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Abstract

How big are the gains to international migration? How do they vary across migrants? We study these questions using linked administrative data for Austria and Germany, focusing on migrants who were steadily employed 2-4 years before their move and using their previous co-workers as a comparison group for a difference-in-differences design. We combine data from the origin and destination countries for 5 years after the move, allowing us to assess the gains for those who remain in the destination and those who return. On average, migrants from Austria to Germany experience an immediate and persistent rise of around 13% in their daily wage relative to their matched co-workers, while migrants from Germany to Austria gain about 4%. The higher returns for Austrians are mainly driven by higher average wages in Germany, rather than by differential selection of migrants. Consistent with a dynamic learning model, the returns to migration are largest for migrants who remain in the destination country, smaller for those who return after 1-4 years, and zero or even slightly negative for those who return in less than a year. They are also larger for migrants who follow established cross-border networks between workplaces. To help interpret our findings we conduct a parallel analysis of domestic migrants who move to a larger city (Vienna or one of the 5 largest cities in Germany). "Big city" movers experience gains in wages of about 5% for Austrians and 10% for Germans. Again the gains are largest for those who remain in the destination city, with smaller effects for those who move on.

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Thousands of people move between developed countries every year (Docquier et al., 2014). Many of these are highly skilled workers whose talents allow them to overcome the legal barriers to international migration (see Kerr et al. (2016) and Amanzadeh et al. (2024)). In settings like the EU, however, the flows include a broad range of skill groups.[1] How important are the opportunities provided by unfettered international migration? Do most migrants gain, or do some fare worse than they would have at home? If movers in one direction experience gains, do those moving in the opposite direction generally lose? And how do the gains from international migration compare to the gains from moving within a given country?

Conventional economic theory (Borjas, 1987; Sjaastad, 1962) suggests that migrants compare expected earnings in a potential destination to expected earnings in their origin market and move if the difference – the expected return to migration – exceeds the costs.[2] As in other treatment-effect settings, however, we never observe the realized values for both sides of this comparison: a given individual either moves or stays. In fact, we rarely see even a naive approximation of the counterfactual for people who move, due to a lack of comparable data for movers and stayers and difficulties in interpreting the comparisons even when such data are available.[3] Many international movers also return home within a few years (Dustmann and Weiss, 2007). A full accounting of the return to migration therefore has to account for the outcomes of both stayers and returners.

In this paper we use novel linked administrative data and a *previous co-workers* research design (Jacobson et al., 1993) to evaluate the returns to migration for movers in both directions between Austria and Germany. The two countries share a common language and similar institutions, and impose few legal constraints on cross-border flows.[4] Our migrants are derived from the full population of Austrian citizens who appear in the German Social Security system between 1975 and 2014, and the full population of German citizens who appear in the Austrian system during the same interval. We match these migrants to their earnings records in their home countries from before and after the move. We focus on mi-

[1] Other examples with relatively free migration include Australia and New Zealand (Poot, 2010) and Ireland and Britain (Fitz Gerald and Kearney, 1999).

[2] We define the term "return to migration" as the relative earnings gain from moving, without accounting for costs – paralleling the use of the term "return to education" to refer to the earnings gain per year of schooling.

[3] A few existing studies use special surveys or linked data from origin and destination countries to assess the relative characteristics of migrants and non-migrants (i.e., the "selectivity" of migrants) and to estimate the gains to migration. Akee (2010) links observations from the 1994 population census in the Federated States of Micronesia to a special survey of Micronesian immigrants conducted in Hawaii and Guam in 1997. McKenzie et al. (2010) use survey data to compare Tongans who were successful in a lottery for permanent residence in New Zealand to lottery applicants who were unsuccessful. Abramitzky et al. (2019) use data from the 1910 Norwegian census (which includes information on people who had spent time in the U.S.) and data on Norwegian immigrants in the 1910 U.S. census to compare Norwegians who migrated permanently or temporarily to the U.S. to non-migrants. Ibarraran and Lubotsky (2007) use 2000 Mexican Census data to derive an imputed estimate of educational attainment for migrants to the U.S.

[4] A detailed description of the institutional setting is provided in Appendix Section B.

grants age 20-45 who were continuously employed during a "baseline period" 5 to 12 quarters before their first appearance in the destination country records. This baseline allows us to measure the pre-migration wages of migrants, while accounting for job disruptions prior to their move. It also allows us to identify the pre-migration co-workers of migrants. We use the changes in labor market outcomes for migrants relative to their pre-migration co-workers to construct difference-in-differences estimates of the returns to migration. The fact that we observe labor market outcomes for migrants whether they remain in the destination country or return home addresses concerns about selective return migration (Adda et al., 2022; Akee and Jones, 2024; Dustmann and Görlach, 2016), and allows us to assess the impact of foreign work experience on wages in the home country.

Comparisons between migrants and previous co-workers hold constant many factors that might otherwise confound a difference-in-differences design, including location- or industry-specific demand shocks.[5] But migrants tend to be younger than their co-workers, and many have lost their previous job prior to moving. Moreover, because we identify migration events using the date that an individual first appears in the administrative data of the destination country, and 95% of these first appearances are associated with the start of a new job, migrants in our sample are nearly all employed at the start of their migration event. In the spirit of a synthetic control approach (Abadie, 2021), we therefore reweight the co-workers to have the same gender and age distribution as migrants, and similar employment probabilities in the two quarters just before moving and the first quarter after. We show that the mean log daily wages of migrants and their previous co-workers follow parallel trends in the 5 years prior to the move, suggesting that co-workers provide a credible comparison group for evaluating the wage impacts of migration.

We have four key sets of findings. First, descriptively, we find that workers who move from Austria to Germany and those who move from Germany to Austria are remarkably similar, paralleling "Linder's hypothesis" (Hufbauer, 1970) that bidirectional trade flows between developed countries are often made up of similar products. About two-thirds of migrants are male, while one-fifth were unemployed prior to moving. Based on an AKM (Abowd et al., 1999) decomposition, migrants from both countries are positively selected, and in the years before migrating they held relatively good jobs: their mean person effects in the baseline period are 10-15% above the national average; their mean firm effects are slightly above the national average.[6] They also come from a relatively diverse set of regions, though out-migration rates are higher from the border regions of both countries. One key difference is that the flow of workers from Germany to Austria is concentrated in the post-

[5]Given the degree of assortative matching by education and occupation at a given workplace (see Card et al. (2013) for evidence from Germany), they also help to control for shocks that differentially affect different education or occupation groups.

[6]For simplicity we follow standard practice in calling the workplace-specific wage premiums from an AKM model "firm effects", but these are based on the administratively defined establishments where people work.

1995 period, whereas the flow from Austria to Germany is more evenly distributed. Rates of return migration are fairly similar for the two sets of migrants, with about 40% of Austrians and 50% of Germans returning within 5 years.

Regarding the *impacts* of an international move, our second key finding is that migrants from both countries experience an immediate and persistent rise in wages relative to their previous co-workers. The average gain is around 13 percentage points (ppts.) for Austrians and 4 ppts. for Germans. Reassuringly, these average impacts are nearly identical whether we use our preferred reweighing strategy or a simpler approach that equalizes only the age and gender distributions of migrants and co-workers. The alternative weighting strategies lead to some differences in the post-migration employment gaps between migrants and previous co-workers, so the stability of the estimated wage impacts suggests that they are not strongly affected by biases arising from selection into employment.

AKM-based decompositions show that the wage gains of Austrian movers arise from increases in their relative person effects coupled with an across-the-board increase associated with the higher level of wages in Germany. German movers also experience gains in their person effects, offset by the lower level of wages in Austria. Our decompositions suggest that the larger average gains from international migration for Austrians than Germans are mainly due to the overall wage gap between the countries, rather than to country-specific patterns of selection.

Our third set of findings concerns the heterogeneity in the returns to migration. We do not see a systematic pattern of differences in the return to migration for people who moved directly between jobs in the origin and destination markets ("job-to-job" movers) and those who experienced a spell of unemployment prior to moving. The gains are higher for the roughly 10% of migrants who move between origin and destination workplaces with 4 or more movers in our sample – i.e., "connected" movers. Returns are also lower for women than men, but we are unable to track families so we cannot test whether these gaps are explained by the "tied mover" hypothesis.

A fundamental distinction between migrants, highlighted by a dynamic learning model, is the duration of their stay in the destination country. Consistent with such a model, we find that the gains from migration are zero or even slightly negative for migrants who return within a year, but relatively large and positive for those who are still in the destination country 5 years after moving. For those who stay between 1 and 4 years we find medium-run gains that are in-between those of stayers and early returners. The earnings gains at the end of our follow-up window for migrants returning after the first year are positive, suggesting that there are benefits in the home market from an international migration experience, as has been found in a few other settings (e.g., Görtz (2025); Koikkalainen et al. (2016); Reinhold and Thom (2013); Wahba (2021)).

Our fourth set of findings relate to the similarities and differences between international

and domestic migrants. For this analysis, we identify Austrians and Germans who started their labor market careers in a smaller city or rural area and then moved to Vienna or one of the 5 largest German cities (Berlin, Hamburg, Munich, Cologne, Frankfurt), respectively. Paralleling our design for international migrants, we focus on domestic movers who were steadily employed in the 5-12 quarters prior to their first spell in a major city, and use their previous co-workers to form a comparison group (with a similar reweighting strategy). Migrants to the big city are broadly similar to international migrants, though in Austria they are more negatively selected than international migrants (with roughly 15% lower pre-migration wages) whereas in Germany they are slightly more positively selected (with 4% higher pre-migration wages).

On average, the returns to domestic migration are positive for movers to the big city in both countries, with average gains 2-5 years after moving of about 10% for Germans and 5% for Austrians. Again, the gains for moving to the "big city" are highest for those who stay at least 5 years, though the relative patterns of gains for people who move on relatively quickly or stay for a few years are not as clear (and differ between countries). We also find a reversal of the relative returns for connected versus unconnected movers, with smaller gains for connected domestic movers. Overall, the evidence suggests that international and domestic migration are driven by similar forces in our setting, though there are some unique aspects of international migration even in the case of two long-connected countries like Austria and Germany.

Our work contributes to the large but rather disconnected literatures on international and domestic migration.[7] With respect to the former, we offer causal estimates of the return to cross-border migration based on a difference-in-differences comparison with previous co-workers. Unlike nearly all previous studies, we have access to linked longitudinal records for the same individuals in the origin and destination countries, allowing us to follow individuals over time within and between countries.[8] We use the earnings outcomes of previous co-workers to form a counterfactual for the earnings of migrants in the absence of moving – mimicking the workhorse design first proposed by Jacobson et al. (1993) for studying mass layoff events (see Bertheau et al. (2023) for a recent application). Importantly, in a setting where many migrants eventually return home, we measure post-migration outcomes in the destination and origin labor markets. We estimate average returns to migration in both di-

[7]There is some literature on the choices of rural Mexicans to migrate to larger cities or to move to the U.S. – see e.g., Davis et al. (2002). Ramos (1992) examines the migration of Puerto Ricans to the mainland U.S. as an example of a movement that is arguably "in between" a domestic and international move.

[8]The closest existing study to our's is Akee (2010), who looks at migrants from Micronesia to Hawaai and Guam, and finds very large returns. Dodini et al. (2025) use linked records for medical doctors who commute from Sweden to Norway: their results suggest that commuters experienced sizable wage gains. Bütikofer et al. (2024) use cross-country matched registry data to follow individuals commuting from Sweden to Denmark, studying how gaining access to a larger labor market after the opening of the Öresund Bridge affected labor market outcomes; they find substantial increases in commuting and wages, alongside rising inequality.

rections for Austrians and Germans, and also characterize the heterogeneity in returns by workers' pre-move characteristics and by the duration of stay in the destination country.

With respect to the literature on domestic migration, we provide causal estimates of the return to migration for individuals who first enter the labor market outside a major city and then move to a large city. Our design complements other longitudinally based estimates of the returns to working in different labor markets in the same country (e.g., Card et al. (2025); Combes et al. (2008); Dauth et al. (2022); De La Roca and Puga (2017); Gibbons et al. (2014)). Unlike existing studies based on 2-way fixed effects specifications, however, we use narrower comparisons of migrants to their previous co-workers to estimate the returns to moving. Our approach incorporates the possibility, raised by De La Roca and Puga (2017), that migrants to a larger urban area experience a permanent return to their big city experience even when they leave the city. We find evidence of a persistent boost in wages for international migrants who ultimately return home, and for domestic movers to one of the 5 biggest cities in Germany, but less evidence of such an effect for movers to Vienna. In addition, we are able to systematically compare international to domestic migration.

The paper proceeds as follows: Section 1 presents a simplified dynamic model of location choice that motivates our empirical setup; Section 2 describes the derivation of our migrant and co-workers data sets, and our methods for measuring workers' locations, wages, and other outcomes; Section 3 presents a descriptive overview of our migrant samples; Section 4 provides a graphical overview of the labor market outcomes of migrants and their matched co-workers before and after the migrants' moves; Section 5 presents estimates of the average returns to migration for movers in both directions, as well as a decomposition of the sources of these returns in an AKM framework; Section 6 presents a detailed analysis of the heterogeneity in returns to migration for various subgroups of migrants; and Section 7 presents a parallel analysis of the returns to domestic migration for people who move from smaller cities and rural areas to a larger city. We conclude in Section 8.

1 A Simple Model of Location Choice

In this section we sketch a very simple dynamic model of location choice that motivates our analysis and underscores the connection between outcomes in the destination and the probability of returning home. In the model there are only two locations: in each period t, an individual is either present in her origin labor market (denoted by superscript "o") or the destination labor market (denoted by superscript "d"). If she is in market $m \in \{o, d\}$ in period t then she observes and earns the wage in that market; the wage in the other market remains unobserved. At any point in time she can choose to exit her current market and

move to the other market, incurring a mobility cost c.

At time t there are two value functions, $V^o(t)$ and $V^d(t)$, representing the expected discounted present value of being present in the respective market in period t and following an optimal path thereafter.[9] We make two simplifying assumptions to begin. First, we assume that:

$$\begin{aligned} E_{t-1}[V^d(t)] &= V^d(t-1) \\ E_{t-1}[V^o(t)] &= V^o(t-1), \end{aligned}$$

in other words, that the best one-period ahead forecast of the value of being in market m is the current value. Second, we assume that if an individual is not present in market m in period t then $V^m(t) = V^m(t-1)$ – in other words, there is no "passive updating" of the value associated with the market the worker is not present in. This is similar to the assumption adopted in many search models with learning about match quality – e.g. Jovanovic (1979). An individual will move from o to d between periods $t-1$ and t if

$$E_{t-1}[V^d(t)] > E_{t-1}[V^o(t)] + c$$

where c is the cost of moving. Under our simplifying assumptions, the decision to move during period $t-1$ is triggered when:

$$V^d(t-1) > V^o(t-1) + c.$$

Consider an individual who begins her career in the origin market, and is then observed migrating to the destination market between $t = -1$ and $t = 0$. Under the assumption of no passive updating, the value function associated with the destination market is fixed at some value prior to the move – i.e., $V^d(s) = V^*$ for periods $s < -1$ with

$$V^o(s) > V^* - c.$$

In the period of migration ($t = -1$), however, the value of remaining in the origin falls below the value of the destination (net of moving costs):

$$V^o(-1) < V^* - c.$$

Such a pattern is illustrated in panel a of Figure 1. Notice that from the perspective of period -1, $V^d(0)$ – the value of being in the destination labor market as of period 0 – is a random

[9] In the classic multi-arm bandit model, these value functions are known as Gittin's indexes – see Bergemann and Välimäki (2008) and McCall and McCall (1987).

variable with $E[V^d(0)] = V^d(-1)$. The distribution of $V^d(0)$ is shown by the bell curve in the figure.

Once the individual moves, the value of $V^d(0)$ is realized, while $V^o(0)$ remains at its prior value. The realization of options in the destination market could yield $V^d(0) > E_{-1}[V^d(0)] = V^*$, i.e., the destination market is better than expected. In this case the distribution of potential values for $V^d(1)$ updates to the (tighter) bell curve shown in panel b of Figure 1, making it less likely that in the future the individual will return home. Alternatively, the realization of wages in the destination market could be lower than expected, leading to the distribution of values for $V^d(1)$ as shown in panel c of Figure 1. With this distribution, the individual is more likely to make an early return back to the origin market.

This simple model yields several insights into the migration decision. It suggests that among people who are initially working in their home market, movers will be people with lower costs of moving who have experienced a decline in opportunities in their origin market; and that among movers, those who find better wage opportunities after their arrival will be more likely to stay, whereas those who find worse opportunities will be more likely to return home. Ex post, the return to migration (calculated with realized earnings) is likely to be higher for stayers in the destination. Moreover, it is possible that the ex post return to migration can be negative for people who return home relatively quickly, since these are people who had an overly optimistic expectation of their opportunities in the destination.

It is worth noting that some migrants may never find a job in the destination country, and return home ''empty-handed''. Given the way our data sets are constructed, however, very few such migrants will be in our samples. So we are probably under-counting the least successful migrants.

Extending the model to allow passive updating in $V^d(0)$ – for example, through information about job openings from friends or former colleagues who are working in the destination market (Caldwell and Harmon, 2019; Hansch et al., 2025) – would mean that some people move because of an upward revision in their expected outcome in the destination market, rather than because of bad news in their origin market. Such demand-driven moves might tend to have higher ex post returns than those that originate from declining opportunities in the home market.

Another useful extension is to allow for training opportunities that are only available in the destination market.[10] Such opportunities could lead people to migrate temporarily – even if real wages in the destination are not particularly high. Some of these opportunities may be provided at specific plants owned by an international firm, leading to a pattern of multiple movers between workplaces on opposite sides of the border. A similar pattern of connected moving could arise through information sharing between previous co-workers,

[10] De La Roca and Puga (2017) find evidence that people who work in big cities (Madrid and Barcelona in their study of Spanish labor markets) have faster human capital accumulation than those in smaller markets.

or through learning by employers in the destination market, as in Dustmann et al. (2016).

The model can also be adopted to allow for family migration. If there are two wage earners in a family, the migration decision will in general depend on the potential gains of both workers: large gains for one family member could offset small or even negative returns to migration for the other family member. This reasoning suggests that in settings where families move together and wives work mainly part-time (as they often do in Austria and Germany) joint migration decisions will be dominated by the wage opportunities of husbands, leading to smaller average returns for women than men (e.g., DaVanzo (1976) and Mincer (1978)). Unfortunately, in our data sets we cannot systematically identify families, so we focus only on individual earnings before and after migration.

Like other theoretical models of geographic mobility, this model could be applied to either international or domestic migration. In the context of the model, one might conjecture that international migration entails higher costs and a greater degree of uncertainty surrounding the value of the destination market, $V^d(0)$. Holding other factors constant, higher ex ante uncertainty about the destination market might be expected to lead to a greater divergence between the realized returns to long term stayers versus return migrants, coupled with a higher probability of return migration.[11]

Finally, it is worth pointing out that our model ignores the possibility that movers have to make substantial new human capital investments in the destination market, as is often the case for migration between poorer and richer countries (see e.g., (Adda et al., 2022)). We also assume that the disutility of the destination location is summarized by a once for all moving cost, rather than by more complex dynamic costs that could arise in many settings.

2 Data Derivation and Measurement

Our data are derived from the social security registers of Austria and Germany. All private sector wage and salary jobs and many public sector jobs are included in both countries; civil service and self-employment jobs are excluded. The German records have been assembled by the Institute for Employment Research (IAB) into the Integrated Employment Biographies (IEB) data set (see Schmucker and Vom Berge (2025)). The Austrian records have been assembled by the Association of Austrian Social Security Institutions (HV) into the Austrian Social Security Database (ASSD) (see Zweimüller et al. (2009)).

Contracts signed between Johannes Kepler University of Linz (JKU), the IAB, and HV created a protocol for linking records between the two countries. Since Austria and Germany use different person identifiers, matching was performed by the agencies using first

[11] These predictions arise, for example, in a very simple version of the model in which the value of the origin market is a known constant and the value of the destination market is random prior to moving but realized immediately with a single draw from some distribution.

and last names and exact date of birth. The procedure was as follows: Names and birth dates of German citizens who appear in the ASSD by 2015 were sent to the IAB where they were matched with the full IEB population. Likewise, names and birth dates of Austrian citizens who appear in the IEB by 2015 were sent to the HV and were matched to the full population in the ASSD. We then received two person identifiers per matched individual, one that links to the ASSD and one that links to the IEB. Individual employment biographies for all matched individuals from the IAB were then linked to ASSD biographies in a safe data center at JKU.

Among the 315,000 Austrian citizens in the IEB, 60% could be merged to an individual with the same first and last name and birth date in the ASSD. Likewise, among the 570,000 German citizens in the ASSD, 68% could be merged to an individual with the same name and birth date in the IEB.[12] Many non-matches are people who never worked in their home country (e.g., because they moved as children or students).[13] We drop the roughly 12% of individuals from either country who have multiple records in one system or the other and those whose name plus exact date of birth is not unique, leaving us with 167,944 Austrians and 339,764 Germans who appear in both countries.

We then used the combined registers for these individuals to construct a quarterly panel with labor market status at the start of each quarter (i.e., on January 1, April 1, July 1, October 1). We classify labor market status into 3 states – employed, unemployed, or inactive (which includes people who are not in the register at a particular date). The Austrian register has no indicator for part-time status so we cannot distinguish between full-time and part-time employment spells (as is possible in Germany). We assign each individual to a single country in each quarter, selecting the country where they were employed (if unique), or the one with the longer employment spell if they worked in both. For individuals with no record in either country in a quarter we assign inactive status and the country of the previous quarter. Following this approach, a move to a new country always starts with a new register spell.[14] We define the quarter in which an individual first appears in their non-home country as their "index quarter" or, somewhat loosely as their "quarter of migration", although in our data a person could have changed their country of residence up to 4 quarters before their index quarter.

[12] The populations of Austria and Germany are about 8 million and 82 million, respectively. Thus, the 4% share of Austrians who ever appear in German registers is about 5 times higher than the 0.7% share of Germans who ever appear in registers in Austria. By comparison, the share of Irish-born people who live in the UK (4.6%) is about 40 times higher than the 0.1% share of UK citizens who live in Ireland.

[13] Austria is a major source for international students in German universities (Statistisches Bundesamt, 2025) and Germany is the largest source country for international students in Austrian universities (Statistik Austria, 2026). We suspect that many early movers ultimately stay in the country where they were educated.

[14] 95% of these first spells in the destination country are spells of employment. The other 5% are people who move and register in the social security system as job searchers – an option that is available in both countries, and provides access to some job search services. Eligibility for UI-benefits is usually tied to previous employment in the respective country and therefore highly improbable for first-time migrants.

The Austrian and German social security registers report total earnings received from each employer in a year. They also include the start and end dates of each job spell, and an establishment identifier for the workplace. We use these data to calculate the main employer in each quarter: in most cases there is only one; otherwise we select the one that paid the highest total earnings in the quarter. We assign the wage for the quarter as the average daily wage paid by the main employer, using imputed earnings for those with total earnings above the contribution cap.[15] We measure daily wages in both countries in real 2000 Euros per day.

Our next step is to identify people who move after attaining significant labor market experience. We begin by dropping people who did not have at least two years of continuous employment in their home country prior to their first appearance in the other country. This eliminates about 57% of Austrians and 42% of Germans, leaving us with samples described in the top row of each panel of Appendix Table A1. We then impose a series of further refinements, shown in the subsequent rows of the table. Specifically, we require that migrants are continuously employed in a baseline period from 5 to 12 quarters prior to the index quarter (the quarter in which they first appear in the other country's records); were aged 20-45 in the index quarter; first appeared in the destination country in January 1980 or later; were either employed or registered as unemployed in the index quarter; and were not working as an apprentice during the baseline period. These refinements eliminate about 71% of Austrian migrants and 81% of German migrants from the samples described in the first row of each panel. The main loss of sample arises from the requirement of continuous employment in the baseline period. Importantly, however, as shown in the right-hand columns in the table, the imposition of these refinements does not lead to large changes in the characteristics of migrants relative to the pool with 2+ years of continuous employment prior to their move.

For each migrant in our main analysis sample, we identified all individuals who worked at the same employer(s) at any point during the baseline period, were continuously employed during their matched migrant's baseline period, and never appeared in the register of the other country. We then randomly selected 100 of the co-workers in each employer-quarter (or all the co-workers at smaller firms), and took the union of these selected sets for each migrant. Thus, each migrant is matched to up to 800 co-workers. A small number of migrants cannot be matched to any co-workers who meet our sample requirements: these are mainly employees of small firms with high turnover rates.

Finally, to aid in the interpretation of our findings, we estimated a set of AKM models separately for Germany and Austria across six consecutive seven- to eight-year intervals covering the period from 1978 to 2023. These models use average daily wages for the main employer in each year, following the approach of Card et al. (2013). Given the lack

[15] We use Tobit models to impute the annual total earnings for people whose earnings are above the social security maximum for a given country and year, following the procedures used in Card et al. (2013).

of education information in the ASSD, we use a simple specification of the time-varying covariates in the AKM models, with only year dummies and a cubic in age. These models provide interval-specific estimates of the person effects for each of the migrants and their co-workers, as well as estimates of the firm effects for their employers.

We normalize the AKM models as follows. First, for each interval, we set the mean of the person effects to 0 (weighting each person by the number of years they are in the estimation sample for that interval). Second, we set the mean of the establishment pay premiums to zero (weighting each establishment by the number of person-year observations for that workplace). Third, we normalize the polynomial in age by setting the value at age 40 to zero. With these normalizations, the year effects in the AKM models identify the annual means of log daily wages in the labor market as a whole, after standardizing the wages of all workers to age 40. As we discuss below, mean log daily wages defined this way are higher in Germany than Austria, with a gap that declined from around 21% in the early 1980s to around 5% in the 2008-15 period.

Appendix Section C provides a more detailed discussion of the AKM models, as well as a summary of the estimation results for each country and interval. In brief, the estimates are very similar to estimates reported in the literature, with adjusted R-squared statistics of around 0.9. We also compared the person effects for the same individual in different intervals, and for the same individual in different countries. The person effects from consecutive intervals in the same country are very highly correlated ($\rho \approx 0.9$); this correlation fades slightly as the gap between intervals widens. The person effects for the same individual observed in consecutive intervals but in two different countries are somewhat less highly correlated ($\rho \approx 0.7$).

3 Description of Migrants

Table 1 presents the characteristics of the Austrian and German migrants in our analysis sample (columns 1 and 4), along with the subset who have at least one co-worker in the baseline period (columns 2 and 5), and the subset who have 1+ co-workers and estimated AKM effects for at least 2 quarters in the baseline period and 2 quarters in the post-migration period (columns 3 and 6). The latter is our main sample for estimating the wage returns to migration.

Figure 2 presents complementary information on how some of these characteristics have changed over our 35 year sample period (limiting attention to the samples in columns 1 and 4 of Table 1). On average, just over a third of migrants from both countries are female, with very stable female shares over time (panel b of Figure 2). Their average age at labor market entry is around 21 (slightly older in Germany); their average age at migration is around

32 (again, slightly older in Germany). Average age at migration rises until around 2005 (panel c of Figure 2); thereafter it stabilizes for Austrian migrants and actually falls slightly for Germans. The distribution of migration dates is relatively constant across decades for Austrians (panel a of Figure 2) but is more heavily concentrated in the 2000+ period for Germans. We suspect that the rise in German out-migration was driven by a combination of factors, including reunification, which opened the door for East Germans to move to Austria, and the prolonged 1990s recession in Germany.[16]

A limitation of our analysis sample is that it includes only a minority (20-30%) of between-country movers with substantial pre-migration experience in their home country. To get a sense of the effects of the underlying sample selection rules, Appendix Figure A1 shows a series of comparisons between the trends in the average characteristics of all migrants with 2+ years of pre-migration work experience (i.e., the groups shown in the first rows of the two panels in Appendix Table A1), and those in our analysis sample. Panels a and b of this figure show the number of Austrian and German migrants in the larger sample (left side) and in our main analysis sample (right side), while panels c and d compare the fractions of female migrants by year in the two samples, and panels e and f compare mean ages at migration. Reassuringly, the temporal patterns in our main analysis sample are very close to those in the larger population of migrants with at least 2 years of continuous labor market experience prior to their move.

Returning to Table 1, we see that on average the pre-migration wages of German migrants (in the baseline period prior to migration) were somewhat higher than those of Austrian migrants. As shown in panel d of Figure 2, however, this gap has varied over our sample period. Until the late 1990s, mean wages of migrants were higher for Germans than Austrians. As outmigration flows from Germany expanded, however, the mean wages of German migrants fell, while those of Austrian migrants continued to rise. Consequently, the German/Austrian gap in pre-migration wages switched signs: from +20% in the years before 2000 (about the same as the gap in average wages between the two countries in the 1980s) to -10% after 2005 (compared to a +5% difference in average wages in the 2008-2015 period). Similar trends in pre-migration wages are also evident for the larger sample of migrants with substantial experience prior to moving (see panels g and h in Appendix Figure A1).

We can use the estimated person effects for migrants from their baseline period to assess the selectivity of migration. Since the person effects are normalized to have mean 0, the means for migrants reflect their relative earnings potential compared to other workers in their home country. The entries in Table 1 suggest that both Austrian and German migrants are positively selected, with mean person effects some 10-15% above the national average

[16]The German unemployment rate remained above 6% from 1992 to 2009; the unemployment rate in Austria was below 6% throughout this period.

(i.e., there is "brain drain" in both directions). Looking at the trends in these means for our main analysis sample (shown in panel l of Appendix Figure A1), however, we see that the mean person effects of German migrants fell after 2000 while the mean person effects for Austrians rose. This change in the relative selectivity of Austrian migrants worked in the same direction as the rise in average wages in Austria relative to Germany, with the two factors combining to explain the rather large shift in the pre-migration wages of migrants from Austria versus Germany after 2000.

Table 1 and Figure 2 also provide information on the shares of migrants originating from different industries and regions. Around a quarter of migrants from both countries worked in manufacturing in the baseline period, about 40% in services, and 17% in sales. Figure 2, panels f and h, show that the employment share of migrants in each sector deviated from the corresponding share of all workers in the sector. German migrants were less likely to come from manufacturing in the early years of our sample, and across all years they were relatively likely to have worked previously in the hotel and accommodation sector. In terms of geography, just over 40% of Austrian migrants and 30% of German migrants came from areas close to the border – in both cases substantially above the national employment shares in these regions (see panels e and g). In contrast, the share of German migrants from East Germany was close to the share of all workers in the East in most years after reunification. For Austrian migrants we show the share from the Vienna region, which in the later years is close to the share of all workers in that region. For Germans we show the share of migrants from the 5 largest cities (Berlin, Munich, Frankfurt, Cologne, and Hamburg). This is also not too different from the share of all workers in those cities, suggesting that in both countries the out-migration rates from larger cities are similar to rates from smaller cities and rural areas.

Many international migrants eventually return home (see e.g. Akee and Jones (2024); Amanzadeh et al. (2024); Dustmann and Weiss (2007)). This is also true for migrants between Austria and Germany: Figure 3 shows the fractions of migrants who have ever returned to their home country in each quarter after their move, as well as the fraction who are currently at home. The gap is comprised of "repeat migrants" – people who have migrated back and forth multiple times. Within a year of their index quarter 19% of Austrian migrants and 27% of German migrants have returned home. The exit rates then slow down, and within 5 years about 35% of Austrian migrants and 45% of German migrants are back in their home country. These rates are close to the out-migration rates reported by Dustmann and Weiss (2007) for a broad set of U.K. immigrants, but somewhat higher than those reported for U.S. migrants by Akee and Jones (2024).

4 Graphical Overview of Outcomes Before and After Migration

With this background we turn to a graphical overview of the impacts of migration, using an event study framework that shows the outcomes of migrants and co-workers before and after the index quarter (which we denote as "quarter 0").[17] Up until quarter -5, migrants were in their home country. From quarter -4 to -1, they could be working or registered as unemployed in their home country, or they could have moved to the destination without starting a job or registering in the UI system. In quarter 0 all migrants are either working or registered in the UI system at the destination. Thereafter, their outcomes reflect a mixture of outcomes in the origin and destination.

Results for the probability of employment are shown in Figure 4A. The left panels (a) and (c) show profiles for co-workers reweighted to have the same age and gender composition as migrants using a propensity score reweighing scheme (DiNardo et al., 1996).[18] Migrants and their co-workers were fully employed in the baseline period (quarters -12 to -5). Starting in quarter -4, the employment rates of the migrants fall off quickly, bottoming out at around 60% in quarter -1 for both Austrians (upper left panel) and Germans (lower left panel). This pattern suggests that many cross-border moves are precipitated by a job loss, consistent with our simple dynamic model.

In quarter 0 the migrants' employment rates rebound substantially, reflecting the fact that nearly all have started a new employment spell in the destination country. (About 2% of Austrians and 5% of Germans start quarter 0 in unemployment). Thereafter, the employment rates of both Austrian and German migrants drift downward, reaching 80% 20 quarters after their move. Reweighting the previous co-workers only by age and gender, their employment rates start at a lower level in quarter 0 but decline more slowly. By quarter 20 about 85% of Austrian co-workers and 87% of German co-worker are employed.

The differences in the post-migration employment profiles of the migrants and their previous co-workers lead to the concern that the previous co-workers are an imperfect counterfactual for the labor market outcomes of the migrants. In the spirit of the synthetic control approach proposed by Abadie et al. (2015), we therefore consider an alternative reweighting scheme that tries to match the gender and age composition of the migrants and their employment rates in quarters -2, -1, and 0. The idea is to place more weight on the outcomes of co-workers who experienced a similar loss and rebound in employment as the migrants around quarter 0. Rather than the reweighting algorithm proposed by Abadie et al. (2015), however, we use a simpler propensity score reweighting approach.

Results based on this approach are shown in panels (b) and (d) of Figure 4A. Adding em-

[17] Recall that we assign the index quarter for a migrant to all his or her co-workers.

[18] All weighting strategies also weight each co-worker by the inverse of the number of sampled co-workers for the associated migrant.

ployment outcomes in quarters -2, -1 and 0 to the propensity score model leads to weighted samples of co-workers whose employment rates bottom out in quarter -1 and rebound in quarter 0, similar to the migrants. After quarter 0 the reweighted sample of Austrian co-workers (panel b) has a profile of employment rates that is similar to that of the migrants, though it does not rise quite as high in quarter 0 and declines a little more slowly. The gap between the employment rates of the German migrants and their reweighted co-workers (panel d) is somewhat larger: around 2-3 ppts. in the first 2 years after the move, and about 5 ppts. in quarters 10-20.

Figure 4B shows the profiles of registered unemployment for the migrants and their matched co-workers under the two weighting schemes. Migrants (and co-workers) all have zero unemployment in quarters -5 to -12. Starting in quarter -4 the migrants start losing jobs and their unemployment rates rise accordingly, reaching around 15% in quarter -1. Post migration, the unemployment rate of Austrian migrants stabilizes at just under 5%, while the rate for German migrants fluctuates around a slightly higher rate. The reweighted samples of co-workers using our preferred approach in the right panels (b) and (d) also have a rapid rise and sharp fall in their unemployment rates. For Austrians, the average unemployment rates of reweighted migrants are quite close to those of the migrants in quarters 1-20. For Germans, the co-workers' unemployment rates stabilize at a rate about 1 ppt. below that of the migrants, consistent with their slightly higher employment rates.

Figure 4C shows our main outcome variable – mean log daily wages – again contrasting results using a simpler weighting scheme (only age and gender) for the panels on the left, and our preferred weighting scheme (age, gender, and employment rates in quarters -2 to 0) on the right. Looking first at the left-hand panels we see nearly parallel trends in wages in quarters -20 to -5, then some divergence in quarters -4 to -1 as the migrants lose their jobs and the mean wage among the remaining workers rises. The wage gap between migrants and their previous co-workers widens immediately in quarter 0, suggesting that migrants immediately find new jobs in the destination market that pay more than they were earning at home. Thereafter, the wage gap between migrants and co-workers is relatively stable. Similar patterns are evident in the right-hand panels of Figure 4C, although as might be expected, re-weighting the co-workers to match the employment rates of the migrants leads to wage trends in quarters -4 to -1 that more closely parallel the migrants.

In the baseline period, the wage gap between migrants and their previous co-workers was about 8 log points for Austrians and about 16 log points for Germans (regardless of weighting approach). In the post-migration period the gap widened to around 20 log points for both Austrians and Germans (again very similarly, regardless of weighting) implying a difference in differences of around 13 ppts. for Austrians and 4 ppts. for Germans.

A potential concern with the use of log wages as our primary outcome is that the employment rates of migrants and co-workers are not exactly the same in the post-migration

period, even under our preferred reweighting scheme. To assess the likely impacts of this divergence, we also looked at average daily earnings for migrants and co-workers, assigning 0's to quarters of non-work. Profiles of this outcome are presented in Figure 4D, again showing the two alternative weighting schemes. For Austrians, we see that migrants have an immediate rise in average earnings after quarter 0, while coworkers' earnings are roughly the same in quarters 1-20 as in quarters -5 to -12 (the baseline period). The difference in differences is about 16 Euros/day or 20% relative to the baseline mean for migrants. For Germans we see a smaller rise in migrants' earnings after quarter 0 relative to the baseline, with a difference in differences of around 5 Euros per day or about 6% of migrants' mean baseline earnings. Thus, the proportional gains in daily earnings, including zeros, give a qualitatively similar picture of the returns to migration as the differences in mean log wages, counting only periods of work.

5 Estimates of the Returns from International Migration

Next we turn to a set of difference-in-difference style estimates of the impacts of migration on earnings. Table 2 shows mean outcomes for the migrants and their co-workers in the pre- and post-migration periods, as well as the differences between the migrants and co-workers, and difference-in-differences of mean daily earnings, mean log wages, and the AKM components of wages over two horizons: from the baseline period to the first year after migration (i.e., to quarters 1-4); and from the baseline period to the 2nd through 5th years after migration (i.e., to quarters 5-20). Columns 1-3 present data for Austrian migrants and their co-workers (re-weighted using our preferred strategy), while columns 4-6 present corresponding data for German migrants.

Since we want to be able to use consistent samples for all the outcomes over a particular time horizon, in this table (and in the related analysis in Table 3) we define two subsamples of migrants and co-workers. The first – which we use for measuring returns to migration in the first year after moving – includes people who have person and firm effects in at least 2 quarters of the baseline period and 2 quarters in quarters 0-4. The second subsample – which we use for measuring returns over the 5-20 quarter horizon – includes people who have person and firm effects in at least 2 quarters of the baseline period and at least 8 quarters in the period 2-5 years after moving.

As a starting point, panels 1 and 2 of Table 2 present data on employment rates and shares in the home country in quarters 1-4 and 5-20. Looking first at the employment rates, we note that the requirement of having person and firm effects in the post-migration period leads to employment rates that are higher than those of the overall samples shown in Figure 4A. These requirements also narrow the gaps in employment between the migrants

and co-workers, with only a small positive gap for Austrians and a small negative gap for Germans. The shares of migrants with AKM wage components who have returned home in quarters 1-4 and 5-20, however. are very similar to the shares for all migrants used in Figure 3.

Panels 3-4 of Table 2 present earnings-related outcomes. We show separate baseline means for workers whose data contribute to the mean for Q1-4 and for those whose data contribute to the mean for Q5-20. Differences between these means reflect differences in the degree of selectivity of the set of people who are still working in the later period; reassuringly, these differences are very small. Panel 3 shows the *levels* of average daily earnings of migrants and co-workers, assigning 0's for quarters of non-work. Interestingly, the mean baseline earnings of the co-workers of Austrian and German migrants are very similar; the baseline earnings of Austrian migrants are about 10% above those of their co-workers, while the baseline earnings of German migrants are about 18% above their co-workers. Post-migration, the mean earnings of migrants rise relative to those of their co-workers, with a difference in differences of about 17 Euros/day for Austrian migrants (roughly 20% of their baseline daily earnings) and 3-6 Euros per day for German migrants (around 4-5% of their baseline daily earnings).

Similar patterns are evident in Panel 4, where we show mean log daily wages, calculated over the subset of people with positive earnings in a given quarter. Using this measure, migrants from Austria gain about 13 log points relative to their previous co-workers, with similar gains in the short and medium runs. By comparison, migrants from Germany gain about 4 log points in both the short and medium runs.[19]

To help interpret the observed gains in wages of migrants, we show the mean estimated person effects and mean estimated firm premiums received by migrants and co-workers before and after migration in panels 5 and 6 of Table 2, as well as the means of the $X\beta$ components of the model in panel 7. As noted earlier, we normalize the person effects to have mean 0 across all person-year observations in the AKM estimation samples from which they are derived. Thus a positive difference-in-differences in the mean person effects of migrants implies that their *relative* position in the distribution of person effects rises after moving. We discuss the interpretation of such a rise below. Similarly, we normalize the firm effects to have mean 0 across all person-year observations in the relevant sample. Thus a relative rise in the firm effects of migrants implies that they have moved up the job ladder to higher-paying employers at a faster rate than their previous co-workers.

Differences in differences in the mean $X\beta$ component reflect differences in mean log

[19]The differences in differences in mean log daily wages are somewhat smaller than the proportional gains in the level of daily earnings, with a gap that varies by country. In part this is due to the fact that there is a rise in the relative probability of employment for Austrian migrants – which adds 2-3 ppts. to the mean gain in their daily earnings– while there is a fall in the relative probability of employment for German migrants – which subtracts 2 ppts. from their mean gain in daily earnings.

wages in the place of work of migrants versus co-workers in the post-migration period.[20] The overall difference in mean log wages between Germany and Austria in our AKM models was around 20% in the period from 1979 to 1991, fell to 11% in 1992-99, 9% in 2000-2007, and 4.5% in 2008-2015. For Austrian movers, whose migration flows were relatively constant, these gaps translate into an average gain in the intercept of their AKM models of +12% (for migrants who remained in Germany), and +8% accounting for the 30% of migrants who are back home in quarters 5-20. For German migrants, who mainly moved after 2000, the gaps in wages imply a loss in the intercept of their AKM models of about -8% for those who remain in Austria, and -5% in quarters 5-20, accounting for the 40% who had returned home.

For Austrian migrants the difference in differences in panels 5, 6, and 7 of Table 2 show that the gains in wages of migrants relative to their previous co-workers arose from a combination of gains in their relative person effects and gains arising from the higher overall level of wages in Germany, with only a small change in their employer pay premiums. German movers also experienced relative gains in their person effects and small changes in their employer pay premiums, but by moving to a lower-wage labor market they ended up with smaller overall wage gains. Indeed, differences in the "country effects" in wages (captured by differences in the $X\beta$ component of the AKM models) are the largest factor driving differences in average returns to migration for Austrians versus Germans. In quarters 5-20 after moving, the 9 ppt. bigger wage gain for Austrian than German migrants arose from a 13 ppt. gain from moving to the higher-wage country, plus a 1 ppt. faster rise in their employer pay premiums, offset by a 6 ppt. faster growth in the relative person effects of German migrants.

What can explain the increases of the person effects of migrants relative to their previous co-workers? One factor is hours of work. Our earnings measures do not account for hours or part-time status, so a rise in migrants' hours will be captured by a rise in their person effects. A second explanation is that moving leads to a persistent wage boost, either because movers actually become better workers (perhaps by changing their friends and social activities), or because moving demonstrates to employers that they have abilities that were previously unrecognized.[21] A third and related explanation, which potentially applies to the subset of migrants who remain with the same firm when they change countries, is that the move is part of a career progression that also includes wage increases.

A fourth potential explanation, implicit in some theoretical models of migration, is that

[20] The $X\beta$ component of our AKM models also captures age effects, but we have reweighted the co-workers to have a similar age distribution as migrants so the age-related differences are small, as can be seen from the differences in the means of $X\beta$ between migrants and co-workers in the baseline period.

[21] Using economy-wide data for Germany, Zen (2024) shows that the changes in the estimated person effects for a given individual between consecutive AKM estimation windows are consistent with a random walk process, and interprets this as evidence of market learning about their abilities, as in Farber and Gibbons (1996).

what matters for earnings is one's *rank* in the distribution of abilities in a given labor market, and that ranks are translated to earnings through a market-specific scaling factor that depends on the dispersion in earnings (i.e., $\alpha_i = \sigma_m r_i$ where α_i is the person effect in earnings for individual i, r_i is their ability rank, and σ_m is a scale factor in market m).[22] In this class of models, an individual's person effect is rescaled when they enter a new labor market; in particular, the person effect for a worker with above-average abilities will become more positive if they enter a more unequal labor market. Since the dispersion in wages is very similar in Germany and Austria, however, this story has limited relevance (see Appendix Table C1). Moreover, the fact that we see rises in person effects for movers in both directions suggests that the person effects are not simply being rescaled.

As noted, the characteristics of migrants and their previous co-workers are not exactly the same, even when we re-weight the co-workers using our preferred strategy. They have different levels of baseline wages and somewhat different profiles of employment. It is therefore important to ask whether our estimated returns to migration are much different when we employ different weighting strategies. Appendix Table A2 presents estimated short-run and medium-run returns to migration under our preferred weighting strategy; using weights that only depend on age and gender; and using weights that depend on age, gender, and baseline wages. We also explore how much different characteristics of Austrian and German migrants matter in explaining their relative returns by using a vector of predetermined characteristics (age, gender, baseline wages, unemployment experience, origin regions and industries) to re-weight Austrian migrants to be more like Germans, and vice versa. The results suggest that our estimated returns to international migration are highly robust to the choice of weights.

6 Heterogeneity in the Returns to Migration

While the average gains to migration are positive for both Austrians and Germans, it is interesting to compare the returns for different types of movers. Table 3 summarizes the heterogeneity in returns for three different classifications of workers: by their unemployment status just before the move; by whether the migrant moved between establishments in the origin and destination connected by multiple migrants; and by their region of origin. We also show returns by duration of stay in the destination, distinguishing between "stayers" – migrants who were still in the destination 20 quarters after their move; "early returners", who spent no more than a year in the destination; and "late returners", who spent between 5 and 19 quarters in the destination.

Columns 1-5 of the table present data for Austrian migrants; columns 6-10 present data

[22] This is a special case of the model presented by Borjas (1987).

for Germans. We show the average returns for the first year after moving ("short run returns") in columns 1 and 6; and the average returns plus the AKM decompositions of these returns for quarters 5-20 ("medium run returns") in columns 2-5 and 7-10. For reference, Figures 5A and 6A show the employment and wage profiles of migrants and their co-workers (reweighted using our preferred strategy) across the three dimensions in the upper panel of Table 3, while Figures 5B and 6B show the corresponding profiles for stayers, late returners and early returners.[23]

6.1 Heterogeneity by Unemployment Status Prior to the Move

We begin by comparing returns to migration for people who were unemployed prior to moving and those who moved directly from a job in the origin to another in the destination (job-to-job or J2J movers). Looking first at the employment profiles of the two groups of migrants (panel a of Figure 5A and Figure 6A), we see that the employment rate in quarter -1 was close to 0 for migrants who were unemployed pre-move, but around 80% for the J2J movers, suggesting that many J2J movers took relatively little time off between their jobs. Post-migration, those who were unemployed pre-move have lower employment rates than those who were not, but for both groups in both countries, the migrants' employment rates are not too different from those of their matched co-workers.

The wage profiles in panel b of Figures 5A show a clear jump in wages at quarter 0 for Austrian J2J movers, versus a relatively stable wage profile for their previous co-workers. The wage profiles for German J2J migrants (panel b of Figure 6A) and their co-workers are broadly similar and also point to a wage gain for migrants relative to previous co-workers. The patterns of wages for migrants who were unemployed prior to moving are somewhat different.[24] For both Austrians and Germans the co-worker comparison groups show a *wage loss* after quarter 0, suggesting that in the absence of moving, the migrants would have faced a decline in their wage opportunities, especially in the first year or so after quarter 0. Relative to this counterfactual, the migrants fared better, though in each case they earned little more than what they earned in quarter -5.

As shown in rows 2 and 3 of Table 3, we estimate short- and medium-run wage gains for Austrian J2J movers of around 14-15%, and corresponding gains of around 10-11% for Austrian migrants who were unemployed pre-move. For German J2J movers the short- and medium-run wage gains are around 3-4%, while the corresponding gains for those who

[23] As in Figures 4A to 4D and Table 2, the samples used in Figures 5A, 6A, 5B, and 6B include all workers in a given quarter with a positive wage, whereas the samples used in Table 3 are limited to people who have estimated person and firm effects in at least 2 quarters of the baseline period and 2 quarters in the first year after moving (for the short run returns) or at least 2 quarter in the baseline period and 8 quarters in quarters 5-20 (for the medium run returns).

[24] As noted, only a very small share of the unemployed migrants or their matched co-workers had jobs in quarter -1, so the mean wages in this quarter are subject to extreme selection bias.

were unemployed pre-move are 6-7%. The AKM components of these gains show that both groups of Austrian migrants saw raises of 6-8% attributable to the higher wages in Germany (column 5), while both groups of German migrants saw losses of 4-5% attributable to the lower wages in Austria (column 10). Complementing the gains of the Austrians and offsetting the losses of the Germans was a rise in average firm pay premiums (columns 3 and 8) with a particularly large gain (+5 ppts.) in the premiums earned by previously unemployed German migrants. Both groups of German migrants and the Austrian J2J movers also experienced significant gains in their person effects, though previously unemployed Austrian migrants did not (columns 4 and 9).

6.2 Heterogeneity by Connected Status of Origin and Destination Workplaces

One possible difference between J2J migrants and those who were unemployed between jobs is that some of the J2J group may have been transferred between establishments owned by the same firm, or between firms connected through an international supply chain relationship.[25] To probe the potential importance of such cross-border connections, we identified origin and destination establishments that were connected by 4 or more movers in our matched file. Under this criterion, around 10% of migrants in either direction moved to a "connected" establishment – a rate that is far too high to have occurred by chance. We then compared connected and unconnected movers, keeping in mind that the type of move is an endogenous outcome, rather than a predetermined characteristic of the migrants.

As expected, migrants between connected workplaces have a much smaller drop in pre-migration employment (see panel c of Figure 5A and Figure 6A) and higher employment rates post-migration. They also experience larger wage gains than other movers (see row 4 of Table 3), with average gains of about 17-18 ppts. for connected Austrian migrants and 9-10% for connected German movers. The higher gains for connected movers seem to be explained in large part by the larger gains in person effects for these movers – potentially reflecting promotions that coincide with the move. Another explanation might be better information about potential job matches at connected firms (as discussed in Section I).

6.3 Heterogeneity by Region of Origin

Economic reasoning suggests that people with higher costs of migration will only move if their expected gains are larger. A standard proxy for moving costs is distance (e.g., Vanderkamp, 1971). Putting these pieces together, we might expect to see higher ex post returns to migration for people who move a longer distance. Panels e and f of Figure 5A contrast

[25] Many auto parts manufacturers in Austria, for example, export to German auto companies or major German parts suppliers. See https://con-labour.at/en/home/oesterreichische-autoindustrie/, last accessed March 2026.

the employment and wage profiles of migrants who originated in parts of Austria closest to the German border versus those from Vienna (which is relatively far from the border). Similarly, panels e and f of Figure 6A show employment and wage outcomes for migrants who originated in the region of Germany closest to the Austrian border versus those from the 5 largest cities in Germany (all of which except Munich are over 400 km from the Austrian border). The wage profiles for the two groups of Austrian migrants confirm our expectations, with gains to migration about 10 ppts. higher for migrants from Vienna than migrants from the border region (see rows 6 and 7 of Table 3). For the two groups of German migrants, however, the differences are small, and neither group has large wage gains – though as we discuss below our wage comparisons take no account of changes in the cost of housing, which might have led to gains in *real wages* for German migrants from the larger cities.

Another important regional distinction among German migrants is between residents of East Germany (who only appear in our data starting in 1994), and other parts of Germany. Panels e and f of Figure 6A show employment and wage outcomes for East Germans. These migrants had baseline wages about 20% below the average wage of all Germans, and 33% below the wages of other German migrants. A move to Austria could potentially reduce or eliminate the regional wage penalty captured in their average firm effects. Consistent with this, the observed gain in wages for migrants from the East relative to their matched co-workers in panel f of Figure 6A is large. Looking at row 8 of Table 3, we confirm that they had average wage gains of about 16 ppts. in the short run and 13 ppts. in the medium run, with a 13 ppts. rise in their average firm effects and a gain in their person effects, offset by the lower average wages in Austria than Germany as a whole.

6.4 Heterogeneity by Gender and Wage Level

Although not shown in Table 3, we have also examined the gains to migration for several other subgroups. One obvious comparison is by gender: the results of this analysis are summarized in Appendix Table A4. In brief, we find larger gains to international migration for males than females, with average returns over the medium run of 17 ppts. for Austrian men, 5 ppts. for Austrian women, 7 ppts. for German men, and 1 ppt. for German women. Of the 12 ppt. gender gap for Austrian migrants, two-thirds is explained by larger gains by men in their person effect; of the 6 ppt. gender gap for German migrants, virtually all is explained by larger gains by men in their person effects. These patterns are consistent with the hypothesis that many female migrants are "tied movers" (DaVanzo, 1976; Jayachandran et al., 2026; Mincer, 1978) whose personal earnings gains from migration are small or even negative, though we cannot identify partners in our data and cannot test this directly. When we look at domestic migrants to larger cities, however, we see more similar returns to migration for women and men in both countries (see the discussion below) suggesting that

there may be differences in family migration rates of domestic and international movers, or other factors that offset the tied mover penalty for female movers to larger cities.

Another interesting dimension of heterogeneity is the comparison between higher- and lower-wage workers. In the Roy-style model popularized by Borjas (1987), higher-skilled workers experience larger returns from moving to a higher-inequality country (where skill gaps are wider) whereas lower-skilled workers benefit more from moving to a lower-inequality country. In the case of Austria and Germany the distributions of wages are quite similar, so the market-wide inequality factor emphasized by Borjas has limited impact. Nevertheless, it is interesting to compare the returns for migrants whose wages in the baseline period were in low- or high-wage quintiles for all migrants. Results of this comparison are summarized in Appendix Table A5.

For both Austrian and German migrants we find that the gains to migration are higher for migrants with lower pre-migration wages: the medium-run gains are approximately 18 ppts. versus 9 ppts. for migrants from Austria with wages in the bottom 2 quintiles of the baseline period distribution versus migrants with wages in the top 3 quintiles, and 11 ppts. versus 2 ppts. for low- versus high wage migrants from Germany. As shown in the table, similar patterns are also present among domestic migrants to larger cities (see below).

An issue for these comparisons is that the classification of workers into high and low wage groups is affected by transitory wage factors that are likely to be negative for lower-wage migrants and positive for higher-wage migrants. Other things equal, we would therefore expect larger gains for lower-wage migrants, driven by simple mean regression. One way to assess the degree of mean regression is to measure the changes in the mean AKM *residuals* for migrants relative to their matched co-workers. As might be expected, these residual changes are positive for migrants with bottom quintile baseline wages and negative for migrants with top quintile baseline wages. Differences in the residual components of the wage gains account for nearly one-half of the difference in returns between low- versus high-wage Austrian migrants, and about one-fifth of the gap for Germans. Even abstracting from these residual changes, however, we see higher proportional returns for lower-wage migrants in both directions. Such a pattern might be expected if there are fixed costs of migration: in that case, lower wage workers will only move if they anticipate higher proportional returns.

6.5 Heterogeneity by Duration of Stay

A simple dynamic learning model such as the one outlined in Section 1 suggests that uncertainty over potential opportunities in the destination market can lead to an equilibrium with relatively high rates of return migration. In particular, migrants who find worse-than-expected opportunities will return home quickly; those who find better opportunities will

stay. To investigate the relationship between realized outcomes in the destination labor market and return migration, we divided migrants into three groups: those who were still in the destination 5 years after their index quarter ("stayers"); those who stayed in the destination at least a year but returned within 5 years ("late returners"); and those who stayed less than a year ("early returners"). Appendix Table A7 presents a comparison of the characteristics of migrants from each country in the three groups. The early returners from the two origin countries are fairly similar, but have a number of distinctive characteristics relative to other migrants. In particular, they tend to have had lower baseline earnings than late returners or stayers, mostly attributable to their lower person effects. They are also more likely to have been unemployed prior to their move; to have worked in the construction and hospitality industries; and to be from the border region (for Austrians) or one of the 5 largest cities (for Germans).

Figures 5B and 6B present employment and wage profiles for the three groups of Austrian and German migrants and their previous co-workers, respectively. Specifically, panels a and b show the data for late returners and stayers, while panels c and d show employment and wages of early returners. Panel e of each figure shows the shares of early returners who were in registered unemployment in each month. Finally, rows 9-11 of Table 3 report the estimated short- and medium-run returns to migration for the three groups.

Note that early returners are all back in their origin market by quarter 5, so apart from a small share of repeat movers all of their medium-run returns are based on wages in the *origin* labor market. In contrast, stayers are all in the destination market throughout the medium-run followup period. Later returners are in-between, with a majority of wages in the first few years after the move earned in the destination market, but a rising share earned in their home market in later years.

Starting with the stayers and late returners, we note that for both countries the two groups had similar dips in employment prior to their move, and fairly similar employment rates in the first year after their move (panel a). Thereafter the employment rate of the late returners falls relatively quickly (presumably reflecting a combination of exogenous job losses that led to their return and endogenous disruptions from the move itself), while the employment rate of the stayers trends down more slowly. Looking at wages (panel b), we see that among Austrian migrants the late returners earned more than the stayers in the base period. At the index quarter the wages of both groups rise, while the wages of the co-worker comparison groups trend smoothly (apart from the selection-bias induced rise in wage from quarters -4 to -1). The wages of the stayers rise steadily after quarter 0, while the wages of the late returners flatten out after quarter 5, leading to a cross-over at around the 9th quarter after the index move. From then on, the wages of the stayers are *higher* than those of the late returners.

The wage profiles for the German stayers and late returners (panel b of Figure 6B) are

nearly on top of each other in the years prior to their move, but at quarter 0 the late returners show a bigger rise than the stayers. Similar to the late-returning Austrians, however, their wages flatten out after about a year, while the wages of the stayers continue to rise, leading to a very similar cross-over at about 9 quarters. We interpret these patterns as suggesting that migrants who ended up staying at least 5 years in the destination country found relatively high-paying jobs with continuing wage growth opportunities. Late returner also found good jobs initially – yielding about the same short run returns to their migration experience as the stayers (see rows 9 and 11 in Table 3). But then they experienced bad luck in the destination labor market, with the net result that their medium-run gains from migration are considerably below those of the stayers – 9 ppts. versus 19 ppts. for Austrian migrants and 3 ppts. versus 8 ppts. for the Germans.

The employment, wage, and unemployment profiles of the early returners (panels c, d, and e of Figures 5B and 6B) form an interesting contrast with those of the other two groups. They have employment rates above 90% in quarter 0, and mean wages in quarter 0 that are well above the wages of their matched co-workers. But just one quarter later, their employment rates fall, their unemployment rates rise, and their mean wages fall, suggesting that they experienced deteriorating opportunities almost as soon as they arrived. The experiences of the early-returning Austrians and Germans are very similar: as shown in row 10 of Table 3, the early-returning Austrians have essentially zero wage gains in both the short and medium runs, while the early-returning Germans have slightly negative short- and medium-run gains (around -3 ppts.).

7 Returns to Domestic Migration

Many people who are contemplating an international move could alternatively move to a different labor market in their home country. Typically, the costs of a domestic move are lower, since a change in countries often involves different labor market institutions and substantial legal barriers. In our context, however, these extra costs are relatively small: Germany and Austria share the same language and labor market institutions, and the legal barriers are minor. It is therefore interesting to compare the economic returns to international migration between the two countries to the returns to migration within each country.

Rather than consider all forms of domestic mobility, we focus on moves to larger cities: to Vienna, in the case of Austrians; to one of the 5 largest cities (Berlin, Hamburg, Munich, Cologne, Frankfurt), in the case of Germans.[26] We focus on moves to the "big city" for

[26]Vienna had a population of about 2 million in 2025, accounting for just over one-fifth of the Austrian population. The corresponding populations of Berlin, Hamburg, Munich, Cologne, and Frankfurt am Main were 3.7 million, 1.9 million, 1.5 million, 1.0 million, and 0.8 million respectively, and together these cities accounted for about 11% of the German population.

three main reasons. First, it simplifies the analysis, providing us with a single definition of domestic migration. Second, we need large numbers of migrants to reliably estimate the gains to migration, and moves to larger cities are relatively common. Third, we suspect that for many people who are contemplating an international move, migration to the big city (or one of the big cities) in their home country is a leading alternative (see Davis et al. (2002) for an analysis of Mexican migrants).

7.1 Derivation and Description of Domestic Movers

We use the ASSD data to construct a panel of domestic migrants in Austria who were first observed working in a labor market at least 100 km away from Vienna, and were later observed working in Vienna. Similarly, we use the IEB data to construct a panel of German migrants who were first observed working in a smaller city or rural area at least 100 km away from any of the 5 larger German cities, and were later observed working in one of those cities. Paralleling our analysis of international migrants, we focus on movers who first appear in a big city between 1980 and 2015, were age 20-45 at the first move, and were steadily employed in the 5-12 quarters prior to that point. We also use the same previous co-worker design, reweighting the co-workers to have, on average, the same age, gender, and probabilities of employment as the migrants in the quarters -2 to 0 leading up to their move.

Table 4 presents a side-by-side comparison of international and domestic migrants from Austria who originated outside Vienna (columns 1 and 2) and international and domestic migrants from Germany who originated outside the 5 largest cities of the country (columns 3 and 4).[27] Overall, the four groups are broadly similar, with one exception being their pre-migration wages. In the baseline period international migrants from Austria earned about 15% more than those who moved to Vienna, while international migrants from Germany earned about 5% less than those who moved to one of the big cities in Germany. A comparison of mean person and firm effects from the baseline period shows that in Austria, the higher wages of international movers arose from a combination of higher person effect (+6 ppts.) and higher firm effects (+6 ppts.), plus a difference in timing that added another +3 ppts. In contrast, international movers in Germany had lower person effects (-2 ppts.) and lower firm effects (-3 ppts.) than domestic movers.

The origin regions of domestic and international migrants are also somewhat different: 60% of Austrians from outside Vienna who moved to Germany came from the border regions of the country versus only 15% of those who moved to Vienna. Likewise 20% of Germans from outside the largest cities who moved to Austria came from the border regions of

[27] Note that the statistics for international migrants in this table differ slightly from those in earlier tables because the samples exclude migrants who originated in the large cities.

the country versus only 3% of those who moved to the 5 largest cities. Despite these and other differences, the persistence rates of international and domestic migrants are similar: 48% of Austrian domestic movers, 43% of Austrian international movers, 47% of German domestic movers, and 54% of German international movers returned home (or otherwise moved on) within 5 years.

7.2 Effects of Domestic Moves

Figure 7 shows the employment and wage profiles for domestic migrants in Austria (panels a and b) and Germany (panels c and d), along with profiles for comparison groups made up of their previous co-workers (reweighted using our preferred approach). Looking first at the employment profiles we see that Austrian movers to Vienna have about the same employment rates as their matched co-workers in the first year after moving, but in later years the migrants' employment rates are lower. In contrast, German migrants to the 5 largest cities have about the same employment rates as their matched co-workers from quarters 0 to 20.

The wage profiles for domestic migrants and their co-workers look broadly similar to the profiles for international migrants, with parallel trends between quarters -20 and -5, then a rise from quarters -4 to -1 reflecting selection bias, followed by a divergence between the migrants and co-workers in the post-migration period. There are two key differences with the wage profiles for international migrants: (1) the rise in wages for domestic migrants is bigger for Germans than Austrians, while the opposite is true for international migrants; and (2) it appears that the gains from domestic migration rise over time, whereas the gains for international migration are more stable.

Table 5 presents an overview of the short-run and medium-run wage gains for all domestic migrants (row 1) and for subgroups classified by unemployment status prior to moving (rows 2 and 3); by origin region (rows 4 and 5) and by duration of stay in the destination city (rows 6-8). Consistent with the patterns in Figure 7, we see that returns to moving to a big city are larger for Germans than Austrians, and are also larger in quarters 5-20 (the "medium run") than in quarters 1-4 (the "short-run"). As we found for international migrants from Austria (but not Germany), the returns to a move to the big city are higher for people who move job-to-job than for those who are unemployed before they move. They are also relatively large for people from East Germany. And they are largest for people who stay in their destination for 5 or more years, though the relative size of the returns to moving for people who spend less than 5 years in the destination city is noticeably different for Austrians than Germans.[28] Figures 8A and 8B show that domestic movers in both countries who leave the big city within the first year experience a drop in employment right after quarter 0 which

[28]For domestic migrants, "returners" include people who move back to their origin region as well as those who move from their initial destination city to some other location.

suggests that they have problems almost immediately after their move – very similar to the patterns we observed for international migrants who return within a year.

To better understand the sources of the different returns to domestic and international migration for Austrians and Germans we began by conducting a simple re-weighting exercise, shown in panels 3 and 4 of Appendix Table A3. For each origin country, we fit a propensity score model to distinguish between domestic and international migrants, using a vector of predetermined characteristics including age, gender, year of migration, base period wages, region, and industry of origin. We then re-weight the domestic migrants to have the same characteristics as international migrants from the same country. This reweighting raises the medium-run returns to domestic migration in Austria from 5.3 ppts. to 7.9 ppts. and lowers the returns to domestic migration in Germany from 10.5 to 8.6 ppts. The major factors driving the differences in reweighted returns are the origin industry of the migrants and the share with relatively low base wages.

As a second exercise, we compared the returns to international migration for Austrians who moved to one of the 5 largest German cities versus those who moved to smaller markets in Germany. The medium-run wage gain for movers to the larger cities is 21 ppts., versus 11 ppts. for those who moved to smaller cities, with 5 ppts (see Appendix Table A8) of the gap associated with a bigger rise in average firm effects (reflecting the higher average wages in the big cities), and most of the remaining gap associated with a bigger rise in the person effects of movers to the big cities (reflecting some combination of career upgrading and longer hours of work). Interestingly, the 10 ppt. extra gain in wages for Austrians who move to a larger German city is quite close to the average return for German domestic migrants who move to a larger cities, as are the sources of this extra gain in the AKM decomposition.

In a third exercise, we compared the international and domestic returns to migration for different subgroups. Table 6 presents the mean difference in differences in log wages for the two types of movers (columns 1 and 6), as well as the AKM-related components of these mean changes (columns 2-4 and 7-9 respectively). For simplicity, we limit attention to the medium-run returns. For domestic migrants we also show the difference in differences in the location-specific means of the AKM firm effects (columns 5 and 10). These are uniformly positive, reflecting the fact that average pay premiums in the larger cities of both countries are positive.

Looking first at the data for Austrian migrants, the mean return to international migration across all workers is 7.7 ppts. higher than the mean return to domestic migration (13.0 versus 5.3 ppts.). Virtually all this difference is explained by the higher average level of wages in Germany, which lead to a +7.8 ppts. $X\beta$ contribution to the returns to international migration. The difference in differences in mean person effects and mean firm effects for domestic versus international migrants are nearly the same.

For German migrants the mean return to international migration is 6.5 ppts. lower than

the mean return to domestic migration. Again, most of the gap is attributable to the lower average level of wages in Austria: international movers have a -4.5 ppts. $X\beta$ component in their international returns. For Germans, the person and firm components of the AKM decompositions for international and domestic migrants are also different: domestic movers have larger gains in their firm effects (including a 2.6 ppts. gain in the city-specific component of their wage premiums), but smaller gains in their person effects than international movers.

Rows 2-8 of Table 6 present a parallel set of decompositions of the relative return to domestic versus international migration for different subgroups. For most subgroups of Austrians the returns to international migration are 8-10 ppts. higher than the returns to domestic migration, with nearly all of the gap attributable to the bigger $X\beta$ component for international movers, and few differences between the gains in person and firm effects. One exception is movers from the western part of Austria (which is closer to the German border than to Vienna). For this subgroup, the gains in person effects and firm effects for domestic movers are larger than the corresponding gains for international movers. We suspect that many of the Austrians from this region who move to Germany work in smaller cities near the border where labor market opportunities are limited.

For most German movers, there is a pattern of larger changes in the firm effects for domestic than international movers, in part because these changes capture the increase in city-wide wage premiums for movers to larger cities shown in column 10. An interesting exception is international movers from East Germany, whose gain in firm premiums helps to offset the fact that wages are generally lower in Austria. As discussed earlier, the gains in firm premiums for these migrants reflect the negative local wage premiums incorporated into their pre-move firm effects. When Easterers move domestically, however, their firm premiums rise about as much as the gain in the city-wide wage premium associated with their change in locations, implying that they stay in the same position on the job ladder.

Offsetting the larger increases in the firm premiums earned by domestic German migrants in most subgroups are smaller gains in their person effects than for movers to Austria. This is true for those who moved job-to-job and those who moved after a spell of unemployment, and for movers who stay in their destination for 5 years after moving.

A final interesting observation about the comparisons in Table 6 is that domestic and international stayers from both countries have relatively large gains from migration, whereas the early returners tend to have relatively small gains (though the gains for early returning domestic migrants in Germany are a little bigger). This pattern is consistent with a dynamic learning story in which the decision to stay in the destination labor market is determined in part by whether a migrant finds good job opportunities.

The gains for those who stay at least a year before returning or moving on (the late returners) are harder to characterize. Austrians and Germans who move internationally and

return 1-4 years later experience gains that are midway between the large positive gains of stayers and the negligible or even negative gains of early returners. But domestic movers who return 1-4 years after moving experience wage gains that are about the same as those of early returners. In the case of Austrians who move to Vienna, both early and late returners have small returns (2-4 ppts.); in the case of Germans who move to one of the larger cities both groups have more sizable gains (6-8 ppts.).

As we noted in Section 1, one potential motivation for moving abroad or to a big city is that there may be unique opportunities for skill acquisition. Such opportunities would be expected to lead to higher wages for migrants who spend at least 2 or 3 years in the destination and then return home or move to another place. For international migrants this story seems to fit our findings, though it is not the case that most international migrants in our setting move to a big city, so the skills are better interpreted as "foreign experience" than "big city" experience. For domestic migrants, however, the similarity of returns for early and late returners, and the fact that both are very small for Austrians who move to Vienna, pose problems for a straightforward skills acquisition story.

7.3 Other Comparisons between International and Domestic Moves

In this section we briefly summarize a few other comparisons of the returns to international versus domestic migration.

A striking result from our analysis of international migration is the relatively large wage gains associated with moving between "connected" establishments in Austria and Germany. For domestic migrants there is no comparable premium, and in fact the relative returns are higher for unconnected moves. Specifically, as shown in Appendix Table A6, the medium-run wage gains for connected domestic movers in Austria are 0.4 ppts. versus 6.8 ppts. for unconnected domestic movers, while the medium-run wage gains for connected domestic movers in Germany are 6.1 ppts. versus 11.1 ppts. for unconnected movers. We noted above that the bigger gains for connected international movers are largely attributable to bigger gains in their relative person effects - a pattern that could be due to faster promotions for people who change workplaces but remain at the same firm. Among domestic migrants, however, connected movers have *smaller* gains in their person effects than unconnected movers. One potential explanation for this difference – albeit entirely after the fact – is that multi-establishment firms select their most promising employees to move across international borders, but are more likely to shuffle their least promising workers between domestic workplaces. Another explanation from our extended model would say: the information advantage from previous movers from and to the same firm is much greater for an international move as compared to a domestic one.

Appendix Table A4, which compares returns to migration for men and women, reports

results for both international and domestic migrants. The gender gaps in the return to international migration are relatively large: 12 ppts. higher for males than females who move from Austria to Germany, and 6 ppts higher for males than females who move from Germany to Austria. The corresponding gaps in the returns to a domestic move are smaller: only 3 ppts. higher for Austrian men than women who move to Vienna; and 2 ppts. *higher* for German women than men who move to one of the 5 largest cities (i.e., the "wrong sign" for the conventional story about tied movers). As noted earlier it is not possible to link families in our data sets so we cannot test whether the fraction of women who move as part of a couple is smaller for domestic movers. The relatively large earnings gains for German women who move to one of the bigger cities (+12 ppts in the medium run) is intriguing and could be related to the higher density of well-paying jobs in big cities that allow mothers to coordinate care duties and employment more efficiently (Liu and Su, 2024).

Finally, Appendix Table A5 compares the returns to both international and domestic migration for people with lower wages, measured by the bottom 2 quintiles of baseline period wages, versus higher wages in the top 3 quintiles. In all cases we find higher returns for lower-wage migrants. Interestingly, for both international and domestic migrants from Germany, the bigger gains for lower-paid workers are associated with gains in their firm pay premiums but small declines in their person effects relative to their matched co-workers. In contrast, for both types of migrants from Austria the bigger gains for lower-wage workers are associated with relative gains in their person effects, potentially reflecting gains in hours or promotions.

7.4 Differences in the Local Cost of Housing

So far we have focused on estimating the causal impacts of migration on workers' wages, without any consideration of differences in the cost of living in different destinations. A large literature in urban economics, however, points out that housing costs vary widely across local markets in many countries, and tend to be higher in places with higher average wages (e.g., Diamond and Moretti (2021); Moretti (2013)). This means that some of the gains for moving – particularly for movers to larger cities – may be offset by higher costs of living.

To investigate this issue we use data on average rental costs at the NUTS 2 level which are publicly available from the 2022 Microcensus in each country.[29] We emphasize that these data only allow us to calculate regional differences in rents at the level of 9 regions in Austria and 38 regions in Germany for a single year at the end of our sample period.

We first compared the log of average rents (per square meter) in each region to the average firm effect for the same region based on our AKM models for 2016-2023. As shown in

[29] Beer and Wagner (2017) report that 41% of households in Austria rent their homes, compared with 51% of Germans.

Appendix Figure A2, average rents are very highly correlated with the regional component of our estimated firm effects, with $\rho = 0.78$. Moreover, the scatter of points is very similar for the two countries, with a slope just over 2. Assuming that housing and local services account for around 40% of a typical worker's budget, this slope suggests that *real* wages are somewhat higher in regions with higher nominal wages.[30]

We then used the rental cost data (for 2022) to look at the impacts of migration on housing costs for international and domestic migrants. Specifically, we assigned migrants and co-workers the associated log mean rental rates in the NUTS 2 region of their employer in each quarter. Implicitly, this procedure assumes that the cross-sectional structure of mean log housing costs was constant between 1980 to 2022, so we can use the rents in 2022 to measure geographic differences in rents throughout our sample period.

Table 7 shows the changes in mean log wages in the short run and medium run for international and domestic movers (from Table 3 and 5), along with the associated changes in rental costs. Focusing first on international migrants, we notice that rental prices for movers from Austria to Germany rose by about 10% – roughly the same percentage as their wages – while rental prices for movers from Germany to Austria were essentially constant. These data suggest that accounting for rises in the cost of living would lower the medium-run returns to international migration for Austrians by about 30%, to around 9 ppts. (assuming a 40% expenditure share on housing), but would have no effect on the returns to international migration for Germans. Similarly, adjusting for rises in the cost of living would lower the returns to Austrians for moving to Vienna by 35% (to about 3.5 ppts.), and lower the returns to Germans for moving to one of the 5 largest cities by around 50% (to about 5 ppts.).

We caution that if, in the data underlying Table 7, regional differences in rental rates have widened over time, we are likely overstating the rental rate increases for movers – particularly for domestic movers to larger cities in Germany. An offsetting factor is that the rental price data are based on samples that include all renters – not just renters who have signed a new lease. Since the rents paid by long-term tenants in both Austria and Germany are heavily regulated, the rental costs derived from such samples may understate market rents in larger German cities, where rents have risen faster that inflation in the past decade (Breidenbach et al., 2022).

[30] If households have Cobb-Douglas preferences, and housing and local services account for 40% of expenditures, then the real wage adjusting for housing costs is proportional to $w/p_h^{0.4}$) where w is the nominal wage and p_h is the cost of housing. This would imply that to hold real wages constant across regions, log rents would have to rise by 2.5 times as fast as log wages. See Hsieh and Moretti (2019).

8 Summary and Conclusions

We have used administrative records from Austria and Germany, together with a previous co-workers research design, to estimate the wage returns to international migration for movers between the two countries over the past 40 years. A key initial finding is that migrants from Austria to Germany, and those from Germany to Austria, are remarkably similar. Both groups are positively selected relative to other workers in their home labor market, and worked at better-than-average firms in the period 2-3 years before their move.

Our second main set of findings pertain to the realized wage gains associated with migration. On average, Austrians who move to Germany gain about 13 ppts. relative to their previous co-workers; Germans who move to Austria gain about 4 ppts. Movers in both directions benefit from some combination of career upgrading and a rise in hours, with relatively small gains in the pay premiums offered by their employers. The higher average returns to migration for Austrians are almost entirely explained by the higher average level of wages in Germany. We find roughly similar returns to migration for recent job losers, who avoid some of the wage cuts experienced by matched co-workers, and for job-to-job movers, who show an immediate wage boost relative to their previous co-workers. We also find that the gains are higher for lower-paid workers from both countries, and higher for workers who move between workplaces connected by multiple cross-border movers.

A third set of findings link return migration decisions and the realized outcomes of migrants in their destination labor market. Early returners experience a rise in unemployment soon after arriving in the destination country, whereas the employment profiles of those who return later (or remain in the destination) are broadly similar to those of their previous coworkers. The realized wage gains from moving are largest for migrants who remain 5 years or more in the destination country, smaller for those who stay 1-4 years, and close to zero for those who return within a year. This combination of findings suggests that there is substantial risk in the migration decision, but that the option to return home provides a lower bound that is close to the outcomes for previous co-workers who never moved at all.

Our fourth set of findings are derived from comparisons between international and domestic movers, specifically movers from smaller cities or towns to the largest cities in the two countries. Migrants to the "big city" have profiles of employment and wage growth that look very similar to those of international migrants, with average wage gains that emerge immediately upon arrival. For Austrians, the average returns to moving to Vienna are smaller than the returns to a move to Germany, but most of the gap arises from losing the wage differential associated with higher average wages in Germany. Conversely, for Germans the average returns to moving to a big city within Germany are higher than the returns to moving to Austria. But again, the difference largely reflects the average wage gap between Austria and Germany, which lowers the wage returns for movers to Austria.

We find that the relationship between realized wage gains and the duration of stay is similar for big city movers and international movers, with the largest gains for workers who remain in their destination, and smaller gains for those we return home (or move on). The pattern of gains for early versus late returners, however, is not as clear for domestic migrants as for international migrants.

While existing theoretical models of migration often emphasize comparative advantage-based incentives for migration, in the case of Austria and Germany we conclude that migration flows between the two countries are driven by idiosyncratic opportunities, complemented or offset by the average wage gap between the two countries. These opportunities appear to be available to most groups of workers, rather than being limited to higher-skilled workers – indeed, the gains to migration are if anything larger for lower-skilled workers. The gains also extend to people from larger cities in the two countries, suggesting that the opportunities provided by a move are not solely driven by an increase in market size. Similar incentives appear to drive domestic moves to larger cities, with higher costs of housing reducing but not eliminating the return to such moves. Further research on the sources of these idiosyncratic job opportunities is clearly at the top of the agenda for understanding the returns to migration in settings like ours where labor mobility is relatively unrestricted.

We have also uncovered several new facts that warrant additional attention in future work. Our linked administrative data show a surge in migration flows from Germany to Austria starting around 2000 that was only reversed in recent years. Whether this rise was driven in part by reforms in the German benefit system is an open question. We also find that women in Germany who move from smaller cities and towns to one of the 5 largest cities experience average wage gains that are *bigger* than the gains of men who make a similar move – a reversal of the tied mover pattern that we see in the returns to international migration, and that has been found in many previous studies (e.g., Jayachandran et al. (2026). Finally, we have found an interesting puzzle regarding the gains to domestic migration between linked workplaces (establishments connected by multiple movers). Contrary to expectations – and to the pattern we see for international migrants – the wage gains from connected domestic moves are relatively small in both Austria and Germany.

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Table 1: Descriptive Statistics of international migrants, different estimation samples

	Austrian Migrants			**German Migrants**		
	(1)	(2)	(3)	(4)	(5)	(6)
Female	0.37	0.37	0.36	0.35	0.34	0.34
Age at labor market entry	20.38	20.20	20.40	21.52	21.48	21.51
Age at First Move	31.50	31.63	31.60	33.29	33.78	33.41
Move in 1980's	0.20	0.16	0.20	0.03	0.03	0.03
Move in 1990's	0.28	0.30	0.28	0.14	0.15	0.14
Move in 2000's	0.31	0.33	0.31	0.58	0.58	0.58
Move after 2010	0.20	0.21	0.20	0.25	0.25	0.26
Unemployed pre move	0.22	0.23	0.21	0.20	0.19	0.18
Move to connected est.	0.11	0.12	0.12	0.10	0.10	0.10
Pre-migration wage	78.92	81.38	80.97	84.80	86.39	87.00
Pre-migration log wage	4.24	4.28	4.27	4.30	4.33	4.33
AKM person effect	0.13	0.14	0.14	0.11	0.12	0.13
AKM firm effect	0.05	0.06	0.06	0.02	0.03	0.02
AKM $X\beta$	4.06	4.07	4.06	4.17	4.17	4.17
Return in year 1	0.19	0.19	0.16	0.27	0.25	0.23
Return in years 2-5	0.23	0.24	0.24	0.27	0.27	0.27
Origin Industry						
Manufacturing	0.26	0.26	0.27	0.22	0.22	0.23
Construction	0.07	0.06	0.07	0.07	0.07	0.07
Sales	0.17	0.17	0.17	0.15	0.15	0.15
Hotel	0.06	0.06	0.06	0.10	0.10	0.10
Transport	0.05	0.05	0.05	0.08	0.08	0.08
Service	0.39	0.39	0.38	0.38	0.38	0.38
Origin Region						
Austria Border regions	0.42	0.41	0.42			
Austria-Center&South	0.27	0.27	0.27			
Austria-East except Vienna	0.07	0.07	0.07			
Vienna	0.24	0.24	0.24			
Germany-Top 5 Cities				0.16	0.17	0.16
Germany-East				0.14	0.14	0.14
Germany-Other				0.24	0.24	0.24
Germany-South				0.29	0.29	0.29
German-Border Region				0.17	0.16	0.17
Destination Region						
Big City	0.20	0.20	0.20	0.16	0.17	0.16
Individuals	21,005	19,009	17,917	36,306	33,175	30,212

Notes: The table reports summary statistics for Austrian and German migrants in the main analysis samples. Mean characteristics are measured in quarter -5 before migration. The columns show (1) all Austrian migrants, (2) Austrian migrants with at least one co-workers in base period, (3) Austrian migrants with at least 1 coworker and at least 2 AKM person and firm effects in base period and at least 2 AKM person and firm effects in quarters 1 to 4 after migration, (4) all German migrants (5) German migrants with at least one co-workers in base period (6) migrants with at least 1 coworker and at least 2 AKM person and firm effects in base period and at least 2 AKM person and firm effects in quarters 1 to 4 after migration.

Table 2: Comparisons of Migrants and Co-workers, Before and After Migration

	Austrians			Germans		
	Migrants (1)	Co-workers (2)	Difference (3)	Migrants (4)	Co-workers (5)	Difference (6)
1. Share employed						
Quarters 1–4	0.96	0.93	0.03	0.94	0.96	−0.02
Quarters 5–20	0.93	0.91	0.02	0.92	0.94	−0.02
2. Share in home country						
Quarters 1–4	0.11	1.00	−0.89	0.15	1.00	−0.85
Quarters 5–20	0.29	1.00	−0.71	0.38	1.00	−0.62
3. Mean daily earnings (including 0's)						
Baseline for obs in Q1-4	80.10	72.73	7.37	86.42	72.30	14.13
Baseline for obs in Q5-20	80.68	73.14	7.55	86.01	72.74	13.27
Quarters 1–4	98.54	74.77	23.77	96.24	76.53	19.71
Quarters 5–20	103.12	79.48	23.64	98.19	81.80	16.39
Δ Baseline → Q1–4	18.44	2.04	16.40	9.81	4.23	5.58
Δ Baseline → Q5–20	22.44	6.34	16.09	12.19	9.06	3.12
4. Mean log daily wage						
Baseline for obs in Q1-4	4.27	4.19	0.08	4.33	4.17	0.16
Baseline for obs in Q5-20	4.28	4.20	0.08	4.33	4.18	0.15
Quarters 1–4	4.48	4.27	0.20	4.43	4.22	0.20
Quarters 5–20	4.55	4.34	0.21	4.47	4.28	0.19
Δ Baseline → Q1–4	0.21	0.08	0.13	0.09	0.05	0.04
Δ Baseline → Q5–20	0.27	0.14	0.13	0.14	0.10	0.04
5. Mean person effect						
Baseline for obs in Q1-4	0.14	0.07	0.07	0.12	0.04	0.09
Baseline for obs in Q5-20	0.14	0.07	0.07	0.12	0.04	0.08
Quarters 1–4	0.21	0.11	0.10	0.24	0.05	0.18
Quarters 5–20	0.25	0.15	0.10	0.24	0.07	0.17
Δ Baseline → Q1–4	0.07	0.04	0.03	0.12	0.02	0.10
Δ Baseline → Q5–20	0.11	0.08	0.03	0.12	0.03	0.09
6. Mean firm effect						
Baseline for obs in Q1-4	0.06	0.06	0.01	0.03	−0.04	0.07
Baseline for obs in Q5-20	0.07	0.06	0.01	0.03	−0.04	0.06
Quarters 1–4	0.09	0.07	0.02	0.07	−0.03	0.09
Quarters 5–20	0.10	0.07	0.03	0.06	−0.01	0.07
Δ Baseline → Q1–4	0.02	0.01	0.01	0.04	0.01	0.03
Δ Baseline → Q5–20	0.04	0.01	0.02	0.04	0.03	0.01
7. Mean $X\beta$						
Baseline for obs in Q1-Q4	4.05	4.06	−0.01	4.17	4.16	0.00
Baseline for obs in Q5-Q20	4.06	4.06	0.00	4.17	4.16	0.00
Quarters 1–4	4.18	4.09	0.09	4.13	4.19	−0.06
Quarter 5–20	4.19	4.11	0.08	4.16	4.21	−0.05
Diff: baseline to Q1–4	0.13	0.03	0.10	−0.04	0.03	−0.06
Diff: baseline to Q5–20	0.13	0.05	0.08	0.00	0.05	−0.05

Notes: The table reports outcomes for migrants and their pre-migration co-workers. Columns (1)–(3) refer to Austrian and (4)–(6) to German migrants. Baseline values are averages over quarters −12 to −5, estimated separately for workers whose wages are observed in quarters 1-4 and those who are observed in quarters 5-20. Co-workers are reweighted to match migrants in age, gender, and employment probabilities in quarters −2 to 0. The Austrian sample includes 16,235 migrants for the short (quarters 1–4) and 15,564 for the medium run (quarters 5–20), each with at least 2 AKM observations in the baseline and 2(8) AKM observations in the respective post-migration period, and with at least one co-worker satisfying the same requirements. The German sample includes 28,863 migrants for the short (quarters 1–4) and 28,462 for the medium run (quarters 5–20), subject to analogous AKM and coworker conditions.

Table 3: Difference in differences estimates of short and medium-run returns to migration and AKM decomposition of medium-run returns

	Austria to Germany					Germany to Austria				
	Short run	Medium run (quarters 5–20)				Short run	Medium run (quarters 5–20)			
	(quarters 1–4) Mean log wage (1)	Mean log wage (2)	Mean firm eff. (3)	Mean pers. eff. (4)	Mean cov. Index (5)	(quarters 1–4) Mean log wage (6)	Mean log wage (7)	Mean firm eff. (8)	Mean pers. eff. (9)	Mean cov. Index (10)
1. All	0.125	0.130	0.023	0.031	0.078	0.040	0.040	0.015	0.083	−0.045
	(0.006)	(0.006)	(0.005)	(0.004)	(0.002)	(0.006)	(0.009)	(0.003)	(0.003)	(0.008)
Comparing job-to-job (J2J) movers and movers who were unemployed pre-move										
2. No unemployment pre-move (J2J)	0.142	0.147	0.026	0.045	0.081	0.034	0.037	0.010	0.090	−0.049
	(0.005)	(0.005)	(0.004)	(0.004)	(0.002)	(0.006)	(0.009)	(0.003)	(0.004)	(0.008)
3. Unemployed pre-move	0.114	0.099	0.030	−0.015	0.064	0.066	0.063	0.049	0.065	−0.042
	(0.017)	(0.016)	(0.014)	(0.011)	(0.003)	(0.012)	(0.016)	(0.009)	(0.008)	(0.009)
Comparing movers by frequency of origin-destination (O-D) establishment moves										
4. O-D pairs with 4+ movers	0.176	0.170	0.039	0.066	0.075	0.099	0.088	−0.010	0.158	−0.044
	(0.010)	(0.011)	(0.008)	(0.008)	(0.003)	(0.009)	(0.011)	(0.006)	(0.009)	(0.008)
5. O-D pairs with <4 movers	0.117	0.123	0.020	0.025	0.079	0.032	0.033	0.018	0.076	−0.048
	(0.006)	(0.006)	(0.005)	(0.005)	(0.002)	(0.006)	(0.009)	(0.003)	(0.003)	(0.008)
Comparing movers by origin region										
6. Originate in border region	0.075	0.077	0.001	0.005	0.074	0.023	0.019	0.034	0.039	−0.044
	(0.008)	(0.008)	(0.007)	(0.007)	(0.002)	(0.009)	(0.012)	(0.006)	(0.005)	(0.009)
7. Originate in larger city (Vienna or top 5)	0.171	0.165	0.044	0.052	0.074	0.013	0.017	−0.032	0.116	−0.053
	(0.010)	(0.010)	(0.008)	(0.006)	(0.003)	(0.010)	(0.012)	(0.007)	(0.009)	(0.009)
8. Originate in East Germany						0.157	0.133	0.132	0.056	−0.042
						(0.009)	(0.013)	(0.007)	(0.005)	(0.008)
Comparing movers by duration of stay in destination										
9. Stayer (still in destination at Q20)	0.151	0.187	0.036	0.037	0.112	0.055	0.077	0.023	0.131	−0.077
	(0.007)	(0.007)	(0.005)	(0.005)	(0.002)	(0.006)	(0.009)	(0.004)	(0.005)	(0.008)
10. Early returner (return in Q1–4)	0.006	0.003	−0.017	0.009	0.016	−0.035	−0.029	0.002	0.008	−0.010
	(0.011)	(0.011)	(0.008)	(0.005)	(0.001)	(0.009)	(0.012)	(0.005)	(0.003)	(0.009)
11. Late returner (return in Q5–19)	0.146	0.090	0.023	0.032	0.044	0.070	0.028	0.012	0.068	−0.031
	(0.009)	(0.008)	(0.009)	(0.009)	(0.001)	(0.007)	(0.010)	(0.003)	(0.004)	(0.008)

Notes: Standard errors in parentheses are clustered at the industry (1-digit) × region (NUTS 3) × 5-year time-period level. Entries are difference in differences estimates of the effect of migration on post-move log daily wages, using a weighted sample of previous co-workers as comparison group. See text for further details.

Table 4: Descriptive Statistics, Domestic Migrants and International Migrants from the same origin regions

	Austrian Migrants		**German Migrants**	
	Domestic	to Germany	Domestic	to Austria
	(1)	(2)	(3)	(4)
Female	0.41	0.37	0.44	0.34
Age at First Move	30.04	31.12	31.57	33.25
Move in 1980's	0.37	0.22	0.08	0.03
Move in 1990's	0.31	0.30	0.35	0.14
Move in 2000's	0.25	0.29	0.40	0.58
Move after 2010	0.07	0.19	0.17	0.24
Unemployed pre move	0.25	0.23	0.15	0.20
Wage imputed	62.93	73.65	83.67	81.83
Log wage imputed	4.03	4.18	4.31	4.27
AKM person	0.03	0.09	0.11	0.09
AKM firm	-0.02	0.04	0.03	0.00
AKM $X\beta$	4.02	4.05	4.17	4.17
AKM Industry	0.00	0.01	0.00	-0.02
AKM Region	-0.01	0.01	0.00	0.01
Return in year 1	0.19	0.20	0.17	0.28
Return in years 2-5	0.29	0.23	0.30	0.26
Origin Industry				
Manufacturing	0.25	0.30	0.17	0.24
Construction	0.10	0.07	0.06	0.07
Sales	0.24	0.16	0.16	0.15
Hotel	0.04	0.08	0.03	0.10
Transport	0.04	0.05	0.05	0.09
Service	0.34	0.34	0.53	0.34
Origin Region				
Austria Border regions	0.15	0.60		
Austria Center South	0.75	0.39		
Austria East	0.08			
East Germany			0.20	0.17
Other Germany			0.50	0.29
South Germany			0.28	0.35
German Border Region			0.03	0.20
Individuals	39,596	14,430	377,886	30,385

Notes: The table compares Austrian workers moving from locations at least 100 km outside Vienna to Vienna (columns 2) with those moving from the same regions to Germany (columns 2), German workers moving from locations at least 100 km away from one of the 5 biggest cities (columns 3) with those moving from outside German cities to Austria (columns 4) Mean characteristics are measured in quarter -5 before migration. All columns show the full set of migrants.

Table 5: Difference in differences estimates of short and medium-run log-wage returns to migration to major cities

	Austria to Vienna		Germany to 5 largest Cities	
	Short run (quarters 1–4) (1)	Medium run (quarters 5–20) (2)	Short run (quarters 1–4) (3)	Medium run (quarters 5–20) (4)
1. All	0.029	0.053	0.080	0.105
	(0.005)	(0.005)	(0.010)	(0.013)
Comparing movers who were unemployed pre-move				
2. No unemployment pre-move (J2J)	0.041	0.065	0.081	0.106
	(0.005)	(0.005)	(0.009)	(0.013)
3. Unemployed pre-move	0.008	−0.001	0.056	0.071
	(0.017)	(0.016)	(0.016)	(0.019)
Comparing movers by origin region				
4. Originate in Austria West / Germany South	0.022	0.052	0.077	0.111
	(0.007)	(0.007)	(0.013)	(0.016)
5. Originate in East Germany			0.103	0.120
			(0.007)	(0.012)
Comparing movers by duration of stay in destination				
6. Stayer (still in destination at Q20)	0.043	0.079	0.097	0.134
	(0.006)	(0.006)	(0.008)	(0.012)
7. Early returner (return in Q1–4)	0.009	0.036	0.026	0.061
	(0.006)	(0.006)	(0.012)	(0.016)
8. Late returner (return in Q5–19)	0.019	0.022	0.077	0.080
	(0.007)	(0.007)	(0.012)	(0.016)

Notes: Standard errors in parentheses are clustered at the industry (1-digit) × region (NUTS 3) × 5-year time-period level. Entries are difference in differences estimates of the effect of migration on post-move log daily wages, using a weighted sample of previous co-workers as comparison group. See text for further details.

Table 6: Difference in differences estimates and AKM decomposition for domestic and international migrants

		Austrian Migrants					German migrants				
		Mean log wage (1)	Mean firm effects (2)	Mean pers. effects (3)	Mean cov. Index (4)	Mean city effects (5)	Mean log wage (6)	Mean firm effects (7)	Mean pers. effects (8)	Mean cov. Index (9)	Mean city effects (10)
1. All	Domestic	0.053	0.022	0.030	-0.005	0.017	0.105	0.055	0.040	0.001	0.026
		(0.005)	(0.004)	(0.002)	(0.001)	(0.001)	(0.013)	(0.005)	(0.012)	(0.019)	(0.004)
	International	0.130	0.023	0.031	0.078	–	0.040	0.015	0.083	-0.045	–
		(0.006)	(0.005)	(0.004)	(0.002)		(0.009)	(0.003)	(0.003)	(0.008)	
Comparing movers who were unemployed pre-move											
2. No unemployment pre-move (J2J)	Domestic	0.065	0.029	0.032	-0.004	0.018	0.106	0.057	0.039	0.002	0.026
		(0.005)	(0.004)	(0.002)	(0.001)	(0.001)	(0.013)	(0.005)	(0.014)	(0.019)	(0.004)
	International	0.147	0.026	0.045	0.081	–	0.037	0.010	0.090	-0.049	–
		(0.005)	(0.004)	(0.004)	(0.002)		(0.009)	(0.003)	(0.004)	(0.008)	
3. Unemployed pre-move	Domestic	-0.001	-0.003	0.023	-0.013	0.014	0.071	0.041	0.032	-0.007	0.022
		(0.016)	(0.014)	(0.007)	(0.002)	(0.002)	(0.019)	(0.008)	(0.007)	(0.019)	(0.007)
	International	0.099	0.030	-0.015	0.064	–	0.063	0.049	0.065	-0.042	–
		(0.016)	(0.014)	(0.011)	(0.003)		(0.016)	(0.009)	(0.008)	(0.009)	
Comparing movers by origin region											
4. Originate in Austria West or	Domestic	0.052	0.019	0.031	-0.005	0.001	0.111	0.055	0.042	0.001	0.005
		(0.007)	(0.004)	(0.004)	(0.001)	(0.001)	(0.016)	(0.009)	(0.013)	(0.021)	(0.007)
/Germany South	International	0.077	0.001	0.005	0.074	–	0.019	0.034	0.039	-0.044	–
		(0.008)	(0.007)	(0.007)	(0.002)		(0.012)	(0.006)	(0.005)	(0.009)	
5. Originate in East Germany	Domestic						0.120	0.079	0.034	0.000	0.072
							(0.012)	(0.004)	(0.009)	(0.020)	(0.008)
	International						0.133	0.132	0.056	-0.042	–
							(0.013)	(0.007)	(0.005)	(0.008)	
Comparing movers by duration of stay in destination											
6. Stayer (still in destination at Q20)	Domestic	0.079	0.041	0.036	-0.006	0.028	0.134	0.077	0.045	0.000	0.038
		(0.006)	(0.005)	(0.003)	(0.001)	(0.001)	(0.012)	(0.007)	(0.014)	(0.020)	(0.005)
	International	0.187	0.036	0.037	0.112	–	0.077	0.023	0.131	-0.077	–
		(0.007)	(0.005)	(0.005)	(0.002)		(0.009)	(0.004)	(0.005)	(0.008)	
7. Early returner (return in Q1-4)	Domestic	0.036	0.008	0.022	-0.004	0.002	0.061	0.020	0.032	0.001	0.005
		(0.006)	(0.004)	(0.004)	(0.001)	(0.000)	(0.016)	(0.004)	(0.009)	(0.018)	(0.003)
	International	0.003	-0.017	0.009	0.016	–	-0.029	0.002	0.008	-0.010	–
		(0.011)	(0.008)	(0.005)	(0.001)		(0.012)	(0.005)	(0.003)	(0.009)	
8. Late returner (return in Q5-19)	Domestic	0.022	-0.001	0.026	-0.005	0.009	0.080	0.035	0.036	0.001	0.017
		(0.007)	(0.005)	(0.003)	(0.001)	(0.001)	(0.016)	(0.005)	(0.012)	(0.019)	(0.004)
	International	0.090	0.023	0.032	0.044	–	0.028	0.012	0.068	-0.031	–
		(0.008)	(0.009)	(0.009)	(0.001)		(0.010)	(0.003)	(0.004)	(0.008)	

Notes: Medium-run effect estimates. Standard errors in parentheses are clustered at the industry (1-digit) × region (NUTS 3) × 5-year time-period level. Entries are difference in difference estimates of the effect of migration on post-move log daily wages. City effects are only estimated for domestic movers (marked "—" for international rows). See text for further details.

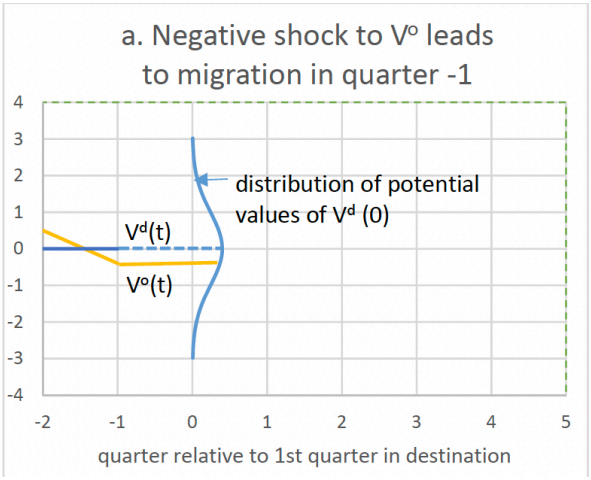
Table 7: Wage Gains versus Changes in Rental Costs

		Log Wage	Rental Cost
International Migrants			
Austria to Germany	Short Run	0.125	0.108
	Medium Run	0.130	0.090
Germany to Austria	Short Run	0.040	-0.003
	Medium Run	0.040	-0.001
Domestic Migrants			
Austria to Vienna	Short Run	0.029	0.065
	Medium Run	0.053	0.046
Germany to 5 largest cities	Short Run	0.080	0.179
	Medium Run	0.105	0.137

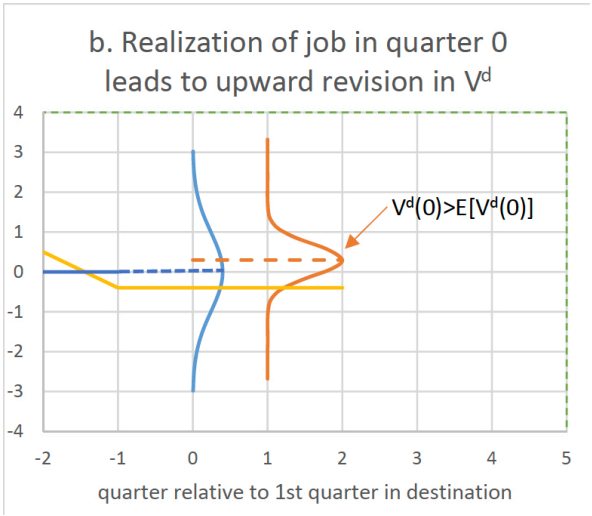
Notes: Log gross rent in 2022 by NUTS 2 regions.

Figure 1: Dynamic Model of Migration Decisions

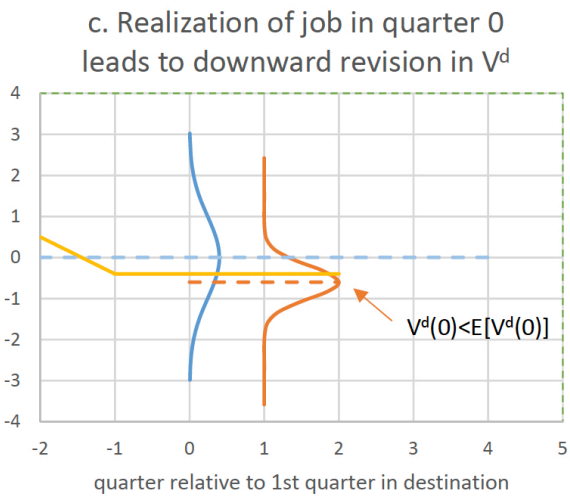
(a)



(b)



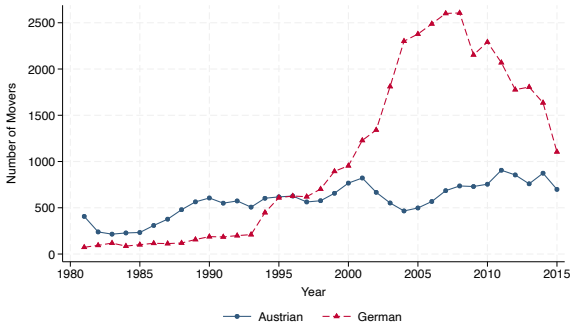
(c)



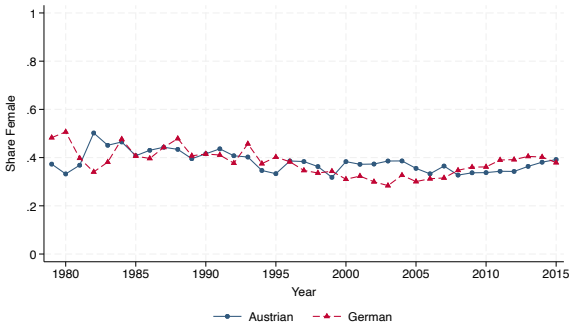
Notes: Figure illustrates the evolution of the value functions around the time of migration in the simple location-choice model introduced in Section 1.

Figure 2: Selection of first-time migrants by year of migration

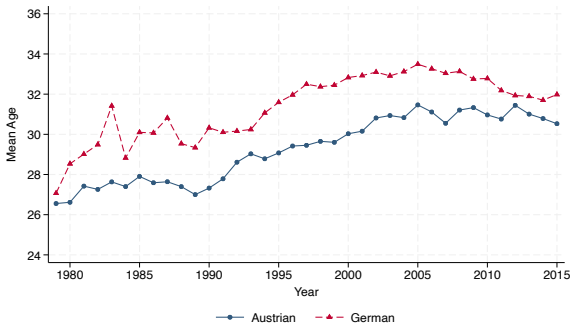
(a) Number of Movers



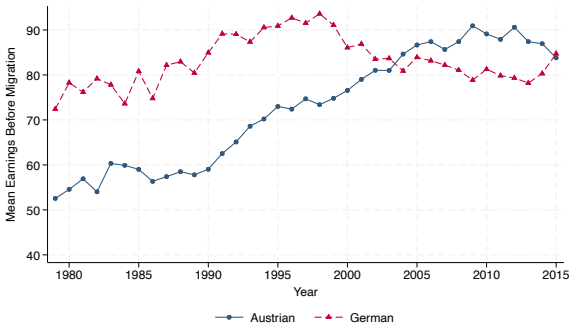
(b) Share Female



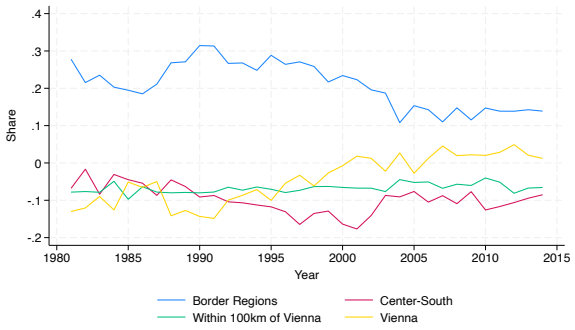
(c) Age at First Move



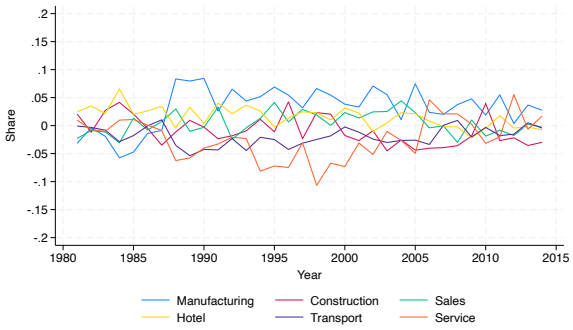
(d) Earnings in Base Period



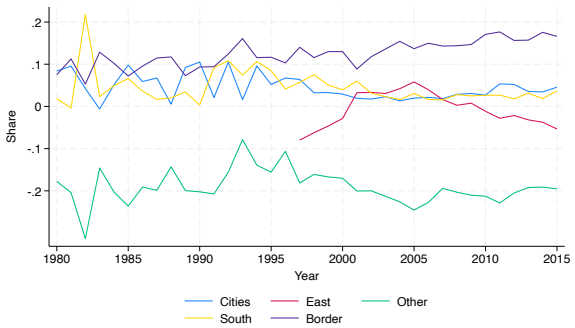
(e) Origin Regions Austrian Migrants



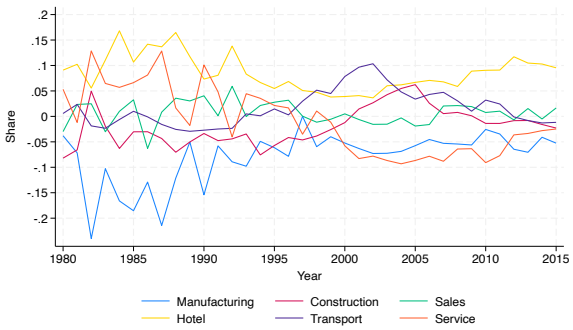
(f) Origin Industries Austrian Migrants



(g) Origin Regions German Migrants



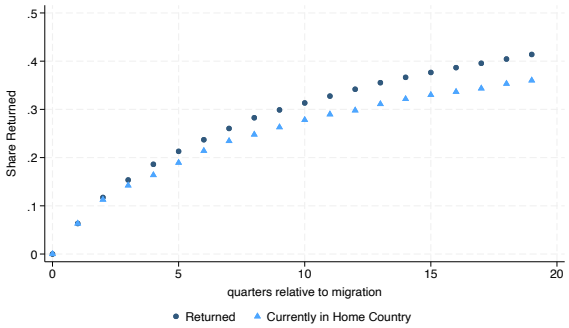
(h) Origin Industries German Migrants



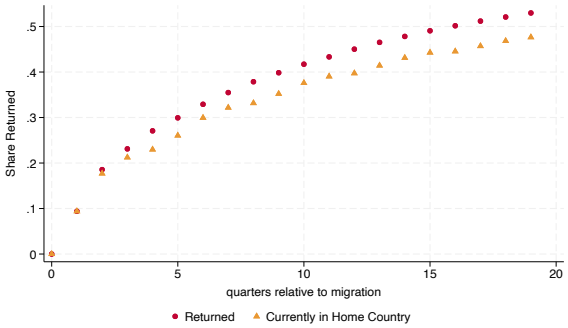
Notes: Panel (a) shows the number of new migrants moving each year and the remaining panels show average characteristics of new movers. Panels (e) to (h) show the share of Austrian/German migrants across origin regions and industries compared to the overall employment shares in the respective regions and industries (employment shares migrants - employment shares full population).

Figure 3: Return to Home Country

(a) Austrians



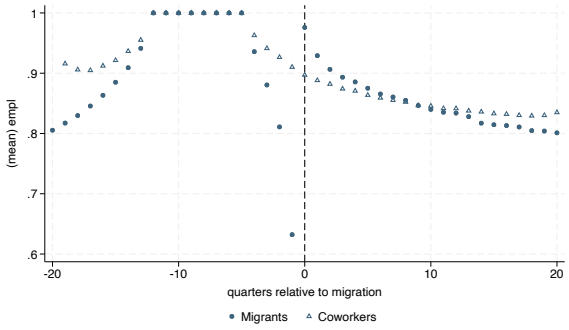
(b) Germans



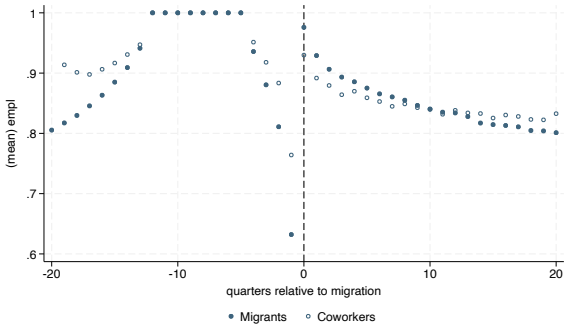
Notes: Figure shows returns relative to the index quarter measured by the share of migrants who have returned to their home country by the current quarter (dots) and the share of migrants who are in the home country in the current quarter (triangles). The gap between the dots and triangles shows the share of circular migrants.

Figure 4A: Employment Profiles of Migrants and Co-workers

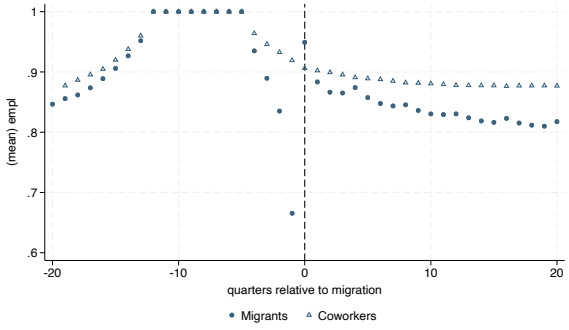
(a) Austrians, co-workers age-gender weighted



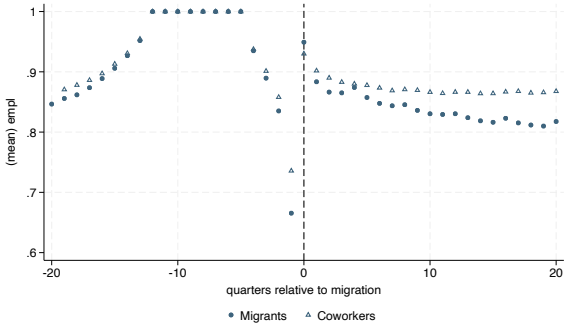
(b) Austrians, co-workers age-gender-employment weighted



(c) Germans, co-workers age-gender weighted



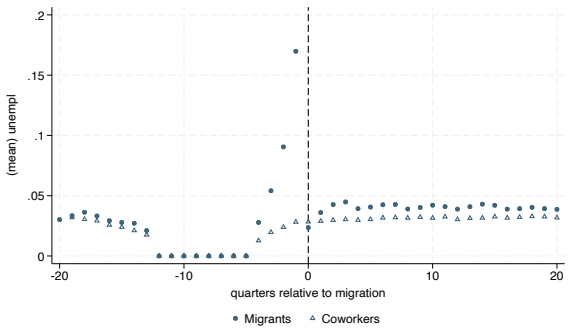
(d) Germans, co-workers age-gender-employment weighted



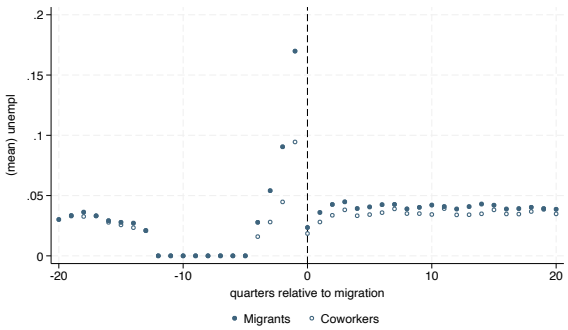
Notes: Co-workers are reweighted by network size, age, and gender in panels a and c. In panels b and d, co-workers are re-weighted by network size, age, gender, employment in quarters 0, -1, and -2. The sample includes all Austrian and German migrants to the other country shown in columns (1) and (4) in Table 1 and their co-workers.

Figure 4B: Unemployment Profiles of Migrants and co-workers

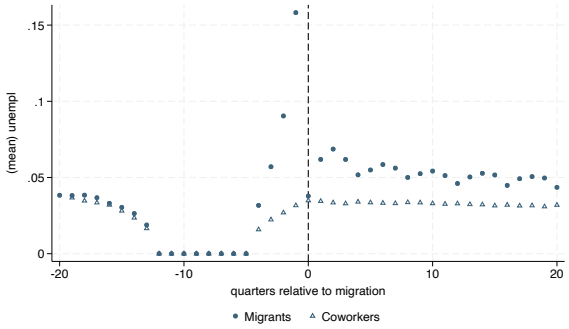
(a) Austrians, co-workers age-gender weighted



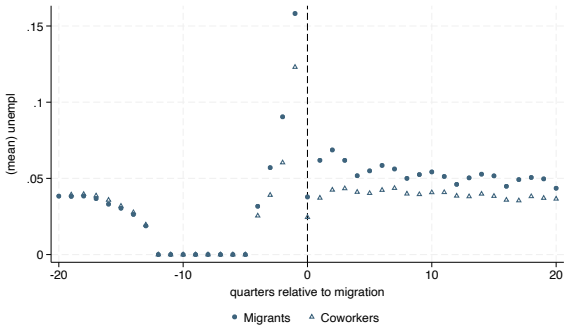
(b) Austrians, co-workers age-gender-employment weighted



(c) Germans, co-workers age-gender weighted



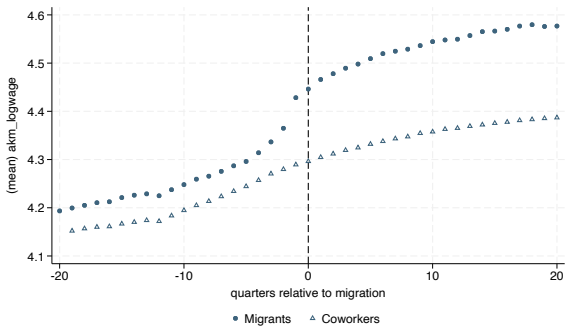
(d) Germans, co-workers age-gender-employment weighted



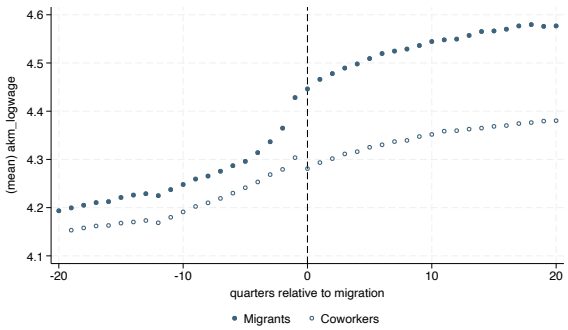
Notes: This figure shows career outcomes of migrants and their co-workers around the index quarter. Co-workers are reweighted by size, age, and gender in panels a and c. In panels b and d, co-workers are re-weighted by network size, age, gender, and employment in quarters 0, -1, and -2. The sample includes all Austrian and German migrants to the other country shown in columns (1) and (4) in Table 1 and their co-workers.

Figure 4C: Log Wage Profiles of Migrants and Co-workers

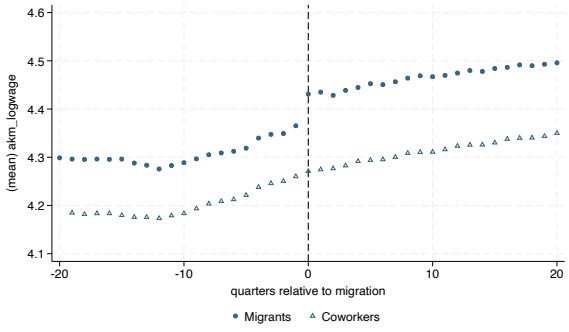
(a) Austrians, co-workers age-gender weighted



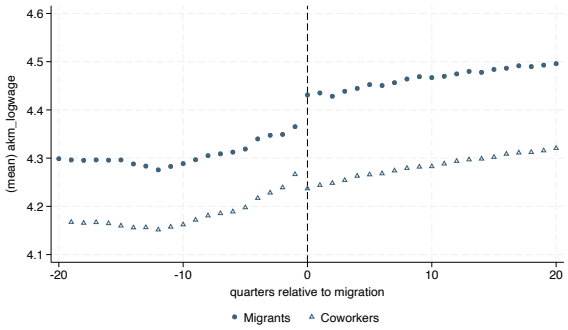
(b) Austrians, co-workers age-gender-employment weighted



(c) Germans, co-workers age-gender weighted



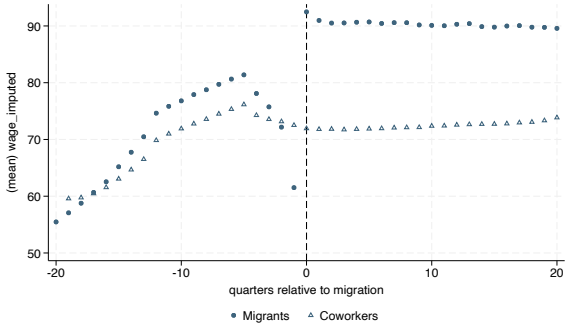
(d) Germans, co-workers age-gender-employment weighted



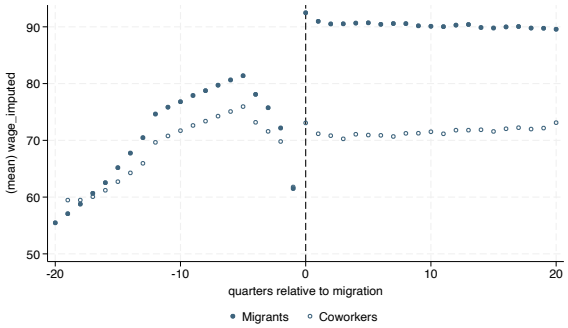
Notes: This figure shows career outcomes of migrants and their co-worker around the index quarter. Co-workers are reweighted by network size, age, and gender in panels a and c. In panels b and d, co-workers are re-weighted by network size, age, gender, and employment in quarters 0, -1, and -2. The sample includes all Austrian and German migrants to the other country shown in columns (1) and (4) in Table 1 and their co-workers.

Figure 4D: Earnings of Migrants and Co-workers

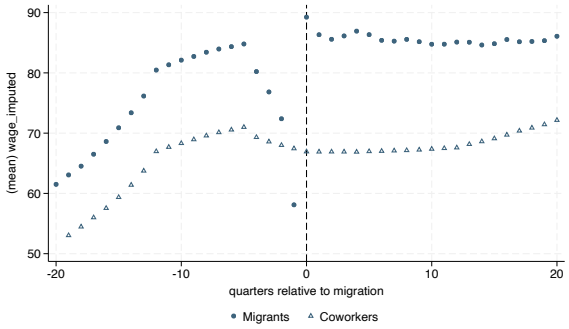
(a) Austrians, co-workers age-gender weighted



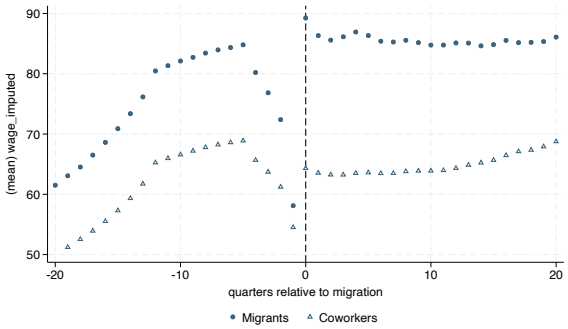
(b) Austrians, co-workers age-gender-employment weighted



(c) Germans, co-workers age-gender weighted



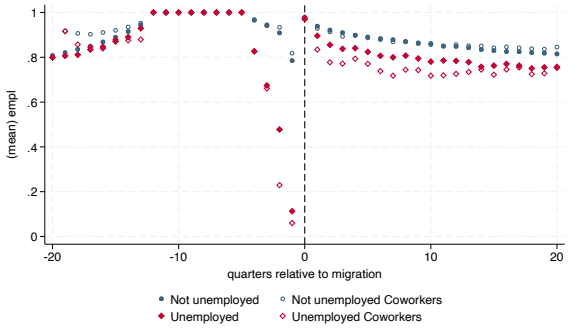
(d) Germans, co-workers age-gender-employment weighted



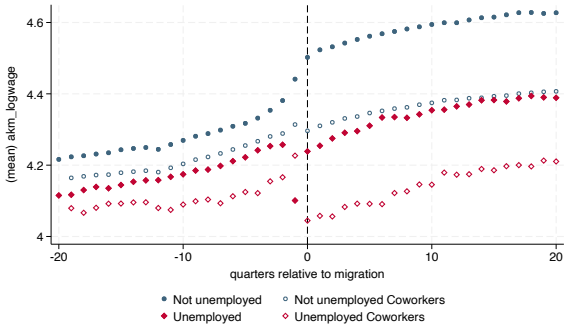
Notes: This figure shows career outcomes of migrants and their co-workers around the index quarter. Co-workers are reweighted by network size, age, and gender in panels a and c. In panels b and d, co-workers are re-weighted by network size, age, gender, and employment in quarters 0, -1, and -2. The sample includes all Austrian and German migrants to the other country shown in columns (1) and (4) in Table 1 and their co-workers.

Figure 5A: Heterogeneity in Career Profiles of Austrian Migrants to Germany

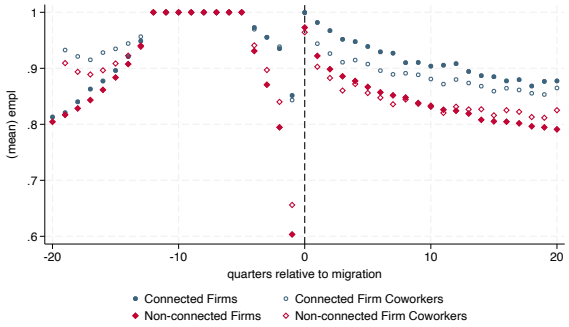
(a) By Unemployment Experience: Employment



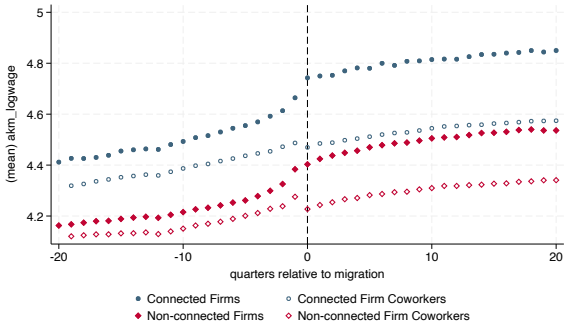
(b) By Unemployment Experience: Log wage



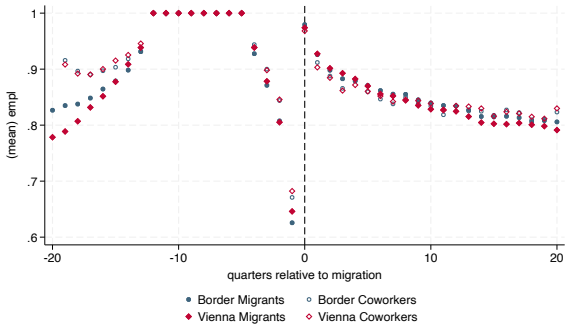
(c) By Firm Connection: Employment



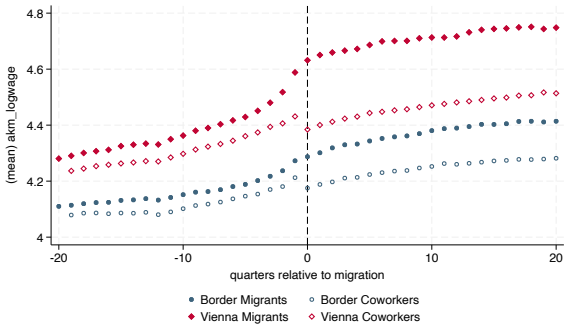
(d) By Firm Connection: Log wage



(e) By Origin Region: Employment



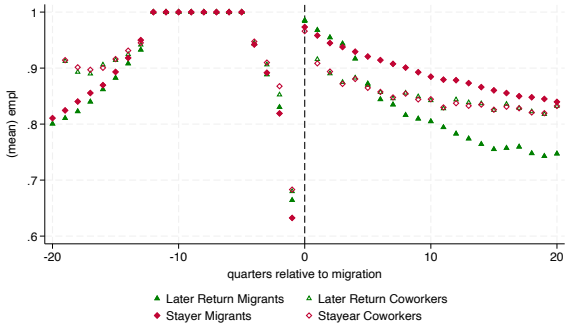
(f) By Origin Region: Log wage



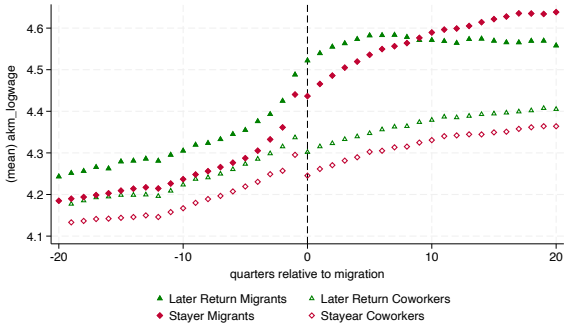
Notes: This figure shows career outcomes of migrants and their co-worker around the index quarter. Co-workers are reweighted by network size, age, gender, and employment in quarters 0, -1, and -2. The sample includes all Austrian migrants to the other country shown in columns (1) in Table 1 and their co-workers.

Figure 5B: Heterogeneity by Duration of Stay Austrian Migrants to Germany

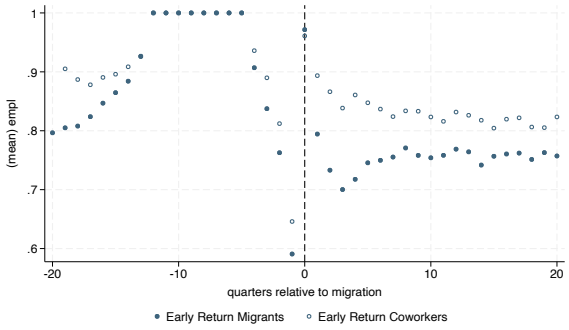
(a) Employment



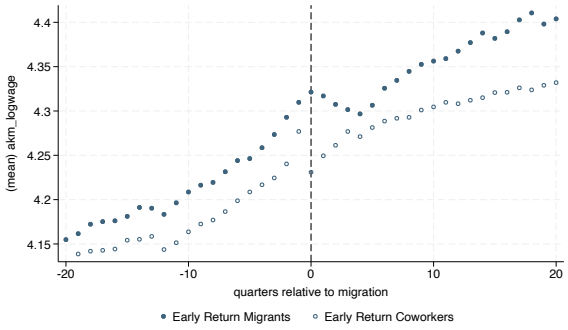
(b) Log wage



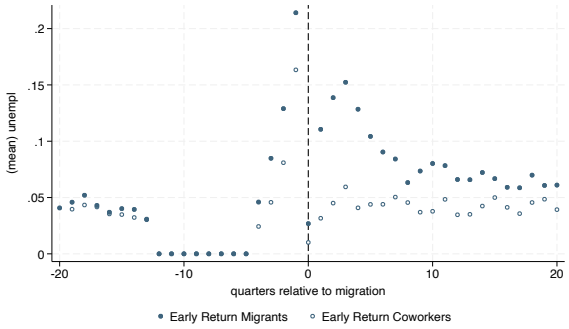
(c) Employment



(d) Log wage



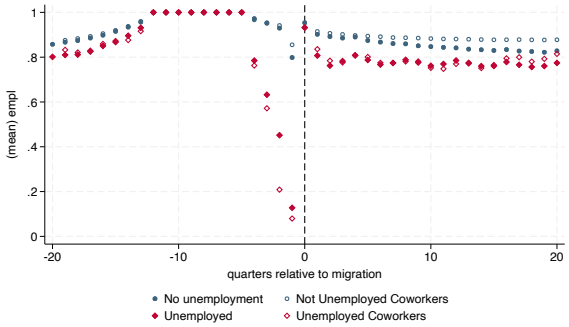
(e) Unemployment



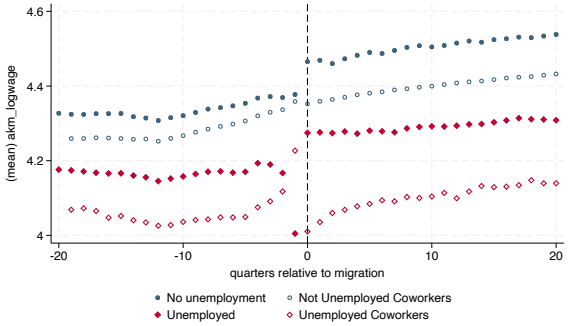
Notes: Co-workers are reweighted by network size, age, gender, and employment in quarters 0, -1, and -2. The sample includes all Austrian migrants to the other country shown in columns (1) in Table 1 and their co-workers.

Figure 6A: Heterogeneity in Career Profiles of German Migrants to Austria

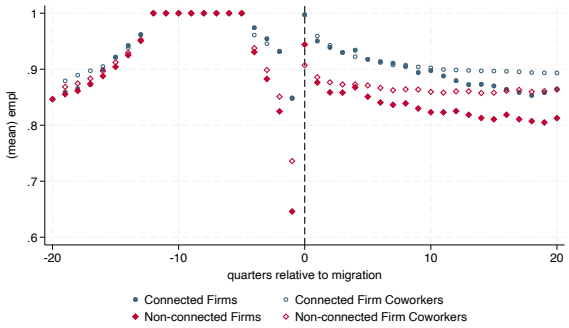
(a) By Unemployment Experience: Employment



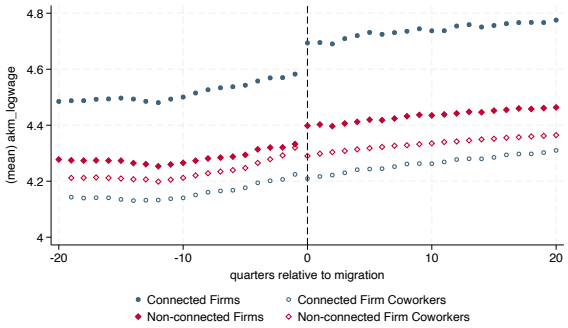
(b) By Unemployment Experience: Log wage



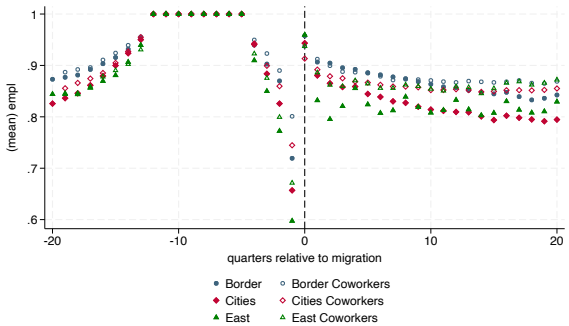
(c) By Firm Connection: Employment



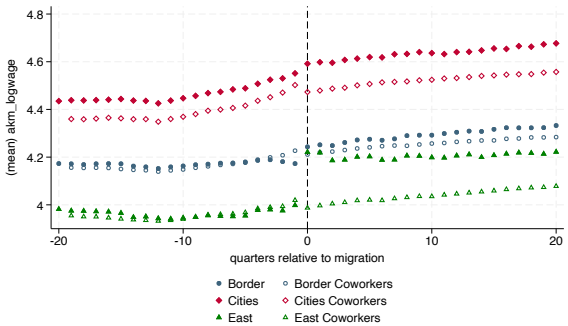
(d) By Firm Connection: Log wage



(e) By Origin Region: Employment



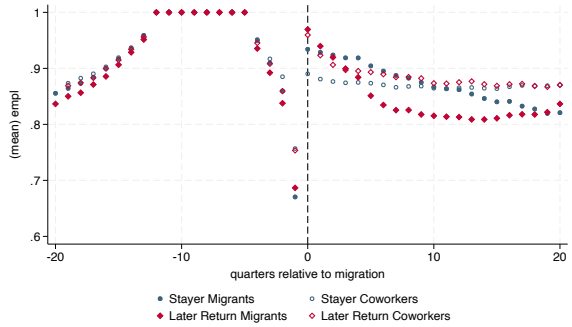
(f) By Origin Region: Log wage



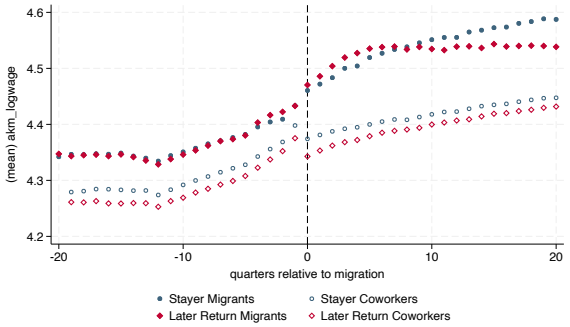
Notes: Coworkers are reweighted by network size, gender, age and, employment in quarters -2, -1, and 0.

Figure 6B: Heterogeneity by Duration of Stay German Migrants to Austria

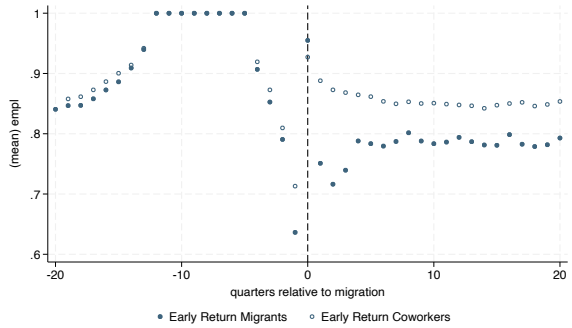
(a) By Return: Employment



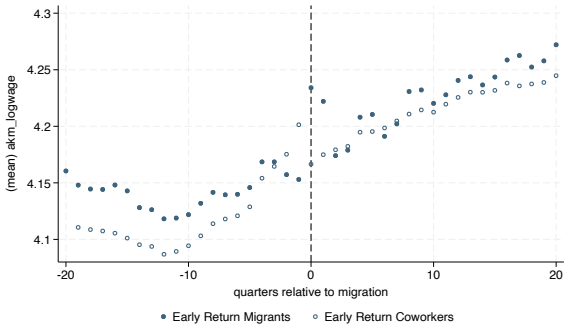
(b) By Return: Log wage



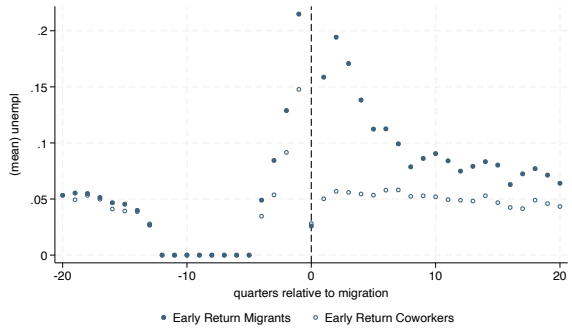
(c) Early Returns: Employment



(d) Early Returns: Log wage



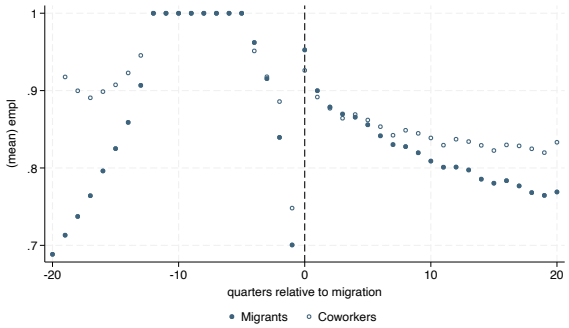
(e) Early Returns: Unemployment



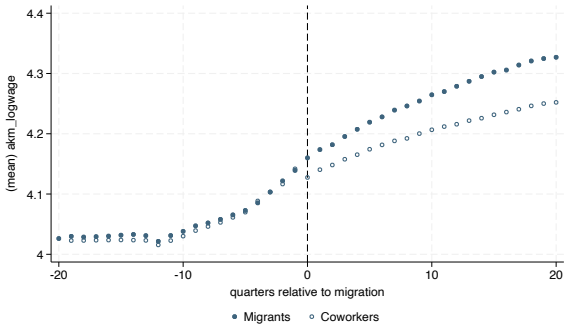
Notes: Coworkers are reweighted by network size, gender, age, and employment in quarters 0, -1, and -2.

Figure 7: Career Profiles of Domestic Migrants

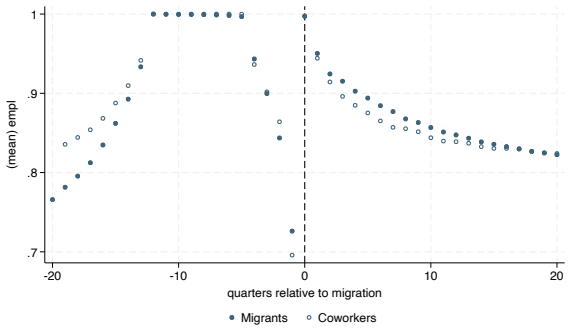
(a) Austrians: Employment



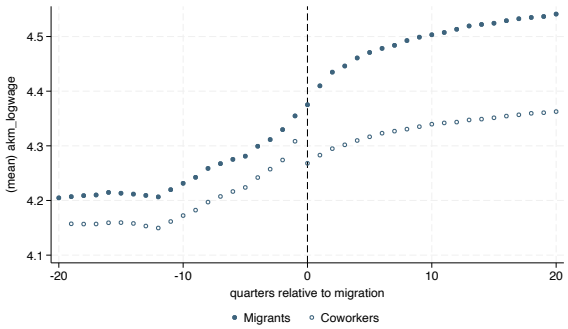
(b) Austrians: Log wage



(c) Germans: Employment



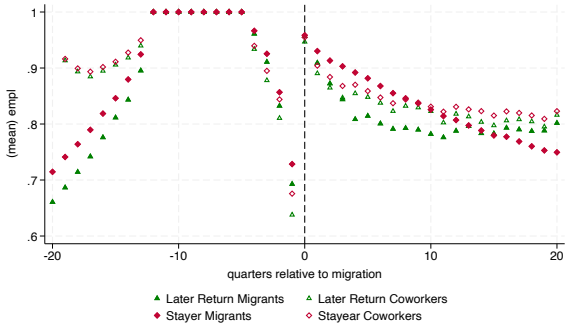
(d) Germans: Log wage



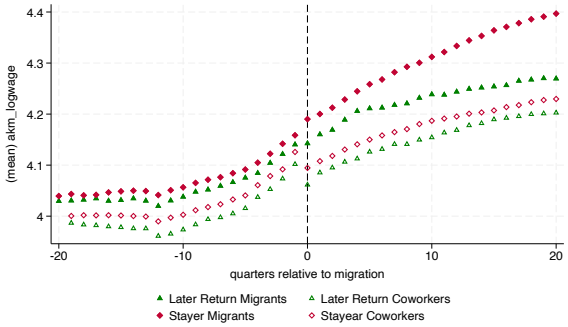
Notes: Co-workers are reweighted by network size age, gender, and employment in quarters 0, -1, and -2. The sample includes all Austrian migrants to Vienna and German migrants to the 5 largest cities shown in columns (1) and (3) in Table 4 and their co-workers.

Figure 8A: Domestic Migrants in Austria: Heterogeneity by Duration of Stay

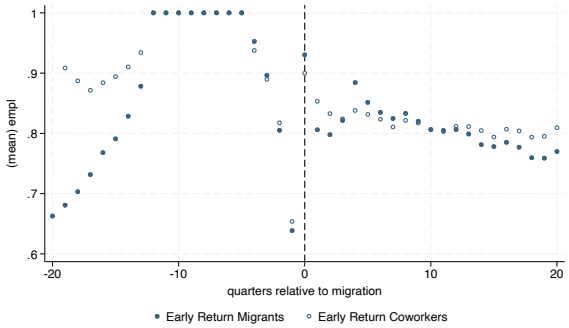
(a) Stayers and Late Return: Employment



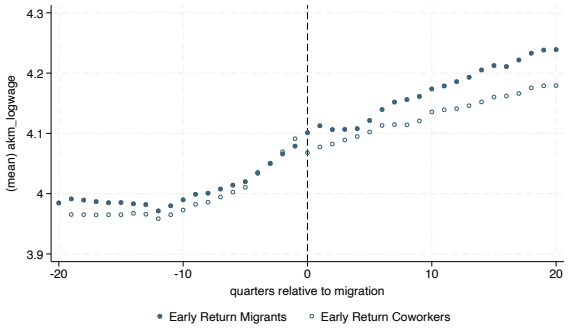
(b) Stayers and Late Return: Log wage



(c) Early Return: Employment



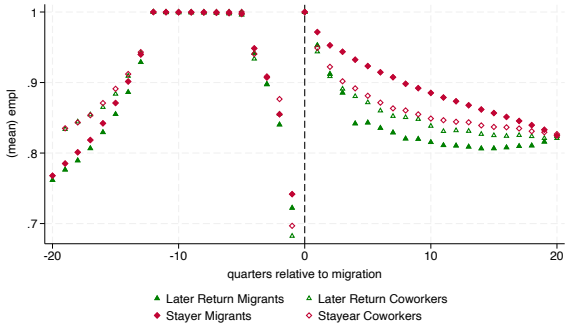
(d) Early Return:Log wage



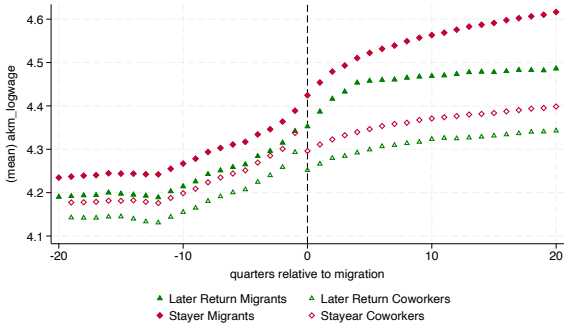
Notes: Co-workers are re-weighted by network size, age, gender, and employment in quarters 0, -1, and -2. The sample includes all Austrian migrants to Vienna shown in columns (1) in Table 4 and their co-workers.

Figure 8B: Domestic Migrants in Germany: Heterogeneity by Duration of Stay

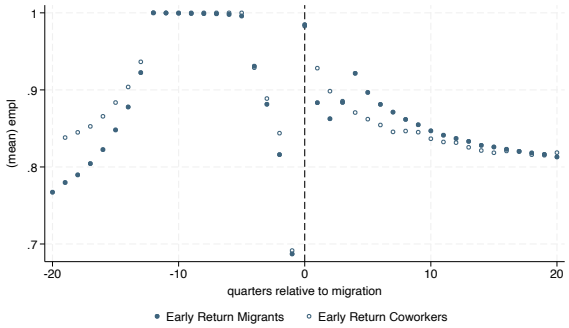
(a) Stayers and Late Return: Employment



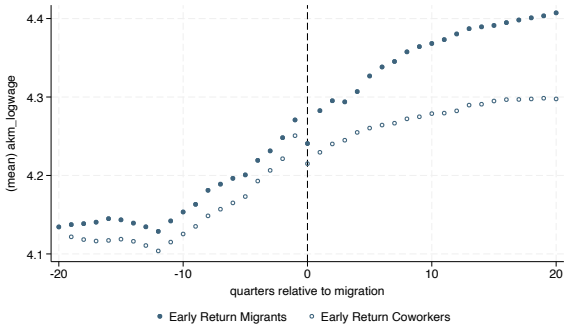
(b) Stayers and Late Return: Log wage



(c) Early Return: Employment



(d) Early Return: Log wage



Notes: Co-workers are re-weighted by network size, age, gender, and employment in quarters 0, -1, and -2. The sample includes all German migrants to one of the 5 largest German cities shown in columns (3) in Table 4 and their co-workers.

Supplemental Appendix

A Additional tables and figures

Table A1: Sample Construction

		Number of migrants	Share Female	Age at LM entry	Age at first move	Return within 3 years	East German
Austrians							
(1)	Move to the other country after a continuous 2-year employment period in the home country	71,980	0.37	19.70	31.54	0.41	
(2)	Employed in baseline period -5 to -12	30,615	0.37	20.08	30.85	0.37	
(3)	Aged 20-45 and moved 1980 or later	24,960	0.38	19.72	29.95	0.36	
(4)	No apprentices in baseline period	21,097	0.37	20.38	31.49	0.34	
(5)	Employed or unemployed in moving quarter	21,005	0.37	20.38	31.50	0.34	
Germans							
(1)	Move to the other country after a continuous 2-year employment period in the home country	196,825	0.39	22.28	34.58	0.53	0.12
(2)	Employed in baseline period -5 to -12	84,161	0.43	21.74	34.16	0.52	0.17
(3)	Aged 20-45 and moved 1980 or later	63,336	0.43	20.30	29.56	0.53	0.18
(4)	No apprentices in baseline period	39,208	0.38	21.47	33.28	0.46	0.14
(5)	Employed or unemployed in moving quarter	36,306	0.35	21.52	33.29	0.45	0.14

Notes: This table shows the steps to arrive at the analysis samples of Austrian and German migrants, starting with all migrants that have a substantial period of employment in their home country before moving to the other country, shown in row (1) of each panel.

Table A2: Robustness Checks International Migrants

Short Run				Medium Run			
log(wage)	Firm FE	Person FE	$X\beta$	log(wage)	Firm FE	Person FE	$X\beta$
1. International Migrants Austria to Germany							
Main Effects							
0.125	0.013	0.033	0.092	0.130	0.023	0.031	0.078
(0.006)	(0.005)	(0.004)	(0.002)	(0.006)	(0.005)	(0.004)	(0.002)
(0.006)	(0.005)	(0.003)	(0.001)	(0.006)	(0.006)	(0.005)	(0.001)
Co-workers Weighted by Age and Gender							
0.109	0.010	0.029	0.092	0.126	0.022	0.029	0.079
(0.005)	(0.004)	(0.004)	(0.002)	(0.005)	(0.004)	(0.004)	(0.002)
Co-workers Weighted by Age and Gender and Baseline Wage							
0.111	0.012	0.026	0.093	0.129	0.024	0.026	0.080
(0.005)	(0.004)	(0.004)	(0.002)	(0.005)	(0.004)	(0.004)	(0.002)
Migrants Reweighted to have Average Characteristics of German migrants							
0.155	0.032	0.059	0.068	0.163	0.034	0.060	0.064
(0.010)	(0.007)	(0.006)	(0.002)	(0.011)	(0.008)	(0.007)	(0.002)
2.International Migrants Germany to Austria							
Main Effects							
0.040	0.028	0.093	-0.062	0.040	0.015	0.083	-0.045
(0.006)	(0.003)	(0.004)	(0.005)	(0.009)	(0.003)	(0.003)	(0.008)
Co-workers Weighted by Age and Gender							
0.023	0.024	0.088	-0.061	0.029	0.014	0.077	-0.045
(0.006)	(0.003)	(0.004)	(0.005)	(0.009)	(0.003)	(0.004)	(0.008)
Co-workers Weighted by Age and Gender and Baseline Wage							
0.029	0.026	0.082	-0.061	0.037	0.017	0.069	-0.044
(0.005)	(0.000)	(0.004)	(0.005)	(0.007)	(0.002)	(0.004)	(0.008)
Migrants Reweighted to have Average Characteristics of Austrian migrants							
0.019	-0.008	0.123	-0.071	0.015	-0.015	0.101	-0.054
(0.005)	(0.003)	(0.004)	(0.005)	(0.007)	(0.003)	(0.004)	(0.007)

Notes: Standard errors in parentheses are clustered at the industry (1-digit) $\times$ region (NUTS 3) $\times$ 5-year time-period level.

Table A3: Robustness Checks Domestic Migrants

	Short Run			Medium Run			
log(wage)	Firm FE	Person FE	$X\beta$	log(wage)	Firm FE	Person FE	$X\beta$
3. Domestic Migrants Austria to Vienna							
Main Effects							
0.029	0.027	0.010	-0.003	0.053	0.022	0.030	-0.005
(0.005)	(0.005)	(0.001)	(0.001)	(0.005)	(0.004)	(0.002)	(0.001)
Co-workers Weighted by Age and Gender							
0.019	0.004	0.007	-0.002	0.051	0.024	0.026	-0.004
(0.004)	(0.004)	(0.001)	(0.001)	(0.004)	(0.004)	(0.002)	(0.002)
Migrants Reweighted to have Average Characteristics of International Migrants							
0.056	0.064	0.007	0.002	0.079	0.055	0.021	0.001
(0.010)	(0.008)	(0.005)	(0.002)	(0.011)	(0.007)	(0.006)	(0.002)
4. Domestic Migrants Germany to 5 Big Cities							
Main Effects							
0.080	0.061	0.021	-0.001	0.105	0.055	0.040	0.001
(0.010)	(0.005)	(0.014)	(0.014)	(0.013)	(0.005)	(0.012)	(0.019)
Co-workers Weighted by Age and Gender							
0.068	0.059	0.018	0.001	0.101	0.055	0.037	0.002
(0.010)	(0.005)	(0.014)	(0.014)	(0.013)	(0.005)	(0.012)	(0.019)
Migrants Reweighted to have Average Characteristics of International Migrants							
0.060	0.052	0.021	-0.002	0.086	0.048	0.040	-0.003
(0.010)	(0.006)	(0.015)	(0.011)	(0.013)	(0.006)	(0.011)	(0.015)

Notes: Standard errors in parentheses are clustered at the industry (1-digit) × region (NUTS 3) × 5-year time-period level.

Table A4: Summary of Returns to Migration for Female and Male Migrants

	Difference in differences for migrants relative to co-workers				Decomposition of D-in-D in firm effects	
	Mean log wage	Mean firm effects	Mean pers. effects	Mean cov. Index	Mean location effects	Mean firm effect net of location
	(1)	(2)	(3)	(4)	(5)	(6)
Female Movers						
1. Austria to Germany	0.054	−0.017	−0.018	0.081	–	–
	(0.017)	(0.018)	(0.016)	(0.002)		
2. Germany to Austria	0.012	0.011	0.053	−0.047	–	–
	(0.010)	(0.004)	(0.005)	(0.009)		
3. Austrian domestic movers	0.034	−0.007	0.034	−0.005	0.017	−0.024
	(0.011)	(0.011)	(0.003)	(0.001)	(0.001)	(0.011)
4. German domestic movers	0.120	0.061	0.043	−0.001	0.028	0.033
	(0.016)	(0.006)	(0.013)	(0.019)	(0.004)	(0.006)
Male Movers						
5. Austria to Germany	0.168	0.038	0.058	0.076	–	–
	(0.006)	(0.004)	(0.004)	(0.002)		
6. Germany to Austria	0.069	0.020	0.109	−0.047	–	–
	(0.009)	(0.004)	(0.004)	(0.008)		
7. Austrian domestic movers	0.060	0.038	0.024	−0.003	0.018	0.020
	(0.004)	(0.003)	(0.002)	(0.001)	(0.001)	(0.003)
8. German domestic movers	0.104	0.050	0.048	0.001	0.024	0.026
	(0.013)	(0.004)	(0.013)	(0.019)	(0.004)	(0.004)
Female − Male Differences						
9. Austria to Germany	−0.115	−0.055	−0.076	0.005		
	(0.018)	(0.019)	(0.017)	(0.003)		
10. Germany to Austria	−0.057	−0.009	−0.056	0.000		
	(0.014)	(0.006)	(0.006)	(0.011)		
11. Austrian domestic movers	−0.027	−0.046	0.010	−0.001	−0.001	−0.045
	(0.012)	(0.011)	(0.004)	(0.002)	(0.001)	(0.011)
12. German domestic movers	0.016	0.011	−0.005	−0.002	0.005	0.007
	(0.020)	(0.007)	(0.018)	(0.027)	(0.006)	(0.007)

Notes: Austrian domestic movers migrate to Vienna, German domestic movers to 5 big cities. Returns in the medium run (quarters 5 to 20), see notes to Table 3. Standard errors in parentheses are clustered at the industry (1-digit) × region (NUTS 3) × 5-year time-period level.

Table A5: Summary of Returns to Migration for Lower-Wage versus Higher-Wage Migrants

	Short run (quarters 1–4)	Difference in differences for migrants relative to co-workers				
		Medium run (quarters 5–20)				
	Mean log wage (1)	Mean log wage (2)	Mean firm effects (3)	Mean pers. effects (4)	Mean cov. index (5)	Mean residual (6)
Lower-wage movers						
1. Austria to Germany	0.159	0.180	0.006	0.060	0.087	0.027
	(0.015)	(0.015)	(0.016)	(0.015)	(0.002)	
2. Germany to Austria	0.123	0.107	0.063	0.068	-0.028	0.005
	(0.010)	(0.014)	(0.006)	(0.004)	(0.011)	
3. Austrian domestic movers	0.088	0.126	0.010	0.070	-0.005	0.050
	(0.012)	(0.013)	(0.013)	(0.003)	(0.001)	
4. German domestic movers	0.151	0.185	0.084	0.059	0.000	0.043
	(0.013)	(0.016)	(0.003)	(0.012)	(0.020)	
Higher-wage movers						
5. Austria to Germany	0.094	0.093	0.023	0.014	0.073	-0.018
	(0.006)	(0.006)	(0.005)	(0.004)	(0.002)	
6. Germany to Austria	0.012	0.016	0.000	0.087	-0.052	-0.019
	(0.005)	(0.008)	(0.003)	(0.004)	(0.007)	
7. Austrian domestic movers	-0.026	0.005	0.023	0.004	-0.003	-0.018
	(0.003)	(0.003)	(0.003)	(0.002)	(0.001)	
8. German domestic movers	0.029	0.049	0.038	0.023	0.001	-0.012
	(0.008)	(0.010)	(0.007)	(0.013)	(0.018)	
Lower – Higher Wage Differences						
9. Austria to Germany	0.064	0.087	-0.018	0.046	0.014	0.044
	(0.016)	(0.016)	(0.017)	(0.016)	(0.003)	
10. Germany to Austria	0.111	0.091	0.063	-0.020	0.024	0.024
	(0.011)	(0.015)	(0.006)	(0.006)	(0.013)	
11. Austrian domestic movers	0.114	0.120	-0.012	0.066	-0.002	0.068
	(0.012)	(0.014)	(0.013)	(0.004)	(0.002)	
12. German domestic movers	0.122	0.136	0.046	0.037	-0.001	0.055
	(0.015)	(0.019)	(0.008)	(0.017)	(0.027)	

Notes: Austrian domestic movers migrate to Vienna, German domestic movers to 5 big cities. Low wage and high wage migrants are classified by the bottom two quintiles of the base period wage distribution versus top three quintiles, see notes to Table 3. Standard errors in parentheses are clustered at the industry (1-digit) $\times$ region (NUTS 3) $\times$ 5-year time-period level.

Table A6: Difference in differences estimates by firm connection for domestic and international migrants

		Austrian Migrants					German migrants				
		Mean log wage (1)	Mean firm effects (2)	Mean pers. effects (3)	Mean cov. Index (4)	Mean city effects (5)	Mean log wage (6)	Mean firm effects (7)	Mean pers. effects (8)	Mean cov. Index (9)	Mean city effects (10)
1. All	Domestic	0.053	0.022	0.030	-0.005	0.017	0.105	0.055	0.040	0.001	0.026
		(0.005)	(0.004)	(0.002)	(0.001)	(0.001)	(0.013)	(0.005)	(0.012)	(0.019)	(0.004)
	International	0.130	0.023	0.031	0.078	–	0.040	0.015	0.083	-0.045	–
		(0.006)	(0.005)	(0.004)	(0.002)		(0.009)	(0.003)	(0.003)	(0.008)	
Comparing movers who were unemployed pre-move											
2. O-D pairs with	Domestic	0.004	−0.013	0.018	−0.004	0.014	0.061	0.017	0.032	0.002	0.016
4+ movers		(0.008)	(0.008)	(0.004)	(0.001)	(0.002)	(0.017)	(0.008)	(0.015)	(0.017)	(0.004)
	International	0.170	0.039	0.066	0.075		0.088	−0.010	0.158	−0.044	
		(0.011)	(0.008)	(0.008)	(0.003)		(0.011)	(0.006)	(0.009)	(0.008)	
3. O-D pairs with	Domestic	0.068	0.033	0.033	−0.006	0.018	0.111	0.060	0.042	0.000	0.027
less than 4 movers		(0.004)	(0.003)	(0.002)	(0.001)	(0.001)	(0.013)	(0.005)	(0.012)	(0.019)	(0.004)
	International	0.123	0.020	0.025	0.079		0.033	0.018	0.076	−0.048	
		(0.006)	(0.005)	(0.005)	(0.002)		(0.009)	(0.003)	(0.003)	(0.008)	

Notes: Medium-run effect estimates. Standard errors in parentheses are clustered at the industry (1-digit) × region (NUTS 3) × 5-year time-period level. Entries are difference in difference estimates of the effect of migration on post-move log daily wages. City effects are only estimated for domestic movers (marked "—" for international rows). See text for further details.

Table A7: Descriptive Statistics of international migrants by return type

	Austrian Migrants			German Migrants		
	Stayers	Early Return	Later Return	Stayers	Early Return	Later Return
Female	0.40	0.32	0.34	0.36	0.36	0.33
Age at First Move	31.36	31.54	31.82	33.98	32.36	33.03
Move in 1980's	0.29	0.07	0.09	0.02	0.04	0.05
Move in 1990's	0.28	0.30	0.29	0.14	0.14	0.15
Move in 2000's	0.26	0.38	0.37	0.58	0.59	0.55
Move after 2010	0.17	0.24	0.24	0.26	0.23	0.25
Unemployed pre move	0.19	0.30	0.23	0.16	0.28	0.18
Connected Firm	0.11	0.10	0.12	0.09	0.08	0.12
Pre-migration wage	77.38	76.07	84.96	90.02	70.38	90.37
Pre-migration log wage	4.22	4.20	4.31	4.37	4.13	4.37
AKM person	0.13	0.08	0.16	0.14	0.02	0.15
AKM firm	0.05	0.04	0.06	0.04	-0.05	0.04
Origin Industry						
Manufacturing	0.28	0.22	0.25	0.24	0.18	0.22
Construction	0.05	0.10	0.08	0.05	0.10	0.05
Sales	0.17	0.16	0.17	0.16	0.13	0.16
Hotel	0.05	0.12	0.06	0.05	0.19	0.10
Transport	0.04	0.06	0.05	0.07	0.09	0.09
Service	0.40	0.35	0.40	0.43	0.30	0.37
Origin Region						
Austria Border regions	0.31	0.38	0.34			
Austria Center South	0.36	0.37	0.35			
Austria within 100km of Vienna	0.33	0.26	0.31			
Germany 5 largest cities				0.12	0.21	0.11
East Germany				0.17	0.13	0.18
Other Germany				0.25	0.22	0.25
South Germany				0.30	0.26	0.31
German Border Region				0.16	0.18	0.16
Destination Region						
City	0.21	0.16	0.18	0.19	0.08	0.18
Individuals	12,168	3,905	4,932	16,821	9,832	9,653

Notes: The table reports summary statistics for Austrian and German international migrants in the main analysis sample. Stayers remain in the destination country for at least 5 years, early returners return within 4 quarters, later returners return between quarter 5 and quarter 19.

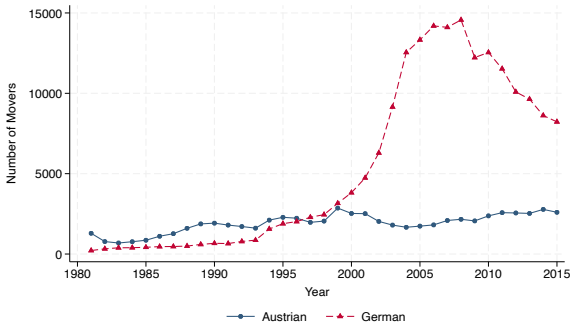
Table A8: Summary of Returns to Austrian International Migration by Destination City

	Difference in differences for migrants relative to co-workers			
	Mean log wage (1)	Mean firm effects (2)	Mean pers. effects (3)	Mean cov. Index (4)
1. Austria to German big 5	0.206	0.061	0.074	0.082
	(0.012)	(0.008)	(0.007)	(0.003)
2. Austria to other German destination	0.110	0.014	0.020	0.078
	(0.006)	(0.005)	(0.005)	(0.002)

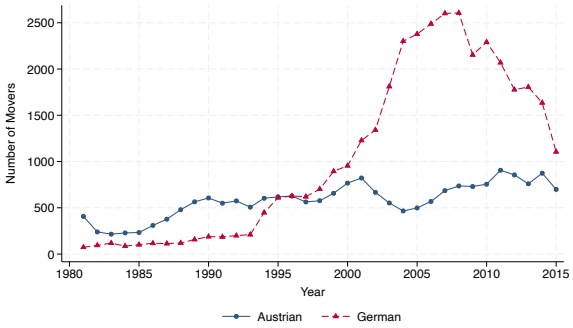
Notes: Returns in the medium run (quarters 5 to 20), see notes to Table 3. Standard errors in parentheses are clustered at the industry (1-digit) $\times$ region (NUTS 3) $\times$ 5-year time-period level.

Figure A1: Selection

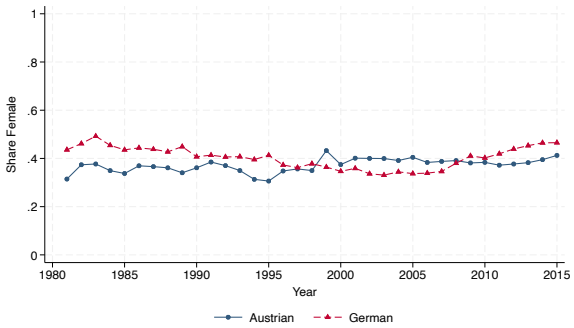
(a) Number of Movers



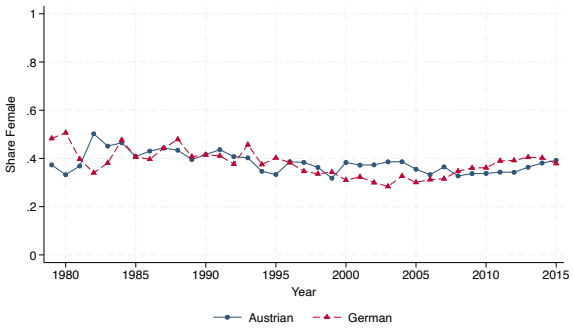
(b) Estimation Sample



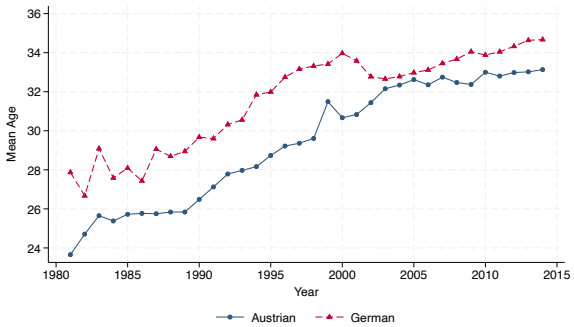
(c) Share Female



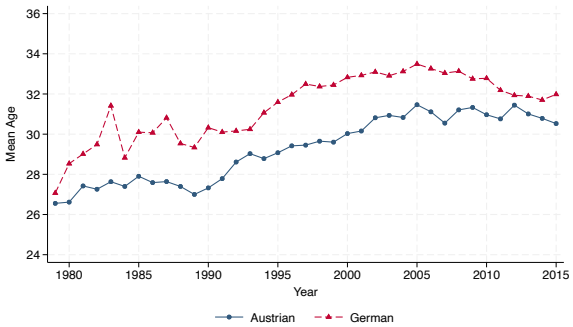
(d) Estimation Sample



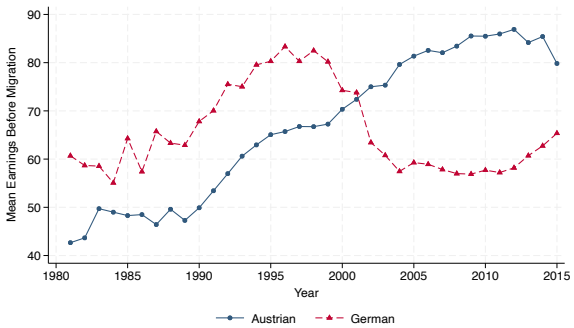
(e) Age at first migration



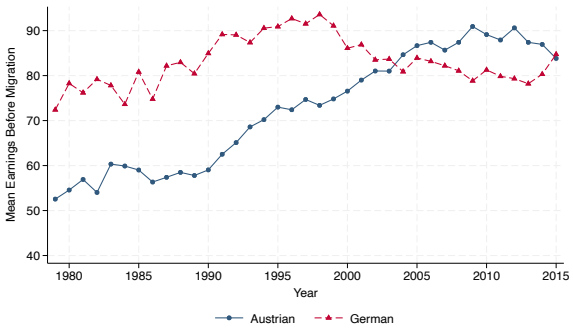
(f) Estimation Sample



(g) Earnings in first job

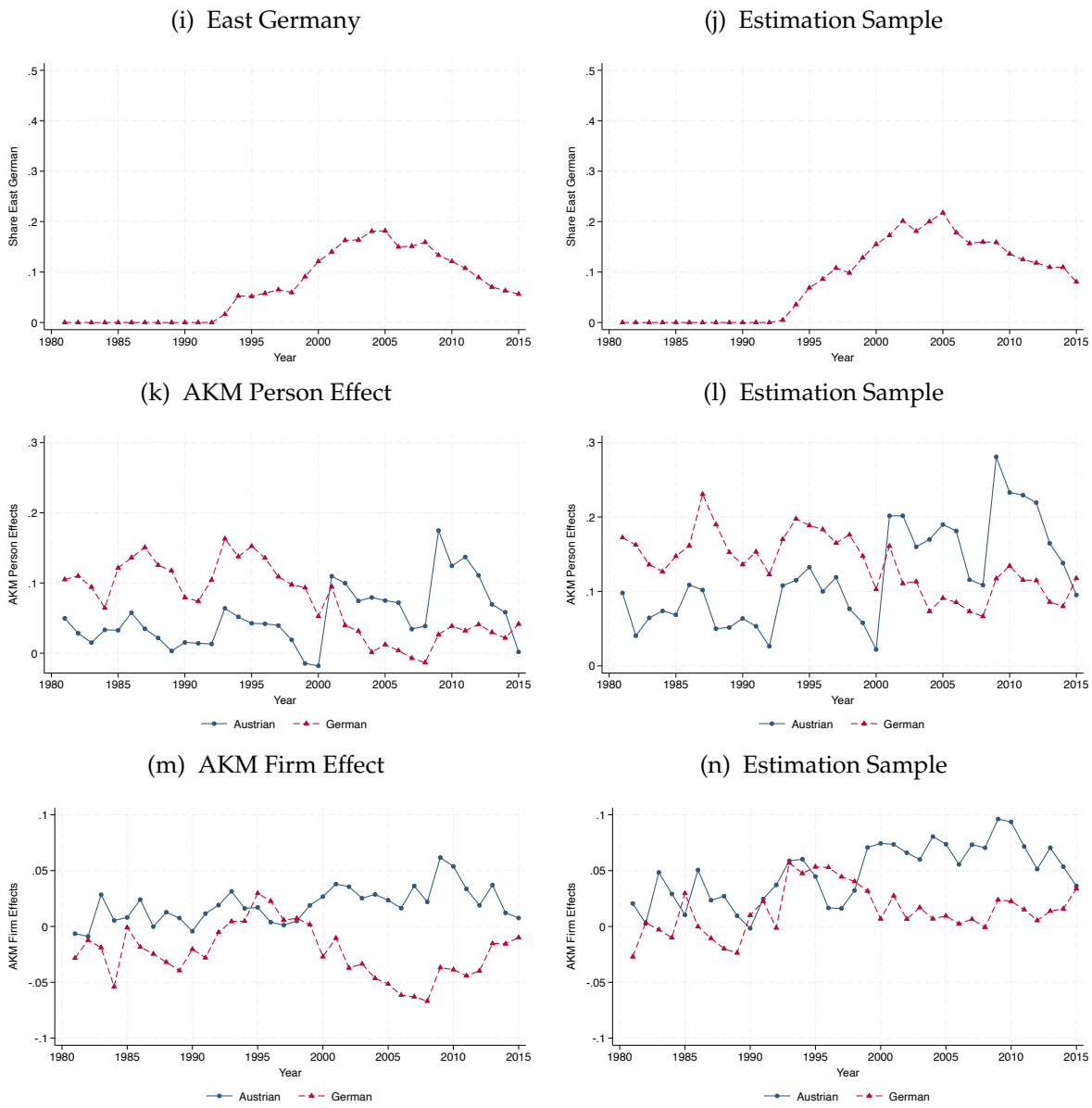


(h) Estimation Sample: Earnings in Base Period



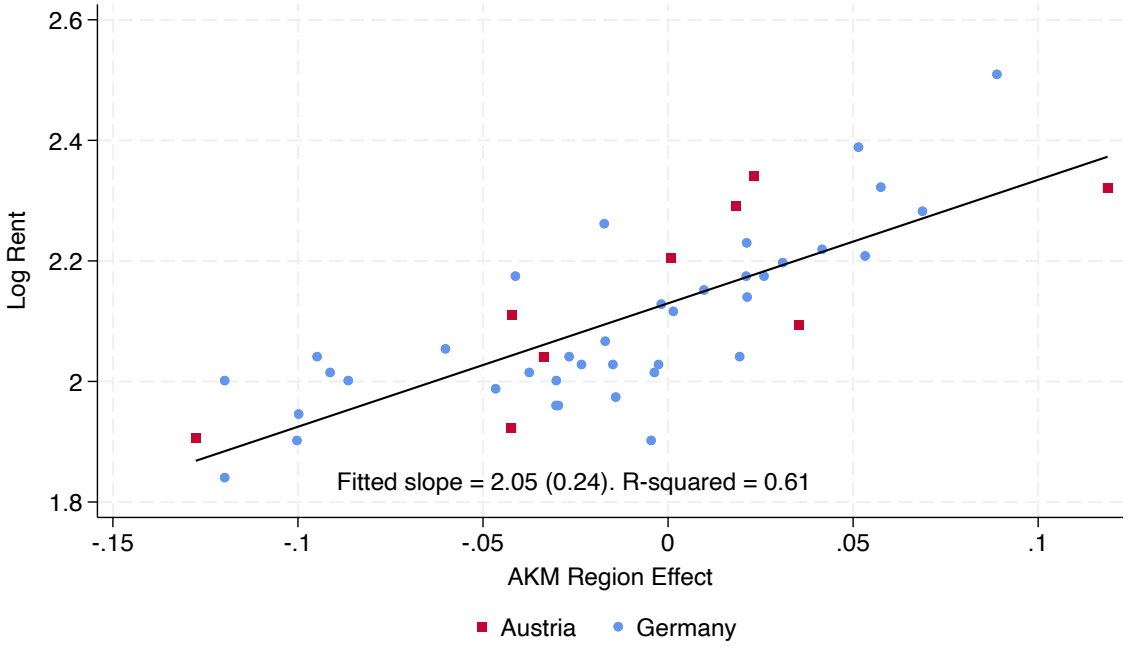
Notes: Comparison of sample in row (1) of Appendix Table A1, migrants first moving to other country after a 2 year job in home country (left column) and row (5) of Appendix table A1, migrants with the additional restrictions of being employed in the base period, aged 20-45 at the first move, moving after 1980, without apprenticeships in base period, and employed or unemployed in quarter 0 (right column).

Figure A1: Selection (continued)



Notes: Comparison of sample in row (1) of Appendix Table A1, migrants first moving to other country after a 2 year job in home country (left column) and row (5) of Appendix Table A1 migrants with the additional restrictions of being employed in the base period, aged 20-45 at the first move, moving after 1980, without apprenticeships in base period, and employed or unemployed in quarter 0 (right column).

Figure A2: Rents versus Place Effects in 47 NUTS 2 Regions



Notes: Figure shows the log average gross rent per square meter in 9 Austrian and 38 German NUTS 2 Regions in 2022 versus the region fixed effects based on the AKM estimates in the estimation period 2016-2023.

B Institutional setting

General: Austria joined the European Economic Area (EEA) on January 1, 1994, and the European Union (EU) on January 1, 1995. Germany, as a founding member of both the EEA and the EU, had already been part of these frameworks. The freedom of movement of workers within the EU was established with the *Maastricht Treaty* in 1992: EU citizens are entitled to seek employment in another EU country, are allowed to work and reside there without needing a work permit, and may stay even after employment has ended. Moreover, EU citizens have the right to equal treatment with nationals in access to employment, working conditions, and all other social and tax advantages. The *Schengen Agreement* was implemented on December 1, 1997. It abolished all internal borders between its members, including Austria and Germany, thereby rendering checks on persons at internal borders obsolete.

Social security: Social security coordination between Austria and Germany is governed by EU Regulation (EC) No. 883/2004, which ensures that individuals pay contributions to the social security system of the country where they work, regardless of their country of residence. This regulation also provides mechanisms for the aggregation of insurance periods across both countries, allowing cross-border workers and migrants to qualify for social benefits such as pensions, healthcare, and unemployment benefits based on combined contribution records. Benefits are generally paid by the institution of the country where the insured person resides or moves to, but calculated based on total periods accumulated in all member states.[31] Before 883/2004, coordination was governed by Regulation (EEC) No. 1408/71 and followed similar principles of single-state coverage and cross-border coordination.[32] For unemployment benefits, a person who becomes unemployed in one country may, under certain conditions, continue receiving that benefit while looking for work in another country for a limited period. Periods of insurance completed in one country can also count toward entitlement in the other country.

Taxation: The taxation of employment income between Austria and Germany is governed by the Double Taxation Agreement (DBA) in force since 2003, which is based on the OECD Model Convention (Lang et al., 2002). Under this framework, employment income is taxed exclusively in the country where the work is physically performed, while the country of residence exempts the income using the exemption with progression method (Kofler, 2005). Thus, Germans living and working in Austria are subject to Austrian income tax, while Austrians living and working in Germany are taxed under German income tax law. Prior to 2003, a special Grenzgängerregelung applied under the 1954 DBA, allowing daily cross-border commuters to be taxed in their country of residence, provided they returned

[31] Regulation (EC) No. 883/2004
[32] Regulation (EEC) No. 1408/71

home each working day (Gassner and Lang, 2002). This rule applied from 1980 until its abolition in 2003, after which the source-based taxation principle became the standard between both countries.

Exchange rate: There has been little uncertainty regarding the exchange rate between the Austrian and German currencies during the relevant time period. Since the introduction of the Euro on January 1, 1999, both countries have shared a common official currency, and from January 1, 2001, also a common day-to-day operating currency. Prior to that, the Austrian central bank had unofficially pegged the Austrian Schilling to the Deutschmark since the late 1970s (Androsch, 1985)

Skill portability: Portability of skills between Germany and Austria is very high due to the equivalence of degrees, the similarity of their education systems, the common language, and the right to equal treatment within the EU. Since July 1, 1990, a bilateral agreement between Austria and Germany guarantees the equivalence of professional certificates, except for occupations requiring a state examination.[33] Additionally, both countries share a dual system of vocational training, commonly known as the apprenticeship education system. Before this agreement, recognition of professional qualifications was less formalized and often required case-by-case approval, creating administrative hurdles and limiting cross-border professional mobility.

C Estimation of AKM models

This section describes the estimation of a set of AKM models as in Abowd et al. (1999), estimated separately for Germany and Austria, following the approach of Card et al. (2013). For Germany, we use data from the *Integrated Employment Biographies (IEB)*, which contain information on the universe of workers in employment subject to social security in Germany. For Austria, we use data from the *Austrian Social Security Database (ASSD)*. We consider data from 1978 to 2023; data for East Germany are included from 1992 onward. The data for both Germany and Austria include information on total (gross) earnings and the number of days worked in each job per year for nearly all private-sector employees (civil servants and the self-employed are not included). Our focus is on male and female employees aged 20 to 60 years, excluding marginal employees and apprentices.[34]

As the ASSD does not contain information on part-time status, we include both full-time and part-time employees for both countries (unlike Card et al. (2013)). Based on data from the European Labour Force Survey available from 1995 onward, the share of part-time employment in total employment has evolved at a similar level in Austria and Germany. In both countries, the part-time share has increased substantially over time: in Germany, it

[33] Berufsbildungsabkommen Österreich - Deutschland

[34] In Germany, approximately 4.5 million individuals were employed exclusively in marginal jobs, while 1.3 million worked as apprentices in 2023.

rose from 16.4% in 1995 to 28.4% in 2023, and in Austria from 13.8% to 30.4% over the same period.[35]

From the universe of employment spells, we construct a person-year dataset. For workers who have more than one job during the year, we select the main job per person and year. We sum the earnings received by a given individual from the main job in each year and obtain the daily wage by dividing the total earnings by the number of days worked (including weekends and holidays). Wages are adjusted for inflation using the Consumer Price Index in the respective country (base year 2000). Employees with daily earnings below 10 Euro (2000 prices) are excluded from the sample.

In both the data for Germany and Austria, earnings are right-censored at the contribution assessment ceiling. In the ASSD, following Card et al. (2013), we fit a series of Tobit models to impute the right tail of the wage distribution.[36] We estimate the Tobit regressions by year, sex, and age group (four 10-year ranges). The model includes the variables age, the worker's mean log wage in other years, the fraction of censored wages in other years, establishment size and its square, a dummy for individuals observed for only one year, a dummy for employees in one-worker establishments, a dummy for employees at establishments with 10 or fewer workers, the mean log wage of co-workers in the current year (i.e., the "leave out mean" of log wages at his or her employer), and the fraction of co-workers with censored wages in the current year. Using the estimated parameters of these models, we replace each censored wage value with a random draw from the appropriate conditional wage distribution. In the IEB data, each censored wage value is replaced with an imputed wage provided by Drechsler and Ludsteck (2025).[37]

Given the lack of education data in the ASSD, the time-varying covariates included in the AKM model comprise year dummies and an age function including quadratic and cubic terms, with age deviated from 40 (similar to Card et al. (2025)). The AKM effects are estimated separately for the time intervals 1978-1984, 1985-1991, 1992-1999, 2000-2007, 2008-2015, and 2016-2023. In the first two periods (1978-1984 and 1985-1991) only individuals employed in West Germany are included in the data for Germany.

Appendix Table C1 summarizes the estimation results for the six time intervals in our analysis for Germany (upper panel) and Austria (bottom panel).

[35] Data retrieved in March 2026 from Eurostat (https://doi.org/10.2908/LFSA_EPPGA). The data refer to all employed persons aged 25–64 according to the ILO concept (including self-employed, civil servants, and other groups not covered in our sample). For comparison, the part-time rate among employees subject to social security contributions in Germany was approximately 30.0% in 2023, very similar to that of all employed persons.

[36] In contrast to the data used in Card et al. (2013) in the ASSD, we do not have (complete) information on education.

[37] The imputation is similar to Card et al. (2013). In particular, the model also includes leave-one-out-means.

Table C1: Estimation Results for AKM Model, Fit by Interval

	1978-84 (1)	1985-91 (2)	1992-99 (3)	2000-07 (4)	2008-15 (5)	2016-23 (6)
I. GERMANY						
Person and Establ. Parameters						
N person effects	24,135,630	26,280,155	35,667,472	33,348,050	34,240,348	38,527,834
N establ. effects	1,832,072	2,030,679	3,087,201	3,083,712	2,881,677	2,916,235
Std. dev. person effects	0.369	0.389	0.385	0.406	0.428	0.426
Std. dev. establ. effects	0.203	0.229	0.256	0.290	0.294	0.265
Std. dev. $X\beta$ effects	0.063	0.100	0.051	0.059	0.079	0.074
Corr. person/establ. effects	0.073	0.101	0.160	0.172	0.242	0.282
Corr. person/$X\beta$ effects	0.041	0.007	0.008	0.037	-0.019	-0.053
Corr. establ./$X\beta$ effects	0.074	0.049	0.019	0.080	0.053	0.041
RMSE AKM residual	0.138	0.151	0.161	0.169	0.174	0.183
Adjusted R^2	0.911	0.910	0.904	0.911	0.917	0.904
Comparison to match model						
RMSE match model	0.111	0.124	0.130	0.131	0.135	0.142
Adjusted R^2 match model	0.941	0.939	0.937	0.944	0.949	0.940
Std. dev. match effect	0.081	0.086	0.096	0.106	0.109	0.115
Addendum						
Mean log wages	4.136	4.218	4.194	4.195	4.165	4.235
Std. dev. log wages	0.460	0.503	0.519	0.566	0.566	0.588
II. AUSTRIA						
Person and Establ. Parameters						
N person effects	2,755,715	2,915,665	3,337,817	3,579,463	4,061,026	4,635,005
N establ. effects	234,417	255,169	353,656	377,647	367,362	372,150
Std. dev. person effects	0.370	0.381	0.404	0.425	0.441	0.442
Std. dev. establ. effects	0.226	0.235	0.253	0.256	0.255	0.249
Std. dev. $X\beta$ effects	0.055	0.083	0.056	0.052	0.055	0.074
Corr. person/establ. effects	0.018	0.038	0.073	0.120	0.125	0.077
Corr. person/$X\beta$ effects	0.067	0.028	-0.003	-0.037	-0.024	-0.039
Corr. establ./$X\beta$ effects	0.028	0.013	-0.009	-0.016	-0.007	0.024
RMSE AKM residual	0.133	0.140	0.164	0.176	0.183	0.205
Adjusted R^2	0.916	0.916	0.900	0.896	0.894	0.866
Comparison to match model						
RMSE match model	0.106	0.113	0.132	0.142	0.151	0.173
Adjusted R^2 match model	0.946	0.945	0.935	0.932	0.928	0.903
Std. dev. match effect	0.080	0.083	0.097	0.104	0.104	0.109
Addendum						
Mean log wages	3.927	3.995	4.081	4.105	4.120	4.143
Std. dev. log wages	0.462	0.485	0.520	0.549	0.566	0.562

Notes: Results from estimating AKM models following Card et al. (2013). Time-varying covariates include year dummies and quadratic plus cubic terms in age. Match model additionally includes a separate dummy for person–establishment pair. The standard deviation of the match effect is estimated as the square root of the difference in mean squared errors between the AKM and the match effects model. For Germany, the first two intervals include only individuals employed in West Germany.

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