to migration-vs-staying.

Experimental settings allowing to identify the returns to migration are very rare (an exception being the migration lottery in Tonga used by McKenzie et al. (2010)). Our rich BASiD data offer detailed information on individual, regional, and employer characteristics as well as labor market history in East Germany before migration. Furthermore East Germany suffered a strong negative labor demand shock, which limits the role of selection with respect to unobserved individual heterogeneity. This justifies

[3]Other recent studies which analyze the selection of migrants into internal migration are Young (2013), De la Roca and Puga (2017) or De la Roca (2017), who study rural-to-urban migration and find a positive selection of migrants, because skilled individuals can obtain higher returns to their skills in urban regions compared to rural regions. Lkhagvasuren (2014) and Amior (2015) analyze the selection of migrants between regions by skills. Arntz et al. (2014) relate differences in the aggregate unemployment rates between different German regions to the selection of internal migrants.

[4]Note that we estimate the returns to migration for migrants. Hence, the results are relevant for East German non-migrants who are similar to migrants with respect to the drivers of labor market outcomes, but who differ in terms of expectations and moving costs.

a selection-on-observables assumption similar to Ham et al. (2011) or Zaiceva (2010)).[5]

While there is some disagreement in the international literature on the sign of the returns to migration,[6] the literature on East-to-West migration in Germany suggests substantial positive returns to migration. Burda and Hunt (2001) and Hunt (2006) present strong descriptive evidence regarding positive wage returns to migration in the early 1990s, which decline over time but still remain substantial in the late 1990s.[7] We extend upon the existing evidence by the use of more detailed data, by accounting for the dynamics before migration, and by the analysis of the heterogeneity of returns.

Our causal estimates of the returns to migration on earnings and employment prove positive and substantial, with the returns of migration-vs-job-change being much smaller than the returns of migration-vs-staying. We find returns to migration of 21% in daily earnings (where spells of unemployment are counted as 0 earnings) compared to job changers, with returns being quite stable over the course of two years after migration and across migration cohorts. Compared to stayers, the initial gains for migrants are substantially higher (105% higher initial earnings), and the gains decline somewhat over time amounting to 35% two years after migration. A persistently higher employment rate of those who change jobs compared to stayers is the key driver of the different returns to migration.

There is also strong heterogeneity in the returns by gender and by labor market outcomes before migration. Returns are higher for males and for individuals with lower pre-migration earnings and less stable employment. Heterogeneity of returns may thus explain non-migration of those with stable labor market histories and high paying jobs. When controlling for regional price differences, returns to migration are lower but still remain substantial. At a methodological level, accounting for the dynamics of

[5]Different non-experimental approaches have been used in the literature, such as Heckman (1979) type selection models to control for unobservables driving the selection of migrants and stayers (e.g. Nakosteen and Zimmer (1980), Tunali (2000), Nakosteen and Westerlund (2004), Bartolucci et al. (2018)), fixed-effects or difference-in-differences (e.g. Yankow (2003), Lehmer and Ludsteck (2011)) or instrumental variable estimation (Venhorst and Cörvers (2018), Zaiceva (2006), Ham et al. (2011)).

[6]Most studies finds positive returns, but there are studies with insignificant effects (for example Zaiceva (2006)) or even negative effects (Borjas et al. (1992), Tunali (2000)).

[7]See also Brücker and Trübswetter (2007) and Alm et al. (2014) for evidence on positive returns.

unemployment is crucial in light of the pre-migration dip in earnings and employment because more than 50% of the migrants are unemployed before migration. We show that implementing a standard Difference-in-Differences approach or using data at the annual frequency thus yields downwardly biased estimates.

In light of the low net migration between East and West Germany after 1992, sizeable migration costs may have prevented individual migration despite strong positive returns. We thus also investigate non-financial/behavioral barriers to migration. Because BASiD lacks information on these, we provide evidence based on the German Socio-economic Panel (GSOEP). Conditional on the control variables used in the analysis of returns, migrants prove less risk-averse, less attached to their place of living, less likely to be married, and they have less children as well as a higher willingness to move. Additionally, prospective migrants (and job changers) worry more about their economic future compared to stayers. Worries about one's own economic situation, the perceived need to find a new job and low barriers to migration are important drivers of migration. In turn, being employed in a stable job in East Germany strongly reduces the willingness to migrate, also because returns to migration are much lower for such workers.

The remainder of paper is structured as follows: Section 2 reviews the historical background. Theoretical consideration for the role of source region characteristics are developed in Section 3, and Section 4 presents the dynamic treatment approach. Section 5 describes the administrative panel data used. The main empirical findings are discussed in Section 6, while Section 7 provides additional analyses. Section 8 turns to the analysis of migration costs. Section 9 concludes. The appendix provides further details.

2 Background

Starting in 1990, steps for a swift political and economic integration of East Germany into the Federal Republic of Germany were implemented, e.g. harmonization of insti-

tutions (collective bargaining), monetary union, and starting the privatization of state owned enterprises. In the early 1990s, many observers expected a convergence of wages in the medium run (Burda (1993)). East German real wages rose substantially in the first years after reunification, increasing by on average 83% from 1990 to 1996 according to Hunt (2000). However, this process of convergence stagnated after a while. The left graph in Figure 1 shows that average earnings in the East remained at around 75% relative to West Germany between the mid 1990s and the late 2000s and have increased to about 80% since. Many authors believe that the adjustment of wages in East Germany strongly contributed to the surge in unemployment in East Germany (examples include Burda and Hunt (2001) and Snower and Merkl (2006)). Hunt (2000) notes that between 1989 and 1992, employment rates fell from 89% to 73% in East Germany.[8] The graph on the right in Figure 1 shows that unemployment rates in East Germany were much higher than in West Germany and the difference has only slowly decreased in recent years. Thus, despite the early convergence trend, substantial differences in average earnings and unemployment remain between East and West Germany.[9]

[Figure 1 about here.]

In the light of the documented persistent East-West differences in labor market outcomes, migration to the West appears attractive. However, Figure 2 shows a different picture for gross East-to-West and West-to-East migration as well as for net migration from 1989 to 2013. Net migration to the West was high in the early years after reunification in 1989 to 1991 and then declined swiftly until it picked up again in the late 1990s. In recent years, net migration from East Germany converged to zero.[10] Even

[8] Liepmann (2018) is an recent exemplary study showing that the deteriorating labor market conditions in East Germany had strong behavioral effects, with the study focusing on the decline of fertility.

[9] Our analysis based on a regional price index shows that this holds true in nominal and real terms (adjusted for the costs of living).

[10] Aggregate flows might give the impression that after a short time nearly as many West Germans migrated to East Germany as East Germans migrated to West Germany. However, this interpretation is in so far misleading as a substantial share of West to East migrants are East Germans who return from West Germany. Thus, one should not interpret the development of net migration as East Germany becoming more attractive for West Germans to migrate to, but rather reflecting sizeable return migration of East Germans. Additionally, these figures only count East Germans who move to West Germany, thus excluding commuters.

though migration was still sizeable after the first strong migration wave of the early 1990s, the persistence of economic differences and the relative ease of migration with regard to cultural differences or bureaucratic hurdles could have been expected to create an even greater number of migrants who wanted to improve their living standards by taking up work in West Germany.

[Figure 2 about here.]

3 Labor Market Dynamics and Migration Costs

The most popular theoretical model to explain the selection of migrants (and thus the migration decision) is the augmented Roy model described by Borjas (1987). The focus of this model lies on the returns to skill in the destination and the source region, as well as on earnings uncertainity in the destination region and (in some variants, for example in Chiquiar and Hanson (2005)) on earnings dependent migration costs. However, the model does not account for the labor market dynamics in the source region before and after migration (especially transitions between employment and unemployment) and the implications for earnings uncertainty. Furthermore, (non-monetary) moving costs typically play only a small role in studies based on the model. Both aspects are particularly important in settings in which individuals contemplate migration from an economically worse and unstable source region (e.g. facing a high risk of becoming/staying unemployed) to a economically more stable destination region. This point is particularly important in our case with migrants having excellent information about labor market chances in the destination region and facing low financial/institutional moving costs. The situation in the source region then explains the negative selection of migrants that we find in our data, which is contrary to what the standard Roy model would predict for the selection of migrants from East to West Germany based on the observation that wage dispersion in the destination region is higher than in the source region.[11]

[11]The wage dispersion among employees was higher in the West compared to the East for most of the 1990's until it in the late 1990's (Burda and Hunt (2001), Fuchs-Schündeln et al. (2010)). Also,

As conceptional focus of our analysis, we stress four key aspects. First, we scrutinize the labor market dynamics (earnings and employment) of migrants before migration. We show that changes in pre-migration earnings and employment outcomes act as key drivers of migration. Therefore, one has to take account of the timing of migration with regard to the pre-migration history. This requires the availability of high-frequency panel data and a dynamic treatment approach (as described in section 4) accounting for the fact that workers migrate at different points in time in response to changes in individual labor market outcomes (e.g. losing one's job) in the source region.

The second aspect concerns expectations about future labor market chances, which can have a strong impact on migration decisions. Hence, in a situation of high labor market uncertainty, unemployed individuals or individuals with low earnings may simply migrate because they do not expect their situation in the source region to improve quickly. Specifically, if employment chances are expected to deteriorate strongly after a job loss, then the probability to migrate increases.[12] This holds in particular, when individuals are overpessimistic about their future labor market prospects in the source region.

Third, we distinguish explicitly between job change and staying as alternative counterfactuals to migration. In response to deteriorating employment chances in the source region, individuals may change to a different job in the source region instead of migrating. Ham et al. (2011) consider job change as the relevant counterfactual because migration also involves a job change. We think that both counterfactuals are of interest in a setting with strong mobility between employment and unemployment and we

returns to age/experience (Krueger and Pischke (1995), Jurajda and Harmgart (2007), Orlowski and Riphahn (2009)) and to education (Krueger and Pischke (1995)) are higher in the West. Therefore, the Roy model would predict that East-to-West migrants are positively selected (Parey et al. (2017)) or show no selection. Other existing theoretical models used in the literature to analyze East-to-West migration do not focus on the selection of migrants, returns to migration or the role of unemployment in this (see e.g. Heise and Porzio (2018), Burda (1995)).

[12] In our setting, this assumes that the wage in the West is unaffected by individual employment shocks in the East, which is plausible since a negative labor demand shock for an individual in East Germany is unlikely to have a strong impact on labor market chances in West Germany. This seems justified because the risk of job loss in East Germany is high due to the reunification-caused transition process, implying that a job loss in East Germany is not viewed as a negative signal by West German employers. Furthermore, the qualitative results still hold as long as labor market prospects in West Germany are less negatively affected by job loss than labor market prospects in East Germany.

estimate the treatment effect with respect to both counterfactuals.

Finally, we investigate perceived (non-monetary) migration costs based on pre-migration survey information. In addition to the proxies for migration costs often discussed in the literature (for example marital status, children), we also consider other potential behavioral determinants like attitudes towards migration or risk aversion to analyze whether migrants and non-migrants show substantial differences in these factors before migration.

Appendix 9 develops a formal dynamic model of the migration decision that captures the most important aspects of interest for our analysis. Here, we sketch the model in a nutshell. We posit a three period model. In period 0, it is given whether an individual is employed or not. Employment in the source region in periods 1 and 2 follows a Markov process, with the probability to remain employed being strictly higher than the probability to become employed. Individuals can migrate at the beginning of periods 1 and 2. Further key assumptions are that wages in the destination and the source region are assumed to be constant and that there are sizeable migration costs. Restricting uncertainty to job loss and job finding in the source region greatly simplifies the analysis while focusing upon the main risk faced by East Germans during the transition period in the 1990s. The decision to migrate is modelled as a function of the employment state and expectations regarding state dependent employment probabilities in the source region.

Key model implications are the following: The migration probability falls with the wage in the source region and with migration costs, it is higher for unemployed than for employees, and it rises with the wage in the destination region. Since expectations about future employment matter, the migration probability falls with better employment prospects in the source region. Therefore, key obstacles to migration are high migration costs and overly optimistic expectations about labor market chances in the source region. Among individuals, who migrate at the beginning of period 2, the employment situation or the expectation about the future employment prospects must have deteriorated in period 1 relative to period 0 or migration costs must have fallen

over time. The model implies a negative selection of migrants with respect to labor market outcomes in the source region and it rationalizes the dynamic treatment approach in section 4.

4 Dynamic estimation approach

Our goal is to estimate the causal effect of East-to-West migration on earnings and unemployment, focusing on the average effect of treatment (≡ migration) for the treated (≡ migrants) [ATT]. The observed outcome (earnings, unemployment) is $Y = D \cdot Y_1 + (1 - D) \cdot Y_0$, where Y_1 and Y_0 are the potential outcomes under migration or non-migration, respectively, and D is the migration dummy. We consider two counterfactual outcomes Y_0 corresponding to two different treatments. These are (i) staying in the East without starting a new job in in a given year, referred to as the treatment *migration-vs-staying*, and (ii) starting a new job in the same month as migration (including finding a job after unemployment), referred to as the treatment *migration-vs-job-change*. The non-migration outcome entails the possibility of future migration.

Identification relies on a Conditional Independence Assumption (CIA), similar to Ham et al. (2011) or Zaiceva (2010). Our rich panel data allow us to control for individual employment histories on a monthly basis, socio-demographic characteristics, employer information, and detailed regional information, which arguably allow us to predict well the counterfactual outcomes for both treatments. In particular, we condition on labor market histories up to the month before migration, which accounts for unobservable factors affecting labor market success. Based on the available data, it would be difficult to justify an instrumental variable or selection approach.[13] Our CIA - to be spelled out below - implies that given our rich conditioning set, selection into

[13] A sizeable number of studies use a standard cross-sectional Heckman (1979) two step estimator, see e.g. Tunali (2000), Brücker and Trübswetter (2007), or Bartolucci et al. (2018). In addition to relying on strong distributional assumptions, this requires a credible exclusion restriction (essentially an instrument), being difficult to justify based on administrative data from 1992 onward (see section 5). For our setting, we have to account for dynamic selection, because people migrate in different time periods and migrants were non-migrants before. Such a setting would even require time-varying instruments (see Heckman and Navarro (2007)).

migration is not driven by factors related to future labor market outcomes in the East (recall that we restrict estimation to the ATT). This means that our results apply to the large group of East Germans who are similar in observable and unobservable skills to migrants. Estimation of the average treatment effect in a dynamic setting would require much stronger identifying assumptions. By conditioning on individual employment histories based on monthly data, we extend upon a standard difference-in-differences (DiD) estimator. The latter is not justified because we observe a disproportionate pre-migration dip in earnings and employment during the last months before migration takes place, similar to the widely documented Ashenfelter's dip studied in the training literature (Heckman and Smith, 1999).

Most of the literature estimating the ATT of migration uses non-migrants in the source region as control group. As noted by Ham et al. (2011) for the US, migration of a worker typically entails a job change, thus suggesting to focus on the migration-vs-job-change treatment to isolate the returns to job changing from returns to migration. We view staying in the East without starting a new job and job change in the East as two alternative treatments in a multiple treatment setting, representing two possible counterfactual treatments while remaining in the East, and we estimate the causal effect of migration against both (Imbens (2000), Lechner (2001)). For migration-vs-job-change, we follow Ham et al. (2011) in using job changers who do not migrate to the West as the control group. For migration-vs-staying, our control group involves those East Germans who do not migrate and who either keep their job in the East or who lose their job (or remain unemployed) without starting a new one in a given year. We assume that the CIA holds for both treatments. However, if one is concerned that we may not be able to control sufficiently for the selection into staying versus job change in the East, one should view the two counterfactuals as alternative estimates of the expected non-migration outcome in the East, thus providing a robustness check motivated by the concerns raised in Ham et al. (2011).

We model the selection into migration as a dynamic process. Individuals who decide not to migrate in time period t can still do so later when circumstances have changed.

Including only never-migrants in the control group would condition on future outcomes. To avoid this, we follow Sianesi (2004) and Biewen et al. (2014) in estimating the effect of treatment ($\equiv$ migrating now) versus waiting. This means that we include future migrants (and future job changers) in the control group for period t. Formally, the ATT for the treatment migration-in-period-t-versus-waiting on outcomes in period $t+a$ is given by

$$ATT(t,a) = E(Y_{1,t}(t+a) - Y_{0,t}(t+a)|D_t = 1, D_1 = ... = D_{t-1} = 0)\,,$$

where D_t denotes the dummy for migration in period t, $Y_{1,t}(t+a)$ the migration outcome, and $Y_{0,t}(t+a)$ the non-migration outcome in period $t+a$, where a measures months before/after treatment. Both outcomes are associated with the treatment sequence no-migration-up-to-period-t, i.e. $D_1 = ... = D_{t-1} = 0$. We view migration as an absorbing state, meaning $D_t = 1$ implies that the individual is not at risk of migrating to the West after period t and thus not to be included in the control group for future migrants. This means that we estimate the return to the first migration only, while including post-migration outcomes even after return migration.

The identification of $ATT(t,a)$ builds on a dynamic version of the CIA such that conditional on the covariates and the labor market history up until period $t-1$ the potential non-treatment outcome $Y_{0,t}(t+a)$ from t onward ($a \geq 0$) is conditionally mean independent of migration in period t. Formally, the dynamic CIA we assume is

$$E(Y_{0,t}(t+a)|D_t = 1, D_1 = ... = D_{t-1} = 0, X_t) = E(Y_{0,t}(t+a)|D_t = 0, D_1 = ... = D_{t-1} = 0, X_t),$$

where X_t involves all time-varying covariates and lagged labor market outcomes.

As we document for our data below, migrants experience a substantial decline in employment and earnings before migration, which is clearly visible based on monthly data. Because of this pre-migration dip, it is important to align migrants and comparable non-migrants by their outcome history until period $t-1$, the month before treatment time. Simply comparing migrants and non-migrants at a specific point in

time would group migrants with different durations until migration, thus confounding the short-run pre-migration outcome dynamics.

For estimation of $ATT(t,a)$, we first align the treated and the non-treated by treatment calendar month t and we then control for differences in covariates and outcome history. For the control group of job changers, migrants are compared to those changing jobs in the same month when migration takes place. For stayers, the temporal alignment is less obvious because every month could be the counterfactual "month of migration". As control group, we use all stayers as observed in the year of migration of a specific migration cohort. Non-migrating unemployed are treated as job changers if they start a job during the calendar year of migration. The remaining unemployed who do not start a job during this year are treated as stayers. The appendix includes further details on the alignment. For each treatment month t, we estimate the ATTs for months 0 to 24 after treatment in t as well as the pre-treatment differences for the 24 months before t, i.e. the $ATT(t,a)$'s are estimated based on observed outcomes in $t+a$, where $a=-24,...,24$. The pre-treatment differences ($a<0$) should be close to zero if treated and non-treated are well aligned according to equation (4). To obtain the overall $ATT(a)$ for all migrants a months after treatment, we first estimate $ATT(t,a)$ for all calendar month $t+a$ separately. Then, the migration cohort specific $ATT(a)$ is estimated as a weighted average using the distribution of migrants over a 12-months window as weights (see Appendix for details). Finally, the overall $ATT(a)$ is estimated as the weighted average over all sample years (cohorts).

To account for the differences in observables X_t (covariates, outcome history up to $t-1$) between treated and non-treated after temporal alignment, we use inverse probability reweighting (IPW) based on normalized weights (Busso et al. (2014)). IPW equalizes the distribution of observables between treated and non-treated. We first estimate the probability of migration in month t (the propensity score) using a logistic regression of the migration dummy on X_t. Since the determinants of migration might change over time, a pooled propensity score is estimated separately for every year, also accounting for calendar month dummy variables. In the second step, we reweight the

distribution of observables in the control groups towards the treatment group. Note that the group of migrants is much smaller than our two control groups and the necessary overlap of support for the distribution of the propensity score for the ATT is given.[14] For the two treatment cases, we estimate separate logit models based on migrants and the specific control group only. The reweighted outcomes before migration ($a < 0$) allow for an assessment of how well the reweighting strategy works in balancing the outcome history (which is part of X_t). The outcomes for the 24 months after migration provide estimates of the treatment effects. To account for the possibility of remaining covariate imbalance and to explore the heterogeneity of treatment effects, we also estimate ex post outcome regressions after inverse probability weighting as in Fitzenberger et al. (2013). Inference is based on bootstrapped asymptotic standard errors, clustered at the individual level.

5 Data and Descriptive Statistics

The core data used stem from the "Biographies of selected insurance agencies in Germany" (BASiD), a high-quality administrative panel data set linking a 1% sample of the German pension insurance accounts with the entries of the same individuals in the "Integrated Employment Biographies" (IEB) (Hochfellner et al. (2012)). The BASiD covers all individuals with at least one employment record with social security contributions, comprising about 80% of the German workforce (this excludes civil servants, self-employed, marginally employed and non-employed). Provided the employment criterion is satisfied, the data also include information on registered unemployment, additional schooling, or maternity leave. Attractive features of the BASiD are that employment before reunification is recorded and that the sample size is much larger compared to the German Socio-Economic Panel (GSOEP), the data source used in most of the existing literature on East-to-West migration.

Complete labor market histories in the East after reunification are recorded in

[14]Note that we can not estimate the average treatment effect of migration for the non-migrants (further details on the overlap of the propensity score distributions are available upon request).

BASiD from 1992 to 2006, allowing us to consider migration from 1994 to 2004 while controlling for two years of history and estimating post-migration effects for two years. Migrants in this second wave of migration differ from the large number of migrants in the first wave of migration in 1989 and 1990. On the one hand, individuals with low migration costs are likely to have migrated in the first wave in light of the strong economic incentives for migration. On the other hand, the majority of migrants in the second wave has experienced some unemployment in East Germany after reunification, as a consequence of the restructuring of the East German economy.

Our analysis is restricted to individuals who worked in East Germany before reunification.[15] Migration is defined as a change in the location of the workplace from East to West, which includes commuters. We focus on the first migration spell only, thus abstracting from return migration and repeated migration. Note that the vast majority of migrants only migrates once to West Germany. To avoid misclassifications (e.g. internships, seasonal jobs, highly volatile employment histories), a migration episode is only considered if it lasts at least three months.

Table 1 shows basic descriptive statistics for the time period 1994 to 2004, as measured one month before migration or job change - except for stayers, for whom all observations are used. Compared to stayers, migrants and job changers are more likely to be male. Migrants are also younger, while job changers and stayers are close in age. We find no selection regarding education, except for a slightly higher (lower) share of university graduates (apprenticeship degree holders) among stayers. A higher share of migrants and job changers work in construction prior to migration, possibly because migrants in construction could transfer their human capital to West Germany more easily than other employees or there was a shortage of construction workers in the West. In particular, this holds for migrants in the early 1990s before the construction boom in

[15] These individuals experienced reunification as a sudden shock in their labor market environment, and they had to decide whether to migrate or not. Their motives are likely to differ from those who did not already work in GDR times, and they form the much larger group in the 1990s. Furthermore, it is difficult to identify those East Germans who never worked in East Germany before reunification, because individuals are first recorded when they start their first job. Since there is evidence for young East Germans sorting into studying or taking up an apprenticeship in West Germany, including individuals without employment in the East during GDR times might introduce a sorting bias.

the East. In contrast, there are very few migrants who were former public employees, while their share is much higher among job changers. This may be explained by a higher specificity of human capital among public employees.

[Table 1 about here.]

With regard to labor market history, unemployment during the past 12 months, unemployment since reunification, and job changes in the past are more common among migrants and job changers compared to stayers. In our analysis, unemployment includes all times when an individual is not in (social-security registered) work or training. In terms of spatial allocation, the distribution across federal states of the last job are very much alike for job changers and stayers. Relative to the two other groups, migrants more often come from Thuringia and Brandenburg and less often from Saxony. The share of migrants from Berlin is low because moving from East Berlin to West Berlin is excluded since it just involves changing workplaces in the same city. Migration from other locations in East Germany to West Berlin is counted as migration, but the results are robust if these migration spells are also excluded. Note that Thuringia and Brandenburg offer particularly good opportunities for commuters. Overall there are substantial differences between migrants and stayers in observable characteristics, with job changers being more similar to migrants (see also Ham et al. (2011)).

Our IPW approach can make use of a rich set of covariates in BASiD to align treated and non-treated, including sex, age, education, tenure in the current/last firm (since 1992), number of job changes (since 1992), industry, occupation, total tenure in the industry of the last job (since 1992), current employment status, months in unemployment in the last 12 months, months in continuous unemployment (0 for the employed), share of time in unemployment since reunification, federal state of last job, population/mean employment/mean earnings/distance to Western border of the district of the last job and number of employees/median of earnings in the last firm (all evaluated one month before migration). Regarding labor market history, we consider earnings and employment one month before migration as well as unemployment experience,

earnings, number of past job changes and industry, measured 6, 12, and 24 months before migration. Paying particular attention to unemployment in the past is crucial because about 50% of migrants are unemployed before migration. This drop generates the pre-migration dip in outcomes.

Our outcome variables of interest are earnings and unemployment at a monthly frequency. Earnings are defined as the daily wage for employed individuals and as zero for the unemployed. Thus, a change in earnings may reflect a change in on-the-job earnings or a change in the employment status. Real earnings are calculated in 2004 Euros using the aggregate consumer price index for Germany. Unemployment is measured as a binary variable. The sample used for the further analysis includes all individuals who have non-missing values in all control variables in the month before migration. Observations of individuals after entering retirement are excluded.

6 Main Empirical Findings

Figure 3 provides first graphical evidence on the evolution of earnings and unemployment for the three groups by month before/after treatment. Job changers and stayers are temporally aligned to the treatment month of migrants as described above. Since the results do not vary stronlgy across cohorts, we aggregate over the migration years 1994 to 2004. Figure 3 reveals that, before migration, earnings (unemployment) of migrants and job changers lie below (above) the level for stayers, which shows a negative selection of the former two groups relative to stayers. In addition, there is a continuous and accelerating decline in earnings and employment among migrants and job changers before the treatment month. The strong increase in unemployment among migrants and job changers seems to be the main driver for the strong pre-migration dip in labor market outcomes.[16] In contrast, earnings and employment among stayers remains fairly stable over time. Intuitively, the results indicate that a deterioration of the labor market situation in East Germany increases the migration propensity. Those

[16]The earnings among employed migrants and job changers remain stable over time, but are also lower than those of stayers.

who stay predominantly show a stable development over time, while the employment rate among prospective migrants drops dramatically in the months before migration. This motivates our conceptual focus on the labor market developments pre-migration, especially unemployment, and underlines the importance of the timing of migration. The proximity of the developments for job changers and migrants shows that workers who change jobs/find a job in East Germany at the same time as migrants (in West Germany), show a similar decline in the labor market outcomes in the months before their job change.

[Figure 3 about here.]

After treatment (from month zero onward), migration and job change are associated with a strong initial boost in employment and earnings. By definition, unemployment among migrants and job changers falls to zero in the treatment month, increasing average earnings for both groups. Migrants can additionally profit from the higher wage level in the West, which raises their average earnings above those of stayers, who were in a substantially better labor market position in the time before migration. With respect to the development over time after migration/job change, earnings for both migrants and job changers fall continuously during the first year after treatment, driven by an associated increase in unemployment. Both outcomes stabilize during the second year. The outcomes of stayers do not change much after treatment, showing a stable level over the four-year period considered, idicating that the vast majority of stayers has a job and keeps it during the analyzed period.

While the descriptive evidence on the evolution of outcomes in Figure 3 can be used to study the pre-migration developments of the different groups, it is not informative about actual returns to migration. One can see that at least the group of stayers strongly differs from migrants with respect to individual characteristics and labor market developments before migration. To make job changers and stayers provide valid counterfactuals for the hypothetical labor market development in East Germany for migrants after the date of migration, we will reweight stayers and job changers towards

migrants using IPW. This allows us to estimate the treatment effects of migration compared to the two counterfactuals and to assess if the different definitions of stayers and job changers lead to substantially different counterfactuals in East Germany and thus to different treatment effects (returns to migration).

6.1 Estimated returns to migration

We estimate the ATTs of migration-vs-staying and migration-vs-job-change by applying IPW, thus accounting for the selection of migrants with regard to differences in covariates and pre-treatment labor market history. The latter is particularly important in light of the pre-migration and pre-job-change dip in earnings and employment.[17] Figure 4 shows the evolution of earnings and unemployment for the three treatment groups aggregated over all cohorts after IPW, showing that IPW is very successful in aligning earnings and unemployment prior to migration.[18]

[Figure 4 about here.]

Accounting for selection has a different effect for job changers and stayers (compare Figure 3 and Figure 4). The changes through re-weighting are not large for job changers. The differences compared to migrants decrease a bit, because job changers are more strongly negatively selected than migrants. From the definition of job changers, it follows that job changers provide the average counterfactual for migrants who would have found a job in East Germany at the same time when the migration occurred (in case of being unemployed before migration), or who would have changed jobs in East Germany instead of taking up a job in West Germany (in case of being employed before migration).

For stayers, the pre-migration trajectory is strongly affected by IPW re-weighting because now more weight is given to those stayers who experience a deterioration of

[17] The results of logit regressions used for estimating the treatment probability are shown in Table 6 in the Appendix (for readability, results aggregated over all cohorts with cohort dummies are reported, while for the actual IPW weights, logit models are estimated for individual migration cohorts). Table 7 shows the means of the control variables (aggregated over all cohorts) by treatment group before and after reweighting. IPW proves very effective in equalizing the means of the control variables considered.

[18] The results by calendar years are shown in Figure 15 in the Appendix.

their labor market outcomes mimicking the trajectory for migrants. However, after the month of (potential) migration the curves differ in a substantial way. The reason for this is that, by definition of the comparison group (the alternative treatment to migration), stayers do not experience a specific event in month 0. Rather, they represent an average counterfactual among formerly employed and unemployed workers, who show gradual transitions between the two employment states in the months after potential migration. The gradual increase of employment and earnings after the month of potential migration for stayers is driven by different durations of additional unemployment for unemployed stayers (or for the migrant if she would have stayed in East Germany), which is consistent with a standard job search model. The large initial gap in earnings between migrants and stayers is caused by higher wages in the West and a jump in employment for migrants, which stayers (in contrast to migrants and job changers) do not experience after period 0. The partial convergence between migrants and stayers over time is due to falling employment differences as unemployed stayers find a job and some migrants become unemployed again. The aggregate developments thus show the importance of accounting for unemployment, pre-migration developments and the timing of migration. Ignoring these factors would have led to a comparison of migrants to a comparison group with different dynamic selection. Furthermore, the strong differences between stayers and job changers underline the substantial effects that different counterfactual developments in East Germany can have on returns to migration, confirming for our setting the concerns raised by Ham et al. (2011).

Figure 5 shows the ATTs of migration-vs-staying (ATT^{Stay}) and migration-vs-job-change (ATT^{Stay}), which are the differences of the corresponding curves in Figure 4. The differences before month 0 are almost never statistically significant. In month 0, the jump in earnings among migrants implies a return of $ATT^{Stay} = 33$ Euro in daily earnings (105% higher earnings) compared to stayers. However, returns strongly decline afterwards to around 14 Euros two years after migration (35%). The month-0-returns in daily earnings ATT^{JC} compared to job changers are much smaller at 11 Euros (21%). These returns fluctuate a bit afterwards but remain fairly stable over the post-treatment

period amounting to 9 Euros (20%) in month 24. Both ATTs for earnings are highly significant for the entire 24 months after migration, and ATT^{Stay} is always significantly higher than ATT^{JC} (detailed results are available upon request). Regarding the ATT for the second outcome, unemployment of migrants in month 0 is 51 percentage points (pp) lower (ATT^{Stay}=-51 pp) than for stayers and the difference falls over time to 12 pp in month 24 (ATT^{Stay}=-12 pp). While unemployment among migrants is similar to job changers during the first months, it is (significantly) lower during the second year and the absolute difference increases over time.

[Figure 5 about here.]

Since migration shows significantly positive effects against both alternative treatments, the direction of the effect of migration versus non-migration is robust. At the same time, the stark differences between the two treatment effects ATT^{Stay} and ATT^{JC} show the importance of the counterfactual in East Germany. When a new job is offered in East Germany, the returns to migration are lower and therefore less likely to exceed the individual costs of migration. Therefore, the propensity to migrate is likely to increase when individuals become more pessimistic about employment chances in the East, holding individual characteristics and labor market history constant. We will further explore this in section 8.

6.2 Returns by Prior Employment Status

Since unemployment plays a central role for the pre-migration developments and the size of returns to migration, we will provide further, more disaggregated results based on the employment status before migration. The theoretical considerations in Section 3 presume that average earnings returns to migration are higher for those unemployed before migration than for those employed. We now investigate the validity of this by re-estimating the earnings returns to migration by employment status in the month before treatment. Recall that among migrants and job changers about 50% are unemployed

in the month before treatment, while unemployment among stayers amounts to about 20% (Figure 3).

We divide each of our three treatment groups (migrants, job changers and stayers) into two subgroups based on their employment status in month -1. For stayers, we have to address the difficulty that they do not experience a treatment event in a given year. Similar to the estimation of the ATT above, we replicate each stayer 12 times in a given year and assign each replication a different calendar month as treatment month. These 12 replicated stayers are then assigned to the "employed" or "unemployed" group based on the employment status in the month before the assigned treatment month.

Now, we re-estimate the earnings profiles separately for the subgroups defined by the employment status using IPW after temporal alignment. The results are displayed in Figure 6, to the left for the unemployed in -1 and to the right for the employed in -1. The estimated profiles differ strongly for the two subgroups. For unemployed migrants/job changers/stayers, earnings show qualitatively very similar profiles compared to the results in Figure 4 for the entire sample, with a steeper decline before treatment and a larger jump for migrants and job changers upon migrating/job changing. In contrast, the profiles for the employed sample are very stable over time.

The initial ATT's compared to job changers are comparable irrespective of the employment status before treatment, with ATT^{JC} equal to 11 Euros in the "unemployed" sample and ATT^{JC} equal to 11.5 Euros in the "employed" sample. However, some discrepancy arises over time, with the ATT^{JC} after 24 months being equal to 9 Euros in the unemployed and 7.5 Euros in the employed sample. This difference is due to the fact that the earnings of job changers who were employed before job change are more stable than the earnings of job changers who find a job after a spell of unemployment, whereas the pre-migration employment status matters for the earnings level of migrants, but not much for the development of earnings after migration.

The results are very different when comparing migrants and stayers. Migrants from unemployment can realize an initial gain (ATT^{Stay}) of 50 Euros compared to stayers who are unemployed. In contrast, the ATT^{Stay} is only 14 Euros compared to employed

stayers. The large difference arises through the higher employment rate (after migration) of migrants from unemployment compared to unemployed stayers. Migrants who are employed before migration don't gain that much compared to employed stayers. The difference in migration returns shrinks over time (the ATT^{Stay} in month 24 is 19 Euros when unemployed and 8 Euros when employed before migration). This is due to the increasing employment among formerly unemployed stayers which over time reduces the employment advantage of migrants. Altogether, the results show that there are sizeable migration returns irrespective of the employment status before migration, that there is not much difference in the developments for the different control groups when only workers who are employed in month -1 are considered, and that the large aggregate migration returns compared to stayers are driven by those migrants and stayers who are unemployed before treatment.

[Figure 6 about here.]

6.3 Additional Heterogeneity in Returns

So far, we have discussed the returns to migration aggregated across all migrants or by employment status. Now, we further investigate the heterogeneity of returns with regard to other important characteristics. This can provide some evidence for group-specific variations in returns to migration, which should be connected to the migration propensity if they are informative about variations in returns to migration for non-migrants as well. For this purpose, we follow Fitzenberger et al. (2013) and estimate weighted outcome regressions

$$Y_{ia} = \alpha + x_i\beta + \gamma_a T_i + T_i(x_i - \bar{x})\delta_a + u_{ia} \,, \tag{1}$$

for period $a = -24, ..., 24$ relative to migration, where Y_{ia} are earnings, T_i the treatment (migrant) dummy, x_i are control variables and $\bar{x}$ is the sample average among the treated. The regressions are estimated based on migrants and non-migrants aligned in time. Migrants carry a weight of one and the non-migrants are re-weighted accord-

ing to the IPW (for further details see Fitzenberger et al. (2013)). δ_a measures the heterogeneity in treatment effects for different values of the control variables. The ex post outcome regression in equation (1) also accounts for differences in control variables between treated and non-treated remaining after IPW. The regressions show two important control variables that cause heterogeneity in returns to migration, namely gender and earnings before migration.[19] We now discuss graphical evidence on the differences in treatment effects when grouping the data by these control variables, analogous to the approach in section 6.2.

Figure 7 shows the ATTs by gender - and for comparison for the entire sample. The returns to migration, both versus staying and versus job change, prove to be higher for males than for females, reflecting the fact that the gender pay gap is higher in the West than in the East (this is confirmed by running separate earnings regressions with a gender dummy for the West sample and the East sample). The absolute and relative gender gap in returns is higher for ATT^{JC} than for ATT^{Stay}. Still, the returns to migration are significantly positive for both genders, and female migrants realize substantial earnings gains relative to stayers.

[Figure 7 about here.]

We now turn to the ATTs by earnings before migration (in month -1) displayed in Figure 8. To account for unemployment (zero earnings), we consider three groups, namely *no earnings* (unemployed in month -1), *positive earnings below/at the median* in -1, and *positive earnings above the median in* -1, where the median is based on the sample with positive earnings. There is substantial heterogeneity, especially for ATT^{Stay}. For ATT^{JC}, the differences are mostly not statistically significant (the figure to the left omits the large confidence intervals to avoid confusion of the lines). The returns to migration are similar for those with no earnings or low earnings in -1, and they are higher in both cases than for those with high earnings in -1. Turning to ATT^{Stay}, the differences are larger and mostly significant. The returns to migration

[19] Regression results are not reported here, but available upon request

are highest for those with no earnings in -1 and lowest for those with high earnings in -1. Because earnings are measured in Euros, the differences in relative returns among those with positive earnings are even more striking. This evidence is consistent with a limited transferability of human capital from the East to the West for high-earners, discrimination towards East German migrants with respect to access to high-paying jobs in the West or with different East-German skill-groups migrating into different segments of the West German labor market where different returns to migration could be realized.[20] Sorting out these different explanations is beyond the scope of this paper.

[Figure 8 about here.]

In sum, the last two sections find strong evidence that the returns to migration are higher for individuals with lower earnings potential in the East and that returns for men are larger than for women. This is in line with lower migration rates for women (even though there are probably also other important factors at play) and individuals with a high earnings potential in East Germany.

7 Robustness Checks

7.1 Regional Price Differences

There are persistent regional differences in the cost of living in Germany. Prices are lower in the East than the West and in rural areas compared to urban areas. As a robustness check, we investigate whether returns to migration are still positive after accounting for regional price differences. While migrants on average take up a job in more expensive regions (urban districts in the West), we do not expect sizeable changes in the cost of living for stayers and job changers. We expect the estimates accounting for regional price differences to provide lower bounds of the returns to migration because

[20] Prantl and Spitz-Oener (2019) show that the effects of East-to-West migration on native wages as well as the wage gap between East German migrants and West German incumbent workers depended on the degree of product and labor market regulations in different segments of the West German labor market. Returns to migration might thus also have varied across these different segments.

migrants (especially commuters) are likely to spend a sizeable share of their income in the less expensive source region.

We have to address the problem that there are no consistent time series of regional price indices at the district level, the finest regional unit in our data. 2009 is the first year for which relative price differences across districts are provided by the Bundesinstitut für Bau-, Stadt- und Raumforschung (BBSR). We extrapolate the 2009 regional price index (RPI) at the district level back to earlier years using price indices supplied by the Federal Statistical Office for the German states (Länder) from the year 1995 onward as well as the differential price indices in East and West Germany for the years 1992 to 1995 (Vortmann et al., 2013).[21] Due to potential limitations of our regional price index and the uncertainty about how much migrants spent in the East and the West, we refrain from using the RPI in our main results.

Figure 9 contrasts the effect of migration on real earnings after IPW based on the aggregate CPI as above ('Original' in graph) and based on the regional price index (RPI).[22] After accounting for the RPI, the estimated effects of migration on earnings are reduced, as expected, because of the lower cost of living in the East. However, the effects of migration on real earnings remain strongly positive and show the same time profile as for the estimates based on the aggregate CPI. For instance, after accounting for the RPI, the ATT^{JC} becomes 6 Euros (11%) and the ATT^{Stay} 28 Euros (90%) in month 0. Thus, our main findings are robust when accounting for regional price differences.

[Figure 9 about here.]

[21] There are no price indices for the states Bremen, Hamburg, and Schleswig-Holstein, for which we use the price index for Lower Saxony (the closest large neighboring state).

[22] The city of Bonn is the reference for the RPI in 2009 (RPI=100 for Bonn). To ensure comparability with and without RPI, we take stayers (the largest group) as our reference group and compute the ratio between the real earnings with and without accounting for RPI at month -1. Then earnings after deflation by RPI are divided by this ratio, thus using the stayer average in East Germany as new reference level.

7.2 Comparison to Standard Estimators

Our dynamic treatment approach stresses the importance of aligning detailed labor market histories before migration in the presence of a pre-migration dip. Such a pattern invalidates standard difference-in-differences (DiD) approaches and requires data at a monthly frequency. Next, we investigate whether our methodological considerations change the earnings effects of migration in comparison to standard estimators used in the literature. First, we implement standard DiD estimators of the effect of migration. Second, we redo our analysis based on data at the annual frequency. Figure 10 shows the results of both exercises.

To implement the DiD approach based on monthly data, we run panel OLS regressions with individual fixed effects α_i and year fixed effects $year_{y(j)}$ for individual i and time period j. We also add calendar month fixed effects $month_{m(j)}$ ($m \equiv$Jan, Feb etc.) to account for seasonality. Specifically, we estimate the following two regressions where the first estimates the ATT^{Stay} based on the migrant-stayer sample and the second ATT^{JC} based on the migrant-job-changer sample:

$$(2) \quad Y_{ij} = \alpha_i + year_{y(j)} + month_{m(j)} + T_{ij} \sum_{a=0}^{24} \beta_a I[a(i,j) = a] + \epsilon_{ij} \qquad (Stay)$$

$$(3) \quad Y_{ij} = \alpha_i + year_{y(j)} + month_{m(j)} + \sum_{a=0}^{24} (T_{ij}\beta_a + \gamma_a) I[a(i,j) = a] + \epsilon_{ij} \qquad (JC)$$

Y_{ij} are earnings, T_{ij} is the migration dummy (=1 after migration), $a(i,j)$ is the number of month since migration (job change), and $I[.]$ is the indicator function. The specification (JC) allows for a differential effect of time since job change in the control group of job changers. Note that the individual fixed effects capture the pre-migration differences between migrants and the comparison group. Thus, β_a are the DiD estimates of the earnings effect of migration by month a since migration.

The DiD estimates for migration-vs-job-change displayed in Figure 10 (graph to the left) are quite similar to the IPW results in Figure 5. This is because job changers and migrants have a similar pre-treatment history, which is consistent with the common

trends assumption needed for DiD. However, for stayers, the DiD estimates in Figure 10 (graph to the left) differ in a substantial way from to the IPW results in Figure 5. The DiD estimates are downward biased, especially during the first year after migration. Here, the common trends assumption is not fulfilled because of the pre-migration dip in earnings. Since DiD averages the pre-treatment outcomes before migration, the method does not account for the strong pre-migration dip in earnings.

[Figure 10 about here.]

As the second comparison, the graph on the right in Figure 10 provides IPW estimates based on annual data. Here, we only use the December information, thus discarding the data from January to November of the same calendar year. We still use those control variables which are based on monthly information (e.g. duration of unemployment) because such variables may be available based on retrospective information in data sets with annual data. The treatments migration and job change are now defined based on the event taking place at some point in time within a calendar year. We now align individuals in time based on the yearly information (e.g. year=-1 denotes 1 - 12 months before migration, year=0 0 - 11 months since migration) and we use IPW to account for differences in other characteristics. Our findings for year 0 imply an ATT^{JC} of 8 Euros (16%) and an ATT^{Stay} of 18 Euros (46%). Simply averaging over the first 12 months after migration of our IPW estimates using monthly data yields returns of 10 Euros versus job change and 26 Euros versus staying.[23] Thus, the analysis based on annual data severely underestimates the returns to migration, especially in comparison to stayers. Again, this is because using data at the annual frequency does not account for the pre-migration dip in earnings.

[23] These are even lower bounds because returns to migration decline over time, and migrants in year 0 have migrated between 0 and 11 months before.

8 Migration Barriers and Expectations

In light of the strong positive returns to migration, especially among individuals with low earnings potential in the East, the question arises why migration is not higher in the absence of legal restrictions or language/cultural differences. Thus, it is of interest to explore possible barriers to migration. In addition, our analysis points to the importance of expectations about future labor market opportunities in the East.

The literature discusses different factors which may prove to be barriers to migration. Rosen (1972) and Roback (1982) analyze the role of amenity differences. Bound and Holzer (2000), Chiquiar and Hanson (2005), and Wozniak (2010) point to differences in financial and psychological costs as determinants of migration. Heise and Porzio (2018) document by revealed preferences that East Germans are willing to incur large wage penalties for staying in the East compared to working in the West because of locational preferences ("home-bias"). Behavioral economics emphasizes the role of personality traits and attitudes for economic decision making. Jaeger et al. (2010) find that migrants are on average less risk-averse than non-migrants and Canache et al. (2013) show the impact of personality traits on the emigration decision.

Since the BASiD lacks information to further investigate these channels, we turn to survey evidence from the German Socio-economic Panel (GSOEP). The big shortcoming of the data set is its small size: Among the 4200 adults in East Germany in 1990, there are only 97 migrants between 1994 and 2004 who fit our treatment definition. However, the GSOEP contains information on various factors not available in BASiD. To ensure comparability with our analysis of returns, we use similar definitions of migrants, job changers, and stayers, the same sample years, the same control variables (as far as they are available), and IPW to account for differences in observables. The main differences are: (i) with yearly data no temporal alignment at the monthly frequency is possible, (ii) less information on district and firm, (iii) a logit model pooled over all years is estimated because of the low number of migrants (including dummies for year and month of interview), and (iv) migrants from East to West Berlin are included.

Figure 11 shows the evolution of earnings before and after migration (earnings are earnings in the month before the interview and time is measured in years before/after migration). The GSOEP findings are qualitatively similar to the findings based on BASiD, subject to the fact that the GSOEP does not provide monthly data. Before treatment, migrants and job changers are negatively selected in earnings compared to stayers.[24] Earnings of both job changers and migrants show an initial upward jump after job change/migration and a decline afterwards.

[Figure 11 about here.]

8.1 Financial and Psychological Costs

First, we consider four proxies for psychological or financial costs of migration, which are often used in the literature: Marital status and number of children, owning a house in the East[25], and knowing someone who moved to the West (family, friend, colleague). Table 2 provides means of the four proxies after IPW reweighting in the year before migration. Migrants are less often married, have less children, and less often own a house, indicating lower cost of migration. However, migrants less often know a person who moved to the West. The latter finding is unexpected, but it may be explained by the fact that this question was asked only in 1991 and thus had to be extrapolated forward. In sum, the evidence on the first measures suggest lower migration costs among migrants.

[Table 2 about here.]

[24] Other studies (e.g. Hunt (2006) or Fuchs-Schündeln and Schündeln (2009)) find a positive selection of East-to-West migrants using the GSOEP, which is likely to be caused by the different definition of the migrant group. Recall, that we only consider migrants with work experience during GDR times who have lived in the East until migration. Additionally we only consider migrants who report a change of jobs since the last interview to avoid misclassification. Without the last restriction, migrants are only slightly negatively selected.

[25] Zaiceva (2006) uses this variable as an instrument for migration to the West.

8.2 Risk Aversion and Attitudes towards Migration

The GSOEP elicits risk aversion in 2004 for the first time. Assuming stability over time, we extrapolate risk aversion back to the time of migration (1994 to 2004). Further, we consider the attitude to regional mobility and the attachment to the place of living, which are elicited in the GSOEP for the years 1991 to 1999. Table 3 provides evidence on these factors in the year before migration after IPW. In accordance with findings in the literature, migrants show lower risk aversion (the higher the number the less risk averse the individual), lower attachment to the place of living, and a higher willingness to move than stayers, with the attitudinal differences being quite substantial (lower locational attachment is also found by to Fuchs-Schündeln and Schündeln (2009)). Job changers are similar to stayers with regard to the willingness to move and lie between the two groups with regard to risk aversion. However, they show an even lower attachment to the place of living than migrants. This changes when migrants within Berlin are excluded (as for the analysis based on BASiD). Then, migrants show the lowest attachment. It is conceivable that shocks before migration influence the migration decision as well as the willingness to move. In the years -4 to -2, the willingness to move for migrants is indeed closer to non-migrants, but migrants still show higher willingness to move (see Table 10 in the Appendix).

[Table 3 about here.]

8.3 Expectations and Worries

The GSOEP includes a number of variables on expectations and worries about the individual's economic situation in the East. First, East Germans were asked as to how much they worry about their economic future. Second, all employed East Germans were asked if they worry about losing their job, if they expect to be unemployed in the next two years, and if they expect to voluntarily search for a new position in the next two years. The worries were elicited every year between 1990 and 2015, whereas

expectations at least every second year.[26]

Table 4 provides the evidence. Migrants are more worried about their economic situation than stayers, with 34% being very worried (10% no worries), and job changers are even more worried than migrants and stayers. At the same time, migrants are actually similar to stayers in their optimism about the future, whereas job changers are much more pessimistic. Thus, migrants worry about their economic situation in the East but they are more optimistic in general terms and might expect for example more success from migration compared to job changers (see also Fuchs-Schündeln and Schündeln (2009) who finds migrants to even be more optimistic than stayers and argues that it is rather a measure for general outlook on life than a measure for the expectations for the coming years). When also accounting by IPW for the greater worries among migrants in -1 (results are available upon request), future earnings of non-migrants only change marginally. Thus, worries do not predict future outcomes in the East but they appear to be a driver of migration.

[Table 4 about here.]

Migrants and job changers are also more worried about job safety than stayers and expect more often to search for a new job, while the evidence on job loss expectations is less clear-cut (the share of "likely" or "surely" is considerably higher among migrants and job changers, however, the share of those who state "surely not" is also higher). Note that for the expectation variables the number of migrant observations is much smaller. In sum, the evidence points towards the conclusion that worries about one's own economic situation in the East and the perceived need to find a new job are important drivers of migration. Recall that we use IPW to account for difference in observables including past labor market outcomes in the East.

[26] After 1998, answers to the expectation questions were not elicited in four categories, but rather as a (percentage) probability. To maintain the categorical structure and make it more comparable to the worries questions, probabilities were grouped into four categories with 0-20% corresponding to "Surely not", 30 - 50% to "Rather unlikely", 60-80% to "Likely" and 90 - 100% to "Surely".

9 Conclusions

This paper estimates the labor market returns of migration from East to West Germany in the aftermath of German reunification based on rich administrative panel data (BASiD). We focus on East Germans who already worked before reunification and who stayed in the East for some time after reunification. To estimate the average treatment effect on the treated of migration-versus-staying and migration-versus-job-change, we use a dynamic treatment approach conditioning on a rich set of observable covariates including lagged labor market outcomes. Contrasting migrants against individuals who have not migrated yields the returns to migration at a certain point of time and entails the possibility that non-migrants migrate later.

As our key finding, migration causes sizeable positive returns with respect to earnings and employment, both against staying and against job change in the East. Migrants are negatively selected with regard to previous earnings and employment in the East, experiencing a distinct pre-migration dip in outcomes. The returns to migration are the higher the worse earnings and employment in the East before migration. Our subsequent analysis shows that some of our findings differ from standard difference-in-differences estimates and that it is important to use data at a monthly frequency to account for the pre-migration dip in outcomes.

In light of the high returns to migration, it remains a puzzle as to why migration from East to West Germany in the 1990s was not even higher in the absence of common barriers to migration (legal restrictions, language/cultural differences). Our analysis points to the role of migration costs and expectations about future labor market prospects in the East. Because BASiD lacks information on these issues, we resort to evidence based on the GSOEP, with the caveat in mind that the number of migrants recorded in the GSOEP is much smaller than in BASiD. We find that future migrants have worse expectations, worry more about their current economic situation, and show lower behavioral barriers to mobility. We conclude that the second wave of migrants from East to West Germany in the aftermath of reunification migrates in response to

negative labor market prospects in East Germany. In turn, being employed in a stable job in East Germany strongly reduces the willingness to migrate, also because returns to migration are much lower for such workers. Still, a large number of East Germany with similarly bad labor market prospects as the migrants choose not to migrate because of monetary and behavioral barriers to migration.

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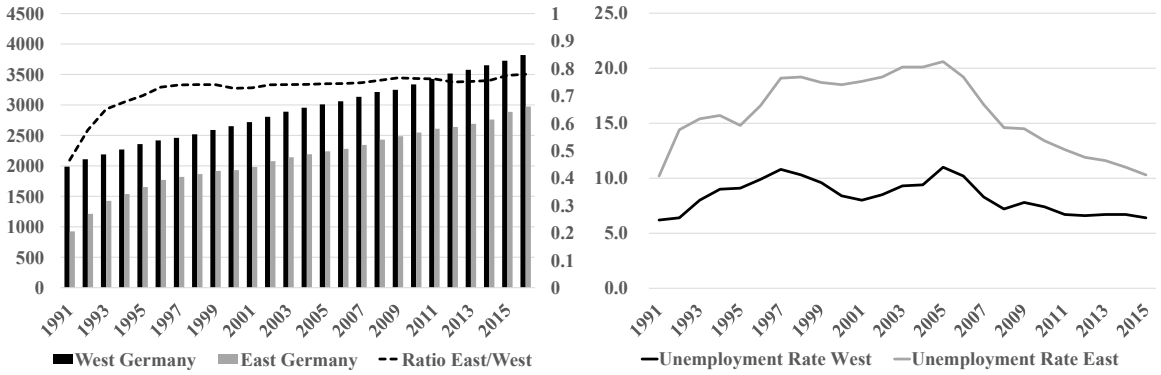
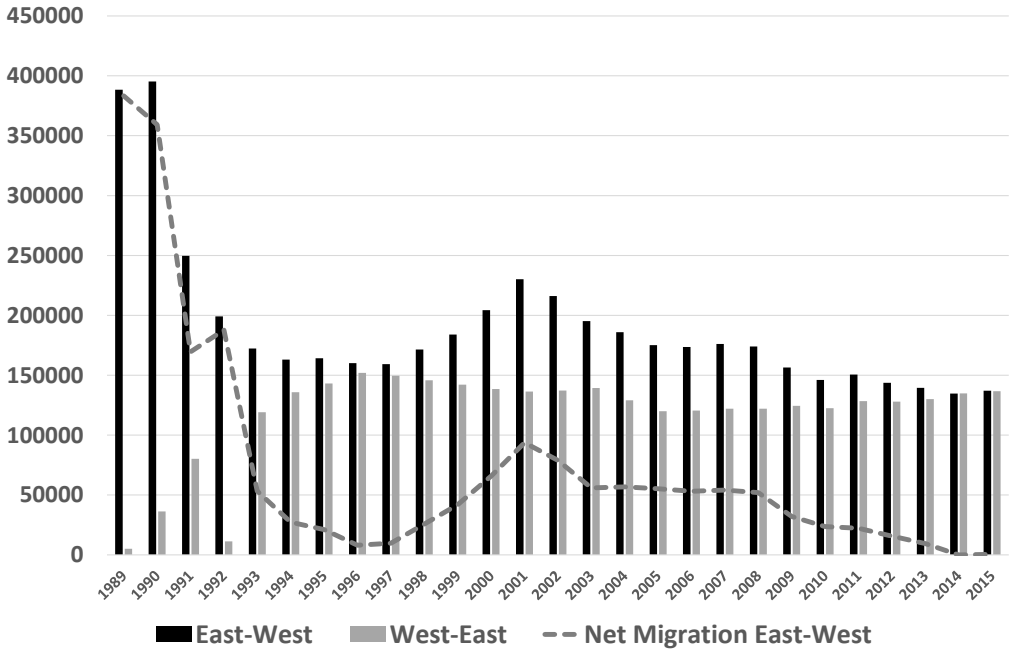
List of Figures

Figure 1: Aggregate norminal Earnings and Unemployment in East Germany



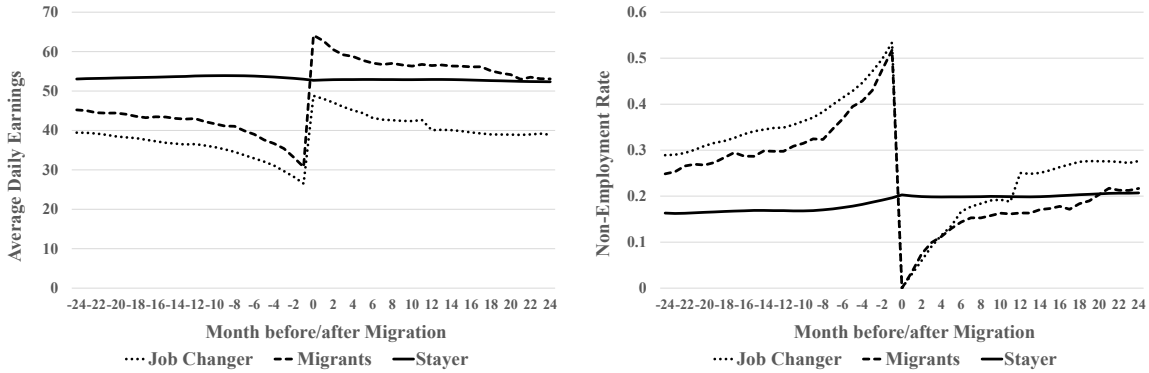
Notes: Data on earnings are taken from the German Statistical Office. Earnings are nominal average monthly pre-tax earnings from Work in East and West Germany. Unemployment rates are taken from the "Bundesagentur für Arbeit" and are based on all registered unemployed and all workers who are not self-employed or employed by the military.

Figure 2: Migration between East and West Germany



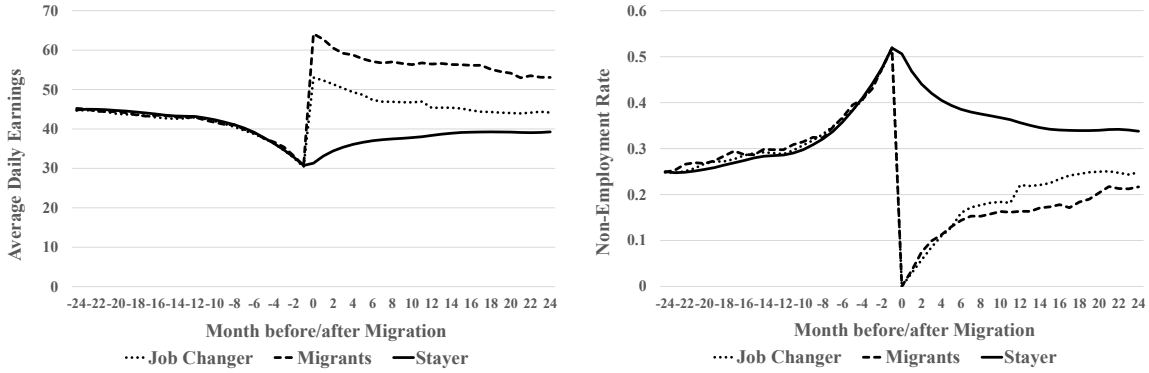
Notes: Migration numbers are taken from the German Statistical Office. Migrants are individuals who changed their registered place of living from East to West Germany or vice versa (thus no commuters or individuals who register a secondary residence are included). Berlin is divided between East and West.

Figure 3: Earnings and Unemployment without IPW



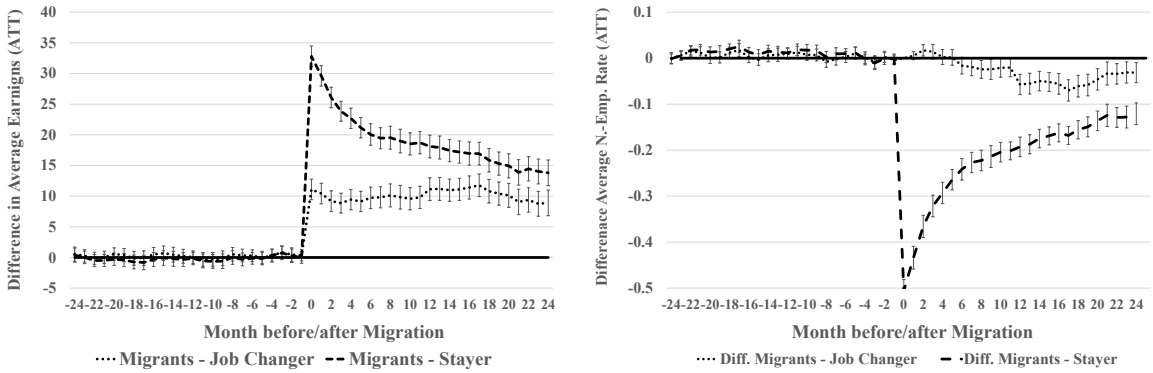
Notes: Earnings (left) are real average daily earnings in Euro and unemployment (right) is the share of individuals among all individuals in the sample who do not work. Both measures are computed based on temporal alignment for the three groups for the months -24 to 24 before/after the treatment month. Population weights are used for all groups. Observations are only excluded from the data if the individual enters retirement. Missing employment information are treated as unemployment.

Figure 4: Earnings and Unemployment after IPW



Notes: Earnings (left) are real average daily earnings in Euro and unemployment (right) is the share of individuals among all individuals in the sample who do not work. Both measures are computed based on temporal alignment for the three groups for the months -24 to 24 before/after the treatment month. Population weights are used for all groups. Additionally IPW are used for job changers and stayers to reweight the within group distribution of observable characteristics towards that of migrants. Observations are only excluded from the data if the individual enters retirement. Missing employment information are treated as unemployment.

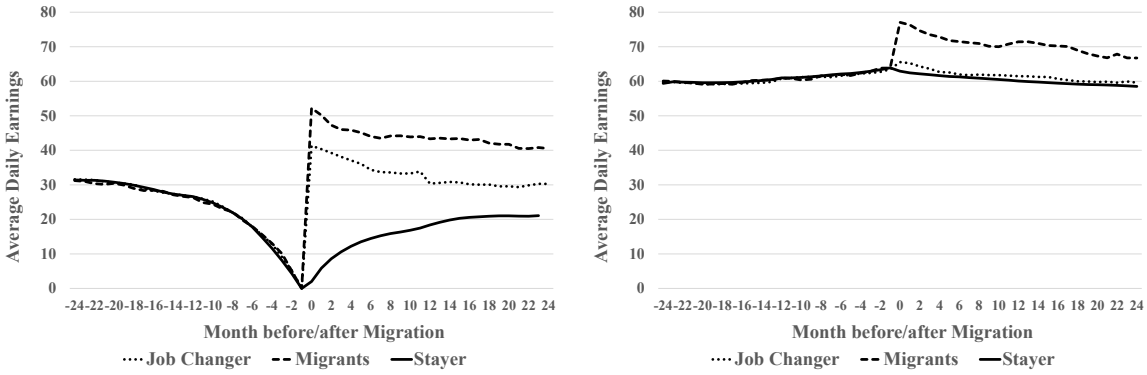
Figure 5: Difference in Earnings and Unemployment after IPW



Notes: Graphs show the ATTs for earnings (left) and unemployment(right) based on the difference in aggregate outcomes displayed in Figure 4 after IPW has been applied. Confidence bands are calculated using bootstrapped standard errors clustered at the individual level.

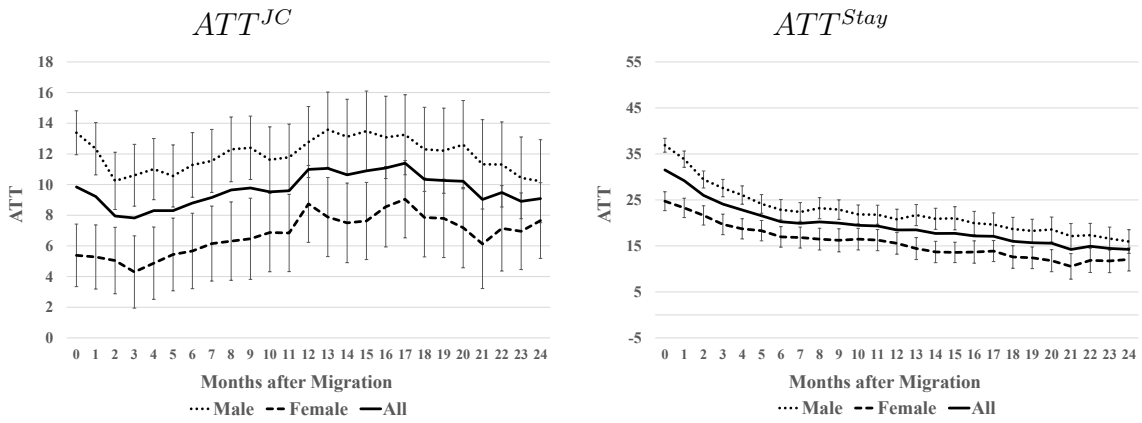
Figure 6: Results by Employment Status

(a) Unemployed before Migration (IPW) *(b) Employed before Migration (IPW)*



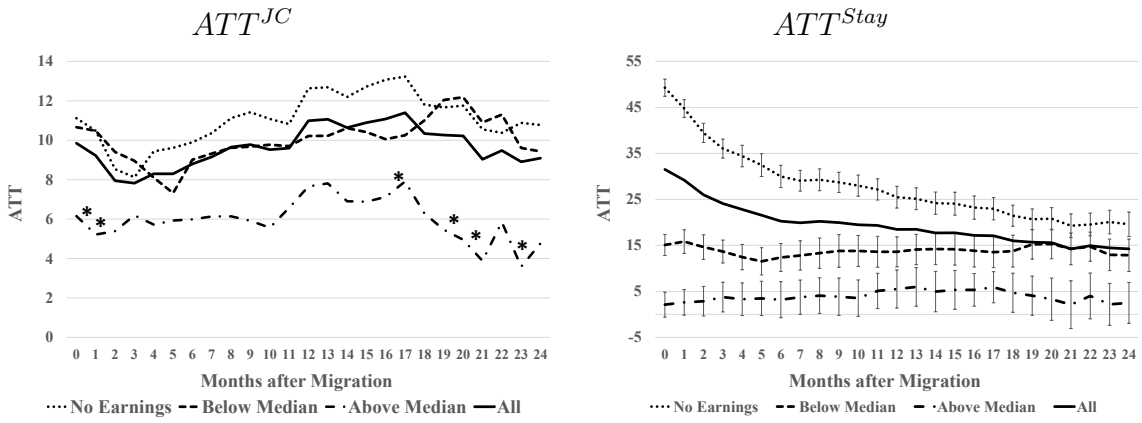
Notes: Displayed are average daily earnings after population weights and IPW have been applied. The results for the three treatment groups are presented for two subpopulations, those who were unemployed in the year before the treatment month (conceptually stayers are replicated 12 times and assigned different treatment months and those who are unemployed in the month before the hypothetical treatment month are assigned to the group of the unemployed) are displayed on the left and those who are employed in the month before the treatment month are displayed on the right. Average earnings and IPW are estimated separately for the two subpopulations.

Figure 7: Heterogeneity in ATT based on Gender



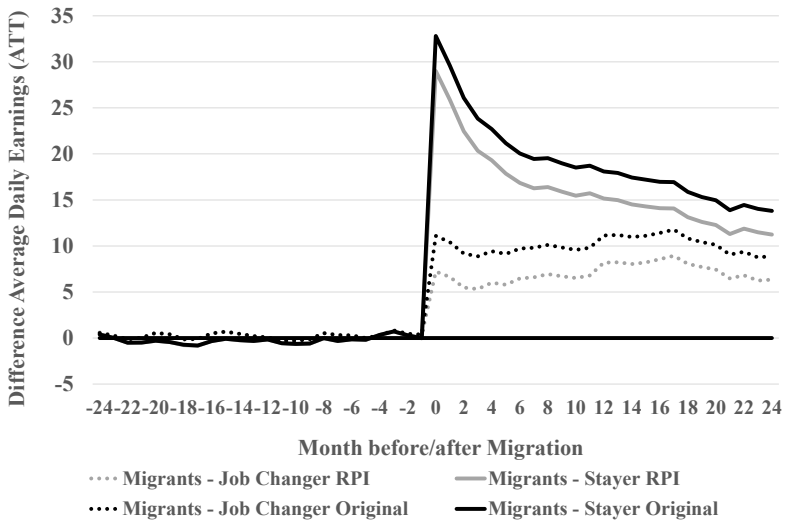
Notes: Results display heterogeneity in ATTs for average daily earnings depending on gender compared to job changers (left) and stayers (right) based on outcome regressions as introduced in the text. ATT aggregated over the two genders are presented as "All". Aggregated ATT might differ slightly from the ATT presented above, due to the additional equalization of control variables after month -1 through outcome regressions and due to less strict temporal alignment (instead of computing monthly ATTs and then aggregating over months and years, month and year dummies are used in the outcome regressions). Confidence bands are based on bootstrapped standard errors, clustered on the individual level. No confidence bands for the aggregated ATTs are shown to increased readability and since significance of group differences is of primary interest.

Figure 8: Heterogeneity in ATT based on Earnings in East Germany



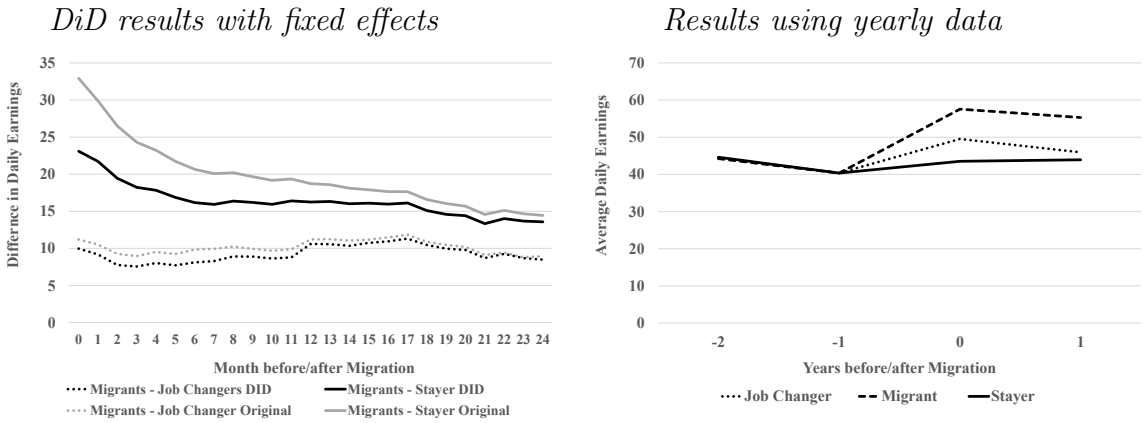
*Notes: Results display heterogeneity in ATTs for average daily earnings compared to job changers (left) and stayers (right) based on outcome regressions as introduced in the text. Heterogeneity here is based on earnings in East Germany in the month before the treatment month. Individuals which are unemployed one month before treatment are assigned to the "No earnings" group. The median of all positive earnings one month before migration is calculated and Individuals with positive but below median/median earnings are assigned to the "Below Median" group and individuals with above median earnings are assigned to the "Above Median" group. ATT aggregated over the different income groups are presented as "All". Aggregated ATT might differ slightly from the ATT presented above, due to the additional equalization of control variables after month -1 through outcome regressions and due to less strict temporal alignment (instead of computing monthly ATTs and then aggregating over months and years, month and year dummies are used in the outcome regressions). Confidence bands are based on bootstrapped standard errors, clustered on the individual level. No confidence bands for the aggregated ATTs are shown to increased readability and since significance of group differences is of primary interest. Since group ATTs are only statistically significantly different in five months (Month 0,1,19,20 and 21 for Above Median Earnings) when migrants are compared to job changers, and confidence bands are too wide to allow readability, the confidence bands have been suppressed in the graph on the left and months with significant differences are marked with a *.*

Figure 9: Differences in earnings with and without RPI



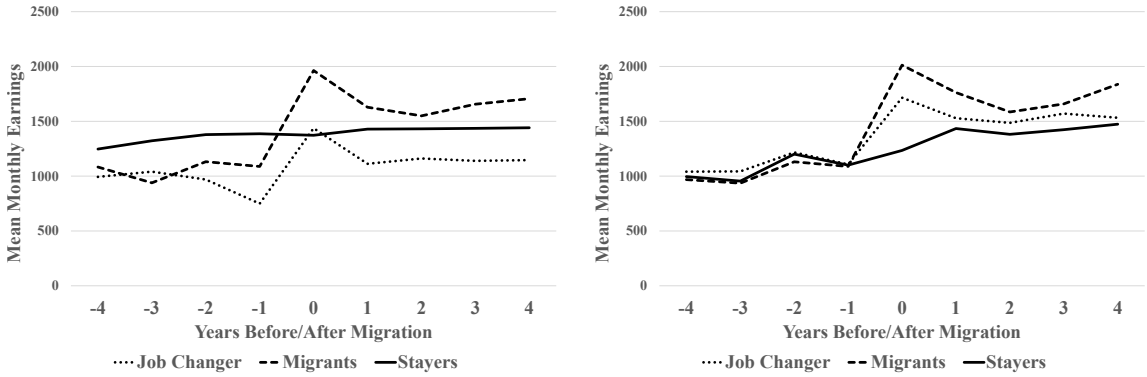
Notes: Displayed are differences in average daily earnings after population weights and IPW have been applied. Results without RPI are reestimated, since the sample slightly changed, due to (very few) observations not having information on the district of work. Results with RPI are computed by first multiplying stayer earnings with the RPI and then estimating average monthly earnings of stayers after population weights and IPW have been applied. These results are then divided by the average earnings of stayers after population weights and IPW but without RPI. Earnings are then divided by these monthly ratios, yielding earnings after application of the RPI. The displayed results are the differences between earnings of migrants and job changers and stayers respectively.

Figure 10: Results using Difference-in-Difference or Yearly Data



Notes: DiD results for earnings (left) are based on the Fixed-effect Difference-in-Difference method introduced in the text and compared to ATT measures obtained through IPW as in Figure 5. Earnings based on yearly data (right) use the same IPW method as before but now only use information from December instead of information from the whole year. Migrants are defined as individuals who change the location of their work between December of a specific year and December the year before. In parallel, job changers are individuals who work for a different employer compared to one year before. Stayers or those who remained in their work or remained unemployed compared to the previous December. Thus migrants who migrated after the previous December but returned before the current December are not counted as well as job changers who lost their new job already before the current December or stayers who were unemployed in the previous December, found a job but then lost it again before the current year.

Figure 11: Monthly Earnings in the GSOEP without (left) and with (right) IPW



Notes: Both graphs show results for average monthly earnings in the month before the survey interview. Earnings are based on yearly data, where the interview can be conducted in different month but mostly in spring/summer. Migrants are defined as individuals whose stated place of work in the last interview was East Germany and is West Germany in the subsequent interview. In parallel, job changers are individuals who work for a different employer compared to one year before. Stayers or those who remained in their work or remained unemployed compared to the previous interview. Thus migrants who migrated after the previous interview date but returned before the subsequent interview are not counted as well as job changers who lost their new job already before the subsequent interview or stayers who were unemployed at the time of the previous interview, found a job but then lost it again before the subsequent interview. The graph on the left shows the results for the three groups with population weights but without IPW. The graph on the right shows results after IPW has been applied. The time unit is years before/after the treatment period (years can last slightly shorter/longer than 12 months since subsequent interviews are not always conducted in the same month).

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Table 1: Descriptive Statistics

	Groups		
Variable	**Migrants**	**Stayer**	**Job Changer**
Female	35%	55%	50%
Age	39.34	42.15	40.83
Education			
High-School Degree	3%	4%	4%
Vocational Training	85%	82%	85%
University Degree	12%	15%	12%
Industry			
Agriculture, Energy and Mining	4%	4%	5%
Manufacturing	15%	16%	13%
Construction	22%	12%	17%
Trade, Transport and Communication	13%	12%	12%
Services	30%	34%	32%
Banking and Insurance	10%	7%	10%
Non-commercial Enterprises, Civil Servants	6%	14%	12%
Federal State of Employment (last job)			
Berlin	3%	6%	7%
Brandenburg	18%	15%	15%
Mecklenburg-Vorpommern	13%	12%	12%
Saxony	28%	34%	32%
Saxony-Anhalt	21%	19%	20%
Thuringia	17%	14%	14%
Share Unemployed	52%	20%	46%
Number of Months in Unemployment last 12 Months	4.33	2.11	4.27
Number of Job Changes since 1992	2.36	1.59	2.19
Share of months in unemployment since reunification	21%	14%	21%
Tenure in firm since 1992 in Months	39.84	50.55	36.16
Median Earnings in Firm	55.15	60.22	54.65
Observations	2519	3385419	50817

Notes: Data for Migrants and Job Changers are from 1 month before migration/job change, for stayers, observations for all time periods are used. Observations are weighted by population weights. Civil servants only encompass a subset of all civil servants, since many civil servants in Germany have a special status ("Beamte") exempting them from social security contributions. Thus, they are not included in our data.

Table 2: Moving Costs

	Groups		
	Migrants	**Stayer**	**Job Changer**
Married	42%	61%	60%
N	99	12281	1320
Number of Children	0.68	0.96	0.87
N	99	12299	1323
Own Property	22%	30%	35%
N	99	12297	1323
Know someone who moved to the West	30%	34%	32%
N	93	11844	1268

Notes: The displayed sample sizes refer to the number of individuals in the data that the values are based on. All results are weighted by population weights and the results for job changers and stayers are reweighted to reflect the distribution of control variables among migrants. Results refer to the the year before migration/job change for migrants and job changers. For stayers, each year between 1993 and 2003 is counted.

Table 3: Behavioural Variables

	Groups		
	Migrants	**Stayer**	**Job Changer**
Risk-aversion	5.09	4.79	4.92
N	80	10038	1029
Attachment to Place of Living			
Very Strong	24%	34%	23%
Strong	51%	42%	57%
Weak	22%	21%	18%
None	2%	3%	3%
N	66	6915	829
Conceivable to move away (job- or family-related)			
Yes	55%	22%	20%
Depends	30%	39%	45%
No	15%	39%	36%
N	78	8717	1030
Conceivable to move to the West			
Yes, gladly	15%	3%	5%
Under some circumstances	73%	56%	58%
Rather not	7%	32%	26%
Definitely not	4%	9%	11%
N	63	4091	540

Notes: The displayed sample sizes refer to the number of individuals in the data that the values are based on. All results are weighted by population weights and the results for job changers and stayers are reweighted to reflect the distribution of control variables among migrants. Results refer to the the year before migration/job change for migrants and job changers. For stayers, each year between 1993 and 2003 is counted.

Table 4: Expectations and Worries

	Groups		
	Migrants	**Stayer**	**Job Changer**
Optimism about the future			
Definitely	4%	6%	8%
Rather yes	35%	41%	45%
Rather no	56%	45%	36%
Definitely not	5%	8%	11%
N	47	4790	553
Worries own economic situation			
Great Worries	34%	28%	35%
Some Worries	56%	58%	58%
No Worries	10%	13%	7%
N	99	12274	1318
Worries own job safety			
Great Worries	32%	22%	40%
Some Worries	39%	49%	37%
No Worries	29%	29%	23%
N	64	9885	676
Expect voluntary job search in next 2 years			
Surely	29%	6%	25%
Likely	23%	12%	25%
Rather unlikely	18%	36%	17%
Surely not	30%	46%	32%
N	43	6302	428
Expect to lose job in next 2 years			
Surely	12%	9%	9%
Likely	20%	10%	12%
Rather unlikely	39%	60%	53%
Surely not	29%	20%	26%
N	43	6304	429

Notes: The displayed sample sizes refer to the number of individuals in the data that the values are based on. All results are weighted by population weights and the results for job changers and stayers are reweighted to reflect the distribution of control variables among migrants. Results refer to the the year before migration/job change for migrants and job changers. For stayers, each year between 1993 and 2003 is counted.

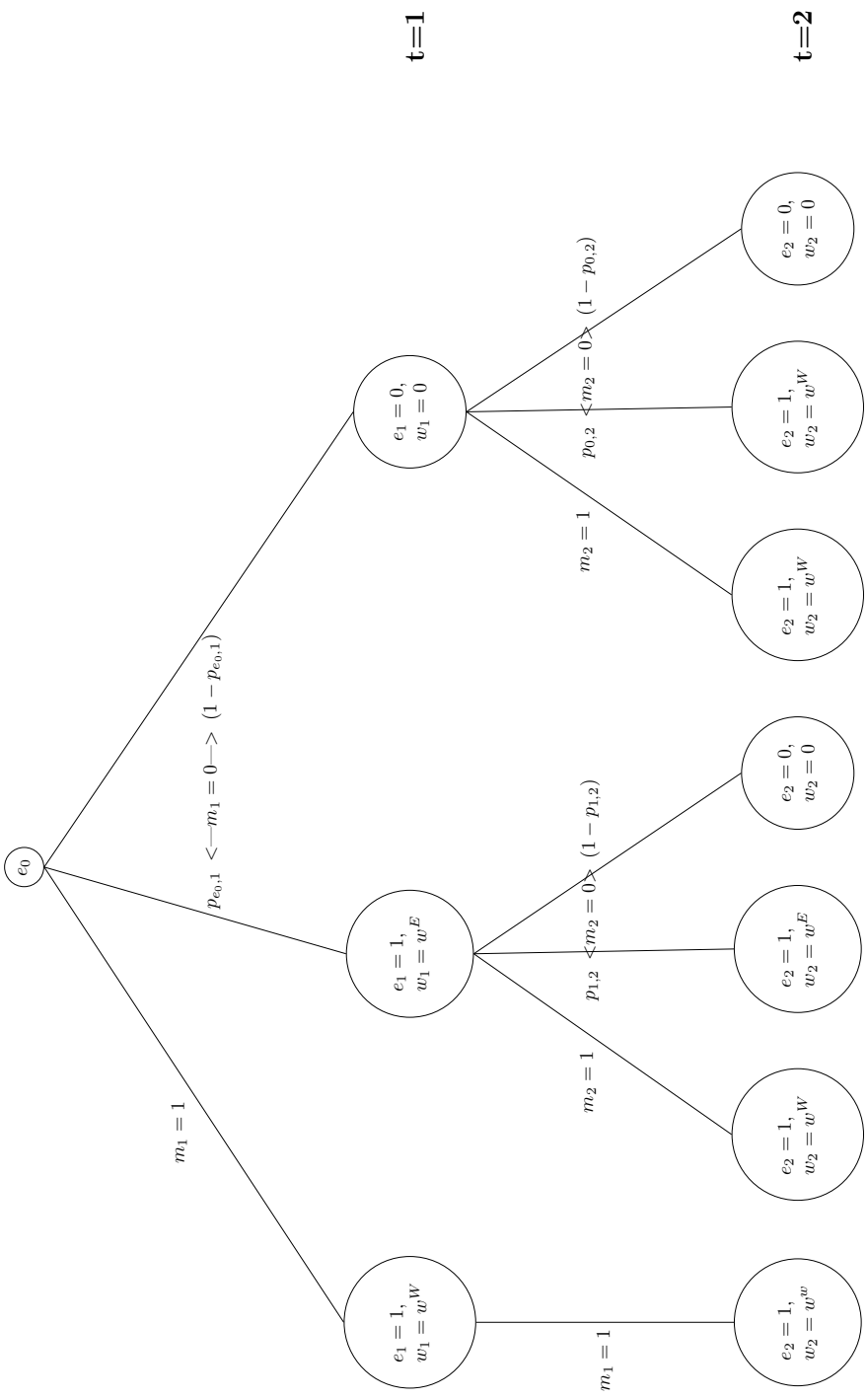
Appendix

A. Dynamic Model

We posit a three period model with periods $t=0,1,2$. The employment state in period t while remaining in the East is given by e_t, with $e_t=1$ employed or $e_t=0$ unemployed. We model East-to-West migration at the beginning of period $t=1$ ($m_1=1$) or period $t=2$ ($m_1=0$ and $m_2=1$). The model is dynamic such that not migrating in period 1 entails the possibility to migrate in period 2. No migration is the event $m_1=0$ and $m_2=0$. The changes in employment while remaining in the East are assumed to follow an exogenous Markov process. Moving to the West involves finding a job with a fixed wage. This means that the wage in the West (and also in the East, see below) is unaffected by individual employment shocks in the East, which is plausible since a negative labor demand shock for an individual in East Germany is unlikely to have a strong impact on labor market chances in West Germany. This assumption seems justified because the risk of job loss in East Germany is high due to the reunification-caused transition process, implying that a job loss in East Germany is not viewed as a negative signal by West German employers. Also note that this is not inconsistent with a positive cross-sectional correlation between outcomes in the East and in the West because our theoretical model holds conditional upon observables and unobservables which jointly affect employment and wages. Further, the qualitative results of the model still hold as long as labor market prospects in West Germany are less negatively affected by job loss than labor market prospects in West Germany.

The basic structure of the model is visualized in Figure 12. We consider an individual who lives in the East in period 0 with given employment state in period 0, e_0, forming the start point in Figure 12. Migration is an absorbing state involving moving to a job in the West with certain wage w^W. Having migrated in period 1 ($m_1=1$, branch to the left in Figure 12), the individual receives the same wage w^W until period 2 (no employment risk in the West). In contrast, there is a sizeable employment risk in the East. It is not certain that an unemployed (employed) worker finds a (keeps her) job in the East the next period (these are the branches in the middle and on the right of Figure 12 for $m_1=0$ and $m_2=0$). Conditional on being employed ($e_t=1$), the wage in the East in period t is w^E and income is zero when unemployed $e_t=0$, i.e. the wage is the additional income when employed.

Figure 12: Model Visualization



Define the Markov transition probability $p_{s,t}=P(e_t=1|e_{t-1}=s,m_t=0)$ as the prob-

ability to be employed in the East in period t=1,2, given that the individual has employment state s in the previous period $t-1$ and that the individual has not migrated up until period t (branches in Figure 12 for m_1=0 and m_2=0). For example, $p_{0,1}$ is the probability that an unemployed individual in period 0 is employed in period 1 in the East given that the individual has not migrated up until period 1. We assume state dependence in employment such that $p_{1,t}>p_{0,t}$, i.e. remaining employed is more likely than finding a job. Individuals form expectations in period $t-1$, given employment state s, about their employment probability in period t, $p^e_{s,t}$. As a behavioral bias, the subjective expectation $p^e_{s,t}$ may differ from the objective $p_{s,t}$.

Migration involves fixed individual costs C_t in the period of migration t=1,2. C_t is continuously distributed with positive expectation and full support over the real line. FC_t is its distribution function and f_t the density, conditional upon not having migrated by the end of period $t-1$. $C_2=C_1+\epsilon$, where C_1 and ϵ are independent random variables which are also independent of employment and wages, implying positively correlated costs [$Cov(C_1,C_2)>0$].

Total utility for the two time periods, t=1,2, is $V(e_0)=u_1(m_1,e_1)+u_2(m_2,e_2)$. u_t is the period specific utility being linear in income and depending upon migration and employment state. Specifically, $u_1(m_1,e_1)=m_1\cdot(w^W-C_1)+(1-m_1)\cdot e_1\cdot w^E$, and $u_2(m_1,m_2,e_2)=m_1w^W+(1-m_1)(m_2(w^W-C_2)+(1-m_2)\cdot e_2\cdot w^E)$. Individuals decide upon migration at the beginning of period t based on the information in period $t-1$ without knowing the period t employment state in the East. We solve the decision problem backwards. The migration decision in period 2, conditional on not having migrated in period 1, is based on maximizing

$$\max_{\{m_2\}} E(u_2(0,m_2,e_2)|e_1)=m_2\cdot(w^W-C_2)+(1-m_2)\cdot p^e_{e_1,2}\cdot w^E,$$

where expectations are taken with respect to the subjective probability $p^e_{e_1,2}$. Thus, the individual migrates, if $(w^W-C_2)>p^e_{e_1,2}\cdot w^E$, i.e. $m_2^*(e_1)=1$ if $C_2<w^W-p^e_{e_1,2}\cdot w^E$ and $m_2^*(e_1)=0$ if $C_2\geq w^W-p^e_{e_1,2}\cdot w^E$. The maximized expected utility for period 2 given e_1 and m_1=0 is

$$E(u_2(0,m_2^*(e_1),e_2)|e_1)=max(\underbrace{w^W-C_2}_{m_2=1|e_1},\underbrace{p^e_{e_1,2}\cdot w^E}_{m_2=1|e_1}).$$

The probability to migrate in period 2 given the information in period 1 is $\widetilde{FC}_2(e_1,C_1)\equiv FC_2(w^W-p^e_{e_1,2}\cdot w^E)$, where $\widetilde{FC}_2(e_1,C_1)$ is the conditional distribution function of migration costs C_2 given C_1 among those not having migrated by the end of period 1. This probability increases in w^W and falls both in w^E and in the probability to be employed in period 2 in the East. Unemployed individuals are more likely to migrate if employment expectations are lower for the unemployed than for the employed, i.e.

$p^e_{0,2} < p^e_{1,2}$. This is likely to be the case given that $p_{0,2} < p_{1,2}$.

The cost thresholds $C_{2,0} = w^W - p^e_{0,2} \cdot w^E$ when unemployed in t=1, and $C_{2,1} = w^W - p^e_{1,2} \cdot w^E$ when employed in t=1, are the critical values. With migration costs below (above) these thresholds, the individual migrates (does not migrate) in period 2. Because of lower employment chances in the East, it holds that $C_{2,1} < C_{2,0}$ for the unemployed, who are therefore more likely to migrate.

The migration decision in period 1 involves the decision about migrating now versus staying with the option to migrate in period 2. The individual maximizes

$$\begin{aligned}
&\max_{\{m_1\}} E\big[m_1 \cdot ((w^W - C_1) + w^W) + (1-m_1) \cdot (e_1 w^E + E(u_2(0, m_2^*(e_1), e_2) | e_1, m_1 = 0) | e_0)\big] \\
&= m_1 \cdot (2w^W - C_1) + (1-m_1) \cdot \big\{ p^e_{e_0,1} w^E \\
&+ (1 - p^e_{e_0,1})[(1 - \widetilde{FC}_2(0, C_1)) p^e_{0,2} w^E + \widetilde{FC}_2(0, C_1)(w^W - E(C_2 | C_2 < C_{2,0}))] \\
&+ p^e_{e_0,1}[(1 - \widetilde{FC}_2(1, C_1)) p^e_{1,2} w^E + \widetilde{FC}_2(1, C_1)(w^W - E(C_2 | C_2 < C_{2,1}))] \big\}.
\end{aligned}$$

The individual migrates in period 1, i.e. $m_1 = 1$ iff the utility difference between $2w^W - C_1$ (wage income in periods 1 and 2 in the West minus migration costs) and the expected utility when remaining in the East in period 1

$$\begin{aligned}
&\big\{ p^e_{e_0,1} w^E + (1 - p^e_{e_0,1})[(1 - \tilde{FC}_2(0, C_1)) p^e_{0,2} w^E + \tilde{FC}_2(0, C_1)(w^W - E(C_2 | C_2 > C_{2,0}))] \\
&+ p^e_{e_0,1}[(1 - \tilde{FC}_2(1, C_1)) p^e_{1,2} w^E + \tilde{FC}_2(1, C_1)(w^W - E(C_2 | C_2 > C_{2,1}))] \big\}
\end{aligned}$$

is positive. In the subsequent section, we show that the utility difference between migrating and not migrating in period 1 is a strictly negative function of C_1. For C_1 going to zero, the individual migrates and for C_1 going to infinity the individual does not migrate. Because the utility difference between migrating and not migrating falls in C_1, there will be a critical threshold C_{1,e_0} depending upon the employment state in period 0 with (no) migration in period 1 if $C_1 < (\geq) C_{1,e_0}$. The probability to migrate in period 1 is $FC_1(e_0) = P(C_1 < C_{1,e_0})$. Analogous to the migration decision in period 2, the threshold - and therefore the migration probability - is higher for non-employed than for employed, i.e. $C_{1,1} < C_{1,0}$ and $FC_1(1) < FC_1(0)$.

There are further important insights to be gained. Since expectations about future employment matter, the period-1-migration probability falls with better employment prospects in the East irrespective of the employment situation in period 1. Analogously, if individuals expect period-2-wages in the East to rise, the expected utility of staying in the East increases and the migration probability falls. The option-value-of-waiting hypothesis of Burda (1993, 1995) relies on the anticipation of higher future wages in the East or on waiting for the uncertainty of migration outcomes in the West to resolve. In contrast, our model assumes that there is higher employment and income uncertainty

in the East. Therefore, the key obstacles to migration are high migration costs and overly optimistic expectations about labor market chances in the East.

Now, we explain the link between the model and our subsequent empirical analysis estimating the dynamic returns to migration. In period 2, the migration problem is a purely static decision without consideration of the future. For all individuals migrating in period 2 and employment state e_1 in period 1, the average return of migration with regard to earnings in period 2 is $(w^W - p_{e_1,2} w^E)$. Analogously, the average period-1-income return to migration in period 1 is $(w^W - p_{e_0,1} w^E)$ for individuals with employment state e_0 in period 0.

The counterfactual of period-1-migration in period 2 involves staying in the East in period 1 with the possibility of migrating in period 2. Thus, the average return in period 2 becomes

$$\begin{aligned} w^W - p_{e_0,1}(&\underbrace{\tilde{FC}_2(1,C_1) w^W}_{m_2=1|e_1=1} + \underbrace{(1-\tilde{FC}_2(1,C_1)) p_{1,2} w^e)}_{m_2=0,e_2=1|e_1=1} \\ -(1-p_{e_0,1})(&\underbrace{\tilde{FC}_2(0,C_1) w^W}_{m_2=1|e_1=0} + \underbrace{(1-\tilde{FC}_2(0,C_1)) p_{0,2} w^e)}_{m_2=0,e_2=1|e_1=0}. \end{aligned}$$

The dynamic counterfactual in period 2 depends upon whether the individual is employed in period 1, i.e. $e_1=0,1$, migrates in period 2, i.e. $m_2=0,1$, and is employed in period 2, i.e. $e_1=0,1$, if not migrating.

Finally, a few further remarks on the role of migration costs are in order. Not migrating in period 1 and migrating in period 2 necessitates that C_2 is sufficiently low relative to C_1. If migration costs do not change, i.e. $C_2=C_1$, and individuals perfectly predict future employment probabilities, then migration in period 2 is low. Everybody with migration costs below $C_{2,1}$ has already migrated in period 1. In fact, depending on the parameters of the decision problem, there may even be no migration in period 2. The only migrants we would possibly observe in period 2 would be individuals who are employed in period 0, who are not employed in period 1, and for whom $C_{2,1} < C_2 < C_{2,0}$. Migration in period 2 is higher, if random migration costs in period 2, C_2, are lower than C_1 for some of those not migrating in period 1 or if individuals overestimate future employment probabilities based on the information in period 0 or in period 1. Thus, changing non-monetary migration costs or biased expectations provide behavioral explanations for delaying migration.

A.1 Proof for the negative influence of C_1

We need to show that the utility difference between migrating and not migrating in period 1 is a strictly negative function of C_1. To do so, we prove below that

$$(4)\quad \frac{\partial\left[(1-\tilde{FC}_2(e_1,C_1))p^e_{e_1,2}w^E+\tilde{FC}_2(e_1,C_1)(w^W-E(C_2|C_2>C_{2,e_1}))\right]}{\partial C_1}=-\tilde{FC}_2(e_1,C_1).$$

The right-hand-side of equation (4) lies strictly between -1 and 0. Thus, the utility difference between migrating and not migrating in period 1 is a strictly negative function of C_1, because $\partial(2w^W-C_1)/\partial C_1=-1$ and the derivative for the expected utility when staying in the East lies strictly between -1 and 0. The latter follows because the derivatives of the two terms in brackets lie between -1 and 0 and the utility difference involves a convex combination of the two terms.

Proof of equation (4):

$$\begin{aligned}
&(1-\tilde{FC}_2(e_1,C_1))p^e_{e_1,2}w^E+\tilde{FC}_2(e_1,C_1)(w^W-E(C_2|C_2>C_{2,e_1}))\\
&=\int_{-\infty}^{C_{2,e_1}}(w^W-C_2)f(C_2|C_1)dC_2+\int_{C_{2,e_1}}^{\infty}p^e_{e_1,2}w^Ef(C_2|C_1)dC_2\\
&=\int_{-\infty}^{C_{2,e_1}}(w^W-C_2-p^e_{e_1,2}w^E)f(C_2|C_1)dC_2+p^e_{e_1,2}w^E\int_{-\infty}^{\infty}f(C_2|C_1)dC_2\\
&=\int_{-\infty}^{C_{2,e_1}}(C_{2,e_1}-C_2)f(C_2|C_1)dC_2+p^e_{e_1,2}w^E
\end{aligned}$$

because $C_{2,e_1}=w^W-p^e_{e_1,2}w^E$. The second term in the sum does not depend upon C_1. The first term can be written as

$$\begin{aligned}
&\int_{-\infty}^{C_{2,e_1}}(C_{2,e_1}-C_2)f(C_2|C_1)dC_2\\
&=\int_{-\infty}^{C_{2,e_1}-C_1}(C_{2,e_1}-C_1-\bar{C})f_0(\bar{C})d\bar{C},
\end{aligned}$$

where we substitute $\bar{C}=C_2-C_1$ and use the fact that $f_0(\bar{C})$ is the pdf of ϵ which does not depend upon C_1. Rewrite this expression as

$$\begin{aligned}
&(C_{2,e_1}-C_1)\int_{-\infty}^{C_{2,e_1}-C_1}f_0(\bar{C})d\bar{C}-\int_{-\infty}^{C_{2,e_1}-C_1}\bar{C}f_0(\bar{C})d\bar{C}\\
&=(C_{2,e_1}-C_1)\tilde{FC}_2(e_1,C_1)-\int_{-\infty}^{C_{2,e_1}-C_1}\bar{C}f_0(\bar{C})d\bar{C}.
\end{aligned}$$

Note that $f_0(\bar{C})$ is the density of the distribution function $F_0(\bar{C})$. Further, it holds that $\tilde{FC}_2(e_1,C_1)=F_0(C_{2,e_1}-C_1)$. Now consider the first derivative with respect to C_1 (using Leibniz rule for the second term)

$$\frac{\partial\left[(C_{2,e_1}-C_1)\tilde{FC}_2(e_1,C_1)-\int_{-\infty}^{C_{2,e_1}-C_1}\bar{C}f_0(\bar{C})d\bar{C}\right]}{\partial C_1}$$
$$=-\tilde{FC}_2(e_1,C_1)-(C_{2,e_1}-C_1)f_0(C_{2,e_1}-C_1)+(C_{2,e_1}-C_1)f_0(C_{2,e_1}-C_1)=-\tilde{FC}_2(e_1,C_1)$$

which completes the proof.

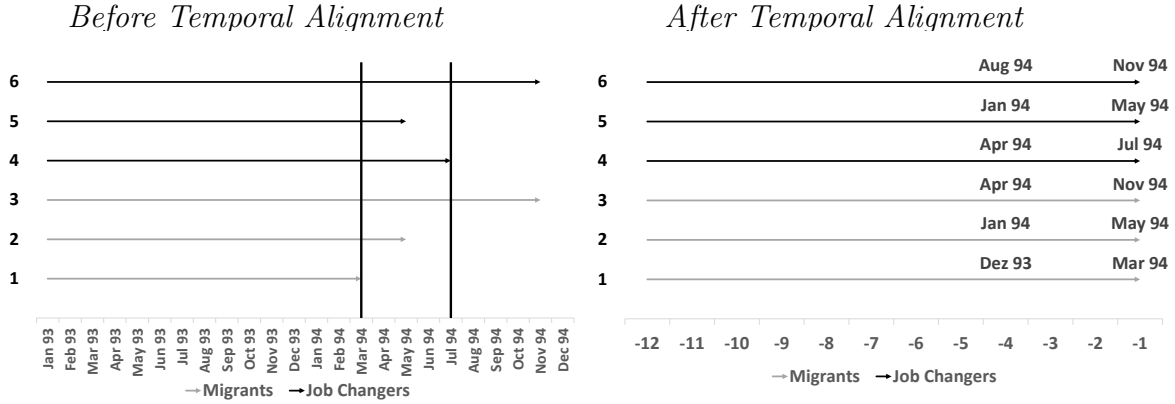
Q.E.D.

B. Temporal Alignment and IPW

Job changers

We start with the migration-vs-job-change treatment to describe the temporal alignment and reweighting, which is particularly important because of the strong pre-migration dip in earnings and employment shortly before migration/job change. We need to balance on the one hand calendar time to ensure comparability in economic conditions and on the other hand time until treatment because of the dip before treatment. Since the pre-treatment dip involves a large change during a few months and we allow for calendar time controls, we align exactly based on the number of months until/since migration and we contrast migrants and job changers treated in the same calendar year. This means that the individual observations used to compute the monthly averages by time relative to treatment stem from different calendar months. We estimate returns to migration for earnings and employment, i.e. monthly means of daily earnings and employment rates are compared across the different groups. Figure 13 illustrates the approach for an example.

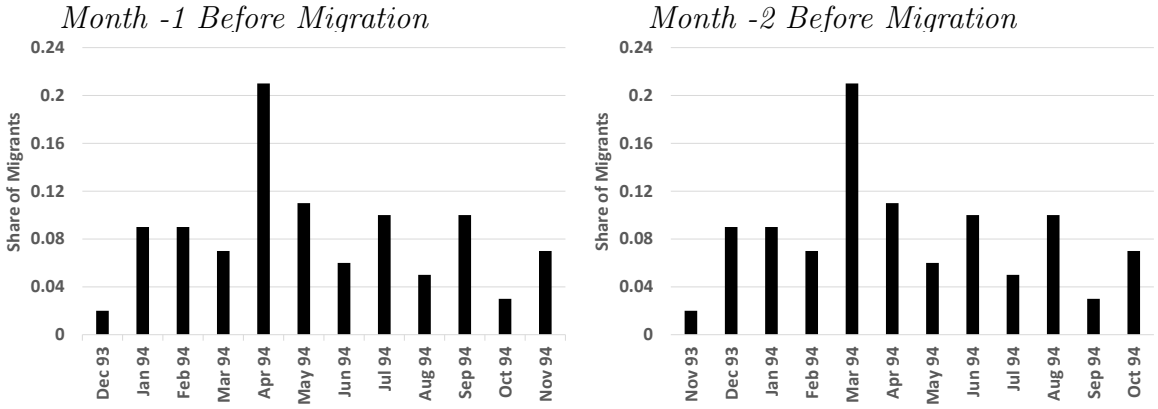
Figure 13: Migration Cohort 1994 - Pre-migration Temporal Alignment



For six individuals in the 1994 migration cohort, the graph to the left shows the timing of migration and job change, respectively. Individuals 1 to 3 are migrants and their pre-migration spells are completed in the month before migration (when the line ends). Correspondingly, the lines for the job changers 4 to 6 end in the month before job change. Temporal alignment by calendar month (vertical lines) would imply that migrants and job changers would be compared at different points durations until treatment. In contrast, we align by duration until treatment, which allows us to trace the pre-treatment dip in earnings and employment, as shown in the graph to the right. Using the alignment in the graph to the right, we then estimate the $ATT^{JC}(a)$ of migration-vs-job-change by contrasting the mean outcomes (after IPW to control for differences in observables) for each month a, i.e. separately for $a=-24,...,24$ before/after the date of migration/job change.

To take account of changes in the differences between migrants and job changers based on calendar time, each $ATT^{JC}(a)$ is a weighted average of yearly ATT's based on the migration cohorts by calendar years. This means that $ATT^{JC}(a)$ is estimated separately for each migration cohort from 1994 to 2004. Furthermore, the migration cohort specific $ATT^{JC}(a)$ is itself a weighted average of the $ATT^{JC}(a)$ by calendar month of migration. For migrants in a specific calendar month, the comparison for month a relative to treatment includes job changers also a month before/after job change in the same calendar month. To obtain the migration cohort specific $ATT^{JC}(a)$, we calculate a weighted average of the calendar month specific ATTs, using the share of migrants in this specific month relative to the total amount of migrants in this cohort. Figure 14 visualizes this approach for the $ATT^{JC}(-1)$ and $ATT^{JC}(-2)$ based on the 1994 migrant cohort.

Figure 14: $ATT^{JC}(-1)$ and $ATT^{JC}(-2)$ for Migration Cohort 1994



The graph to the left shows the relevant 12-months window for the computation of $ATT^{JC,c}(a)$ for $a=-1$ ($c=1994$ represents the migration cohort 1994), one month before migration, and the distribution of migrants across the 12-months window. The

graph to the right considers the same for $a=-2$. For each calendar month, a separate $ATT_m^{JC,c}(a)$ is computed and then weighted by the share of migrants in this month relative to all migrants in migration cohort 1994. Thus, the overall $ATT^{JC}(a)$ can be formally expressed as $ATT^{JC}(a)=\sum_{c=1994}^{2004} k_c(\sum_{m=1}^{12} s_m^c ATT_m^{JC,c}(a))$, where k_c is the share of migrants in cohort c relative to the overall number of migrants, and s_m^c is the share of migrants from cohort c in month m of the moving 12-months window relative to all migrants from cohort c in this 12-months window.

In addition to temporal alignment, IPW is used to balance the observable characteristics between job changers and migrants. Since we estimate the average treatment effect on the treated, migrants get a weight of 1 and we reweight job changers such that the distribution of observable characteristics mimics the one among migrants. To obtain the weights for job changers, we estimate a logit model with the migration dummy as dependent variable and the covariates as observed one month before migration or job change as control variables. The estimated propensity scores, $\hat{p}(X_i)$, are used to compute the normalized weights for the control group using the following formula

$$\hat{w}_{j,m}^c = \frac{\frac{\hat{p}(X_j)}{1-\hat{p}(X_j)}}{\sum_{i\in\mathcal{N}_a}(1-T_i)\frac{\hat{p}(X_i)}{1-\hat{p}(X_i)}}$$

where T_i is an indicator which is equal to 1 (0) if individual i is a migrant (a job changer) and $\mathcal{N}_a$ are all individuals observed a periods before/after migration/job change. Individuals with too large weights are discarded from the computation of the ATT, based on the method described in Huber et al. (2013). The $ATT_m^{JC,c}$ can then be expressed as $\frac{1}{\sum_{i\in\mathcal{N}_a} T_i}\sum_{i\in M_m^c(a)} y_i - \sum_{j\in JC_m^c(a)} \hat{w}_{j,m}^c \cdot y_j$, where $M_m^c(a)$ are all migrants in cohort c in month m observed a months before/since migration, $JC_m^c(a)$ is defined analogously for job changers, and $y_{i/j}$ is the outcome considered (earnings, employment).

Stayers

The temporal alignment and reweighting procedure is more complex for ATT^{Stay}. Stayers do not experience a specific event (like a job change) in a specific year and, on average, stayers do not show the typical pre-treatment dip as migrants or job changers do. Thus, for a stayer, every individual observation from the relevant period of 12 months could be used as the counterfactual for the outcome of migrants one month before treatment. Therefore, when determining the mean earnings of stayers for say month -1 of the 1994 migration cohort, we use all twelve observations from December 1993 to November 1994. We also do this for the estimation of IPW weights. For migrants, only one individual observation is used, namely the one from the month -1. The 12 individual observations of a stayer will get different weights if the control variables for

a stayer changes over the course of the 12 months. Table 5 shows the shift of weights for an individual stayer for the relevant 12 months of the migration cohort in 1994 for months -1 and -2 prior to migration. Our method is equivalent to replicating each stayer 12 times for the 12 potential "treatment" months (for which a is set to 0) January to December 1994.

Table 5: Weight-Shifting for Stayers

	Cohorts			
Month	**Year**	**Weights for Month -1**	**Weights for Month -2**	**Earnings**
October	1993	.	.	1250
November	1993	.	0.02	1250
December	1993	0.02	0.04	1250
January	1994	0.04	0.01	1250
February	1994	0.01	0.11	1250
March	1994	0.11	0.04	1370
April	1994	0.04	0.03	1370
May	1994	0.03	0.07	1370
June	1994	0.07	0.08	1370
July	1994	0.08	0.07	1410
August	1994	0.07	0.07	1410
September	1994	0.07	0.09	1410
October	1994	0.09	0.04	1410
November	1994	0.04	.	1410
December	1994	.	.	1410

Notes: The table displays the weighting scheme for an individual stayer which is used as part of the control group for migration cohort 1994. Weights are determined based on logistic regression with an migration/stayer indicator as dependent variable. Since every month between Jan and December could be a potential treatment month, all month between December 1993 - November 1994 can be used as control obersvations for the month before migration for migrants. This is represented in column "Weights for Month -1". It follows that all month between November 1993 and October 1994 can be used as control observations for month -2. Since weights are held constant for each potential treatment month, weights are shifted one month back as show in column "Weights for Month -2". Earnings are displayed to illustrate that the different monthly weights matter, if the earnings of a stayer change during the moving 12-months window.

To determine mean earnings of stayers, the same method as for job changers is employed to align the distribution of stayers with that of migrants. The only difference is that for each monthly average, observations from all stayers are used (instead of only the observations for job changers for whom the calendar month corresponds to the specific month before/after job change for which the mean earnings are computed).

C. Tables

Table 6: Logit Models of Migration

Reference Group	**Job Changers**	**Stayer**
Female	-0.5156***	-0.6497***
	(-7.4)	(-9.69)
Age	0.0249	0.1267***
	(0.95)	(5.03)
Age^2	-0.0006*	-0.002***
	(-1.86)	(-6.57)
Tenure in Industry of last Job	0.0013	-0.0031***
	(1.19)	(-2.73)
Tenure in current firm (unemployed = 0)	0.0019**	0.0004
	(2.48)	(0.4)
Months in unemployment last 12 months	0.0102	0.0492
	(0.3)	(1.48)
Months in continuous unemployment	0.0059	-0.0044
	(1.03)	(-0.7)
Number of job changes since 1992	0.0221	1.3384***
	(0.23)	(15.6)
Share in non-employment since 1990	-0.0097	0.0131
	(-0.29)	(0.42)
Population in county of last job	-0.0755	-0.1203
	(-0.82)	(-1.32)
Employment rate in county of last job	0.0013	0.0071
	(0.25)	(1.38)
Mean earnings potential in county of last job	0.0226***	0.0251***
	(3.84)	(4.37)
Distance to Western border of county of last job	-0.0023***	-0.002***
	(-3.27)	(-2.88)
Number of Employees in last firm	-0.0282*	-0.072***
	(-1.81)	(-4.68)
Median Earnings in last firm	0.0039**	0.0021
	(2.13)	(1.12)
Labor earnings	0.0033	-0.0078***
	(1.43)	(-3.29)
Unemployed	0.3331	1.4496
	(2.22)	(9.33)
Education		
High School	-0.0532	-0.1376
	(-0.37)	(-0.98)
Vocational Training (Base)	.	.
University	0.0955	0.1344
	(1.02)	(1.5)

Notes: Results for job changers stem from a logistic regression on an indicator for migration or job changing. Observations stem from the month before migration/job change and from all sample years. Results for job changers stem from a logistic regression on an indicator for migration or staying. Observations for stem from the month before migration, for stayers all observations from all sample cohorts are used. These are thus aggregate results over all migration cohorts, in contrast to results used for the estimation of IPW where separate logistic regressions are estimate for each migration cohort. Additional controls used in the estimation of IPW but not displayed here to increase readability: dummies for the industry of the last job, dummies for the occupation, dummies for the federal state where the last job was located, dummies for the calendar month and retrospective values for the months 6, 12 and 24 before migration for the some of the labor market indicators. The logistic regression uses population weights.

Table 7: Means of Control Variables before and after IPW (BASiD)

	Groups				
		Stayer		Job Changer	
	Migrants	**No IPW**	**IPW**	**No IPW**	**IPW**
Female (%)	35.44	55.29	35.19	49.94	35.27
Age	39.34	42.15	39.48	40.83	39.46
Age^2	1619.21	1858.83	1629.96	1745.55	1628.53
Tenure in Industry of last Job	47.42	61.34	47.62	44.14	47.53
Tenure in current firm (unemployed = 0)	39.84	50.55	39.56	36.16	39.62
Months in unemployment last 12 months	4.33	2.11	4.39	4.27	4.4
Months in continuous unemployment	7.41	3.94	7.57	6.41	7.51
Number of job changes since 1992	2.36	1.59	2.4	2.19	2.39
Share in unemployment since 1990	20.74	14.3	20.69	21.1	20.69
Earnings	30.71	52.92	30.75	32.68	30.54
Unemployment	51.95	19.72	52.16	46.27	52.32
Characteristics of County of Last Job					
Population in county of last job	12.23	12.37	12.22	12.39	12.22
Employment rate in county of last job	61.79	61.69	61.53	62.49	61.56
Mean earnings potential in county of last job	56.69	56.66	56.88	55.93	56.82
Distance to Western border of county of last job	106.69	111.37	107.06	113.46	107.36
Characteristics of Last Firm					
Number of Employees in last firm	3.71	4.3	3.69	4.04	3.69
Median Earnings in last firm	55.15	60.22	55.36	54.65	55.28
Education (%)					
High School	3.11	3.05	3.05	3.67	3.11
Apprenticeship	84.69	84.65	84.65	81.76	84.64
University	12.21	12.3	12.3	14.57	12.26
Federal State of Last Job (%)					
Berlin	3.53	3.42	3.42	5.96	3.51
Brandenburg	18.66	17.95	17.95	15.22	18.57
Mecklenburg-Vorpommern	13.53	13.3	13.3	11.89	13.54
Saxony	27	27.72	27.72	33.66	27.04
Saxony-Anhalt	20.95	21.07	21.07	18.87	20.92
Thuringia	16.33	16.54	16.54	14.4	16.42
Industry in Last Job (%)					
Agriculture, Energy and Mining	3.85	3.87	3.87	4.45	3.83
Manufacturing	15.02	15.17	15.17	15.82	14.85
Construction	22.55	22.46	22.46	12.48	22.6
Trade, Transport and Communication	12.95	13.03	13.03	11.52	13.01
Services	30.04	29.66	29.66	34.17	30
Banking and Insurance	9.98	10.1	10.1	7.32	10.08
Non-commercial Enterprises, Civil Servants	5.6	5.71	5.71	14.24	5.63
Occupation in Last Job (%)					
Agriculture	2.77	3.42	2.87	4.34	2.89
Resource Extraction and Production	20.29	19.46	19.98	19.02	20.05
Construction, Architecture	20.87	9.93	21.14	14.61	20.96
Science, Media, Art, Culture	2.41	2.54	2.29	2.08	2.36
Traffic, Logistics, Security	16.62	12.61	16.62	15.47	16.47
Sales	10.37	8.4	10.17	9.01	10.25
Management, Accounting, Law, Administration	14.84	22.82	14.77	18.95	14.75
Health, Social, Education	8.54	17.68	8.83	11.85	8.88
Unskilled Worker	3.28	3.15	3.32	4.67	3.39

Notes: Descriptive Statistics for the variables, except for the earnings measures, are computed here as an average over all different calendar month, unlike in the estimation of returns. Observations for migrants and the "No IPW" category are weighted by population weights. For the "IPW" category, IPW are additionally used. For the earnings measure, first averaging over returns in a calendar month and then over all of the month in the year (weighted by the distribution of migrants across the year) and then aggregation over all years is used as described in the text.

Table 8: Means of Moving Costs and Behavioral Variables before and after IPW - GSOEP

		No IPW		IPW	
	Migrants	**Stayer**	**JC**	**Stayer**	**JC**
Married	42%	73%	66%	61%	60%
Number of Children	0.68	0.65	0.78	0.96	0.87
Own Property	22%	39%	37%	30%	35%
Know someone who moved to the West	30%	29%	33%	34%	32%
Risk Aversion	5.09	4.5	4.71	4.79	4.92
Attachment to Place of Living					
Very Strong	24%	31%	31%	34%	23%
Strong	51%	53%	51%	42%	57%
Weak	22%	14%	15%	21%	18%
None	2%	2%	2%	3%	3%
Conceivable to move away (job- or family-related)					
Yes	55%	15%	16%	22%	20%
Depends	30%	33%	37%	39%	45%
No	15%	52%	48%	39%	36%
Conceivable to move to the West					
Yes, gladly	15%	3%	4%	3%	5%
Under some circumstances	73%	58%	55%	56%	58%
Rather not	7%	30%	32%	32%	26%
Definitely not	4%	8%	8%	9%	11%

Notes: The displayed sample sizes refer to the number of individuals in the data that the values are based on. Results with "No IPW" are weighted by population weights and the results for job changers and stayers "With IPW" are additionally reweighted to reflect the distribution of control variables among migrants using IPW. Results refer to the the year before migration/job change for migrants and job changers. For stayers, each year between 1993 and 2003 is counted.

Table 9: Means of Expectations and Worries before and after IPW - GSOEP

		No IPW		IPW	
	Migrants	**Stayer**	**JC**	**Stayer**	**JC**
Worries own economic situation					
Great Worries	34%	27%	43%	28%	35%
Some Worries	56%	60%	51%	58%	58%
No Worries	10%	13%	6%	13%	7%
Worries own job safety					
Great Worries	32%	23%	36%	22%	40%
Some Worries	39%	50%	46%	49%	37%
No Worries	29%	27%	18%	29%	23%
Expect voluntary job search in next 2 years					
Surely not	30%	55%	26%	46%	32%
Rather unlikely	18%	31%	33%	36%	17%
Likely	23%	9%	23%	12%	25%
Surely	29%	4%	18%	6%	25%
Expect to lose job in next 2 years					
Surely not	29%	24%	15%	20%	26%
Rather unlikely	39%	58%	51%	60%	53%
Likely	20%	12%	18%	10%	12%
Surely	12%	5%	16%	9%	9%

Notes: The displayed sample sizes refer to the number of individuals in the data that the values are based on. Results with "No IPW" are weighted by population weights and the results for job changers and stayers "With IPW" are additionally reweighted to reflect the distribution of control variables among migrants using IPW. Results refer to the the year before migration/job change for migrants and job changers. For stayers, each year between 1993 and 2003 is counted.

Table 10: Locational Attachment and Willingness to Move Years -4 to -2

	Groups		
	Migrants	**Stayer**	**Job Changer**
Attachment to Place of Living			
Very Strong	27%	34%	26%
Strong	46%	46%	56%
Weak	23%	17%	14%
None	3%	3%	3%
N	153	15940	1900
Conceivable to move away (job- or family-related)			
Yes	38%	22%	22%
Depends	44%	43%	41%
No	17%	35%	37%
N	213	24570	2882
Conceivable to move to the West			
Yes, gladly	12%	3%	3%
Under some circumstances	66%	60%	70%
Rather not	13%	29%	22%
Definitely not	8%	7%	4%
N	151	9102	1200

Notes: The displayed sample sizes refer to the number of individuals in the data that the values are based on. All results are weighted by population weights and the results for job changers and stayers are reweighted to reflect the distribution of control variables among migrants. Results refer to the the years 2 to 4 years before migration/job change for migrants and job changers. For stayers, each year between 1994 and 2004 is counted can be the potential treatment year. So each stayer is replecated virtually 10 times and for each of these stayers the results from 2 to 4 years before the hypothetical treatment time are counted if available.

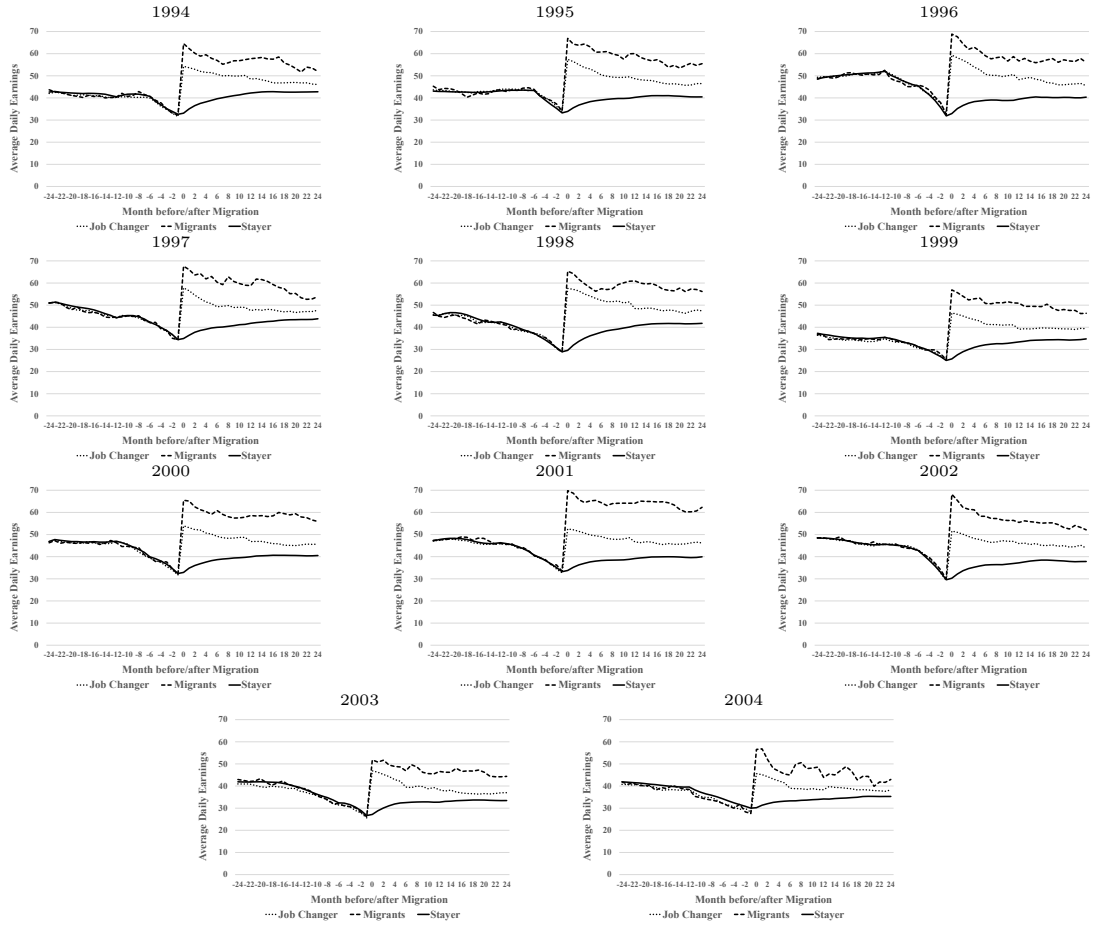
Table 11: Expectations and Worries, Years -4 to -2

	Groups		
	Migrants	**Stayer**	**Job Changer**
Optimism about the future			
Definitely	9%	8%	10%
Rather yes	52%	58%	44%
Rather no	32%	32%	36%
Definitely not	7%	12%	11%
N	106	10709	1256
Worries own economic situation			
Great Worries	36%	31%	31%
Some Worries	50%	57%	58%
No Worries	14%	11%	10%
N	291	36483	3904
Worries own job safety			
Great Worries	31%	22%	29%
Some Worries	52%	52%	51%
No Worries	16%	26%	20%
N	164	26968	1730
Expect voluntary job search in next 2 years			
Surely not	26%	37%	27%
Rather unlikely	35%	37%	47%
Likely	22%	17%	16%
Surely	17%	8%	11%
N	81	12113	850
Expect to lose job in next 2 years			
Surely not	16%	13%	14%
Rather unlikely	54%	62%	64%
Likely	27%	18%	18%
Surely	3%	7%	4%
N	81	12127	853

Notes: The displayed sample sizes refer to the number of individuals in the data that the values are based on. All results are weighted by population weights and the results for job changers and stayers are reweighted to reflect the distribution of control variables among migrants. Results refer to the the years 2 - 4 before migration/job change for migrants and job changers. For stayers, each year between 1994 and 2004 is counted can be the potential treatment year. So each stayer is replecated virtually 10 times and for each of these stayers the results from 2 to 4 years before the hypothetical treatment time are counted if available.

D. Figures

Figure 15: Earnings and Unemployment after IPW by treatment year



Notes: Graphs show the average daily earnings for the three treatment groups, after IPW has been applied. The difference to the aggregate results in the text is that cohort-specific ATTs are not aggregated and reweighted based on the share of migrants in each cohort relative to all migrants, but that results for each cohort are displayed separately. As for the aggregate results, IPW are estimated separately for every migration cohort. Displayed years refer to the year of migration (the migration cohort) and results are displayed for the 24 month before and after the time of treatment.