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## Job mobility as a new explanation for the immigrant-native wage gap: A longitudinal analysis for the German labor market

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Articles on labour market issues

## Job mobility as a new explanation for the immigrant-native wage gap

A longitudinal analysis for the German labor market

Hanna Brenzel  
Malte Reichelt

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# Job mobility as a new explanation for the immigrant-native wage gap

## A longitudinal analysis for the German labor market

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Mit der Reihe „IAB-Discussion Paper“ will das Forschungsinstitut der Bundesagentur für Arbeit den Dialog mit der externen Wissenschaft intensivieren. Durch die rasche Verbreitung von Forschungsergebnissen über das Internet soll noch vor Drucklegung Kritik angeregt und Qualität gesichert werden.

The “IAB-Discussion Paper” is published by the research institute of the German Federal Employment Agency in order to intensify the dialogue with the scientific community. The prompt publication of the latest research results via the internet intends to stimulate criticism and to ensure research quality at an early stage before printing.

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## Abstract

Theoretically, wage gaps between migrants and natives can be explained by human capital theory through either depreciation in human capital with migration or differences in endowments. However, even after considering human capital measures, an unexplained difference remains. We assume that differences in the employment trajectories of migrants and natives contribute to wages that diverge after labor market entrance. Utilizing a rich longitudinal data set (ALWA-ADIAB), we analyze the job mobility of migrants and natives in Germany and distinguish among voluntary, involuntary, internal and other job changes. Indeed, we find evidence for differences in transition patterns and – using several fixed-effects regressions – are able to explain a substantial part of the gap between migrants' and natives' hourly wages by differences in job change behavior.

## Zusammenfassung

Theoretisch lassen sich Lohnunterschiede zwischen Migranten und Einheimischen mithilfe der Humankapitaltheorie erklären. Diese unterstellt Ausstattungsunterschiede oder eine Abwertung von Humankapital bei Migration. Trotzdem bleibt auch nach Berücksichtigung von Humankapital-Variablen meist ein unerklärter Lohnunterschied zwischen Migranten und Einheimischen. Wir benutzen einen umfangreichen Längsschnittdatensatz (ALWA-ADIAB) und analysieren die Arbeitsplatzmobilität von Migranten und Einheimischen in Deutschland, wobei wir zwischen freiwilligen, unfreiwilligen, internen und anderen Wechseln unterscheiden. Wir finden unterschiedliche Übergangsmuster und können – mithilfe von fixed-effects Regressionen – einen substantiellen Teil der Lohnlücke mit Unterschieden im Jobwechsel-Verhalten erklären.

**JEL classification:** J61, J31, J62, J15

**Keywords:** migration, wage inequality, migrant wage gap, fixed-effects regression, ALWA-ADIAB

# 1 Introduction

The integration of immigrants into the labor market is a key concern in industrialized countries and is considered in public and academic debates. In this context, wages are of major importance because they are a key measure of economic and social integration. Often, substantial differences exist between the wages of immigrants and natives, indicating friction in labor market integration. A broad strand of the migration literature addresses the immigrant-native wage gap (Aldashev et al. 2012; Borjas 1985; Chiswick 1978; Chiswick/Miller 2009). However, the size of the gap varies considerably depending on the population of interest and the means of analysis.

Theoretically, the emergence of wage differences can be explained by human capital theory, which includes the depreciation of human capital with migration and differences in characteristics such as qualifications. According to various studies, only some parts of the wage gap can be explained by differences in endowments, and an unexplained portion of the gap remains. Thus, human capital theory cannot fully explain the existing wage gap, leaving space for further approaches to address wage differentials.

We follow a new explanation and – drawing on job-shopping theory – assume that differences in employment trajectories between migrants and natives contribute to diverging wages. We thus draw on debates that emphasize the importance of job mobility for migrant integration (Fuller 2014; Fuller/Martin 2012). Voluntary job changes, especially within the first years of employment, should positively influence future earnings, either through an increase in the wage level or through a steeper growth rate. Involuntary changes, however, should have a negative impact. Assuming differences in the mobility behavior of migrants and natives, i. e., fewer voluntary changes and more involuntary changes, we should thus observe diverging wages after labor market entry. The primary goals of this article are thus first to examine differences in job mobility and second, to analyze whether such differences contribute to wage inequality between migrants and natives.

We focus on Germany, which has become the second-largest immigration country in the OECD. The economic upswing and a growing gap with neighboring countries have increased immigration (Bertoli et al. 2013; Brücker 2015). In particular, labor migration has grown and, according to the OECD (2014), immigration flows have increased by over one-third from 2011 to 2012. Drawing on the longitudinal, retrospective ALWA-ADIAB data set and employing fixed-effects regressions, we indeed find evidence that differences in job mobility between the two groups explain part of the wage gap. Because migrants have fewer voluntary and more involuntary job transitions, wage trajectories diverge over the life course.

The paper is organized as follows. We first provide a brief overview of the main theories used to explain immigrant-native wage gaps. We then derive our hypotheses on the incidence and impact of differing job mobility employing job-shopping theory.

Subsequently, we provide a description of the ALWA-ADIAB data set and sample restrictions and describe the main variables and operationalizations. The empirical part includes descriptive evidence on wage trajectories and job mobility rates before turning to the main results of multiple fixed-effect regressions, in which we analyze the effect of job mobility on the immigrant-native wage gap. The paper closes by offering a conclusion of our primary findings and discussing the limitations of the study as well as potential areas for future research.

## **2 Theoretical background and previous literature**

### **2.1 The immigrant-native wage gap**

The analysis of wage disparities between immigrants and natives has a long history in the literature on the economic and social integration of migrants. Empirical studies on Germany and other industrialized countries agree that a gap exists between native and migrant earnings, utilizing various theories to explain the emergence and persistence of this gap (Lehmer/Ludsteck 2011; Seifert 1997; Velling 1995).

The human capital theory, which addresses differences in the endowments of individuals, is the most prominent approach to explain wage gaps between immigrants and natives. Support for this theory can be found in Velling (1995), who shows that most of the wage differentials in the German labor market are due to differences in human capital. Reasons for dissimilarities in characteristics can be attributed to either the selectivity of migration or to a general educational gap between the host country and the country of origin (Granato/Kalter 2001). This educational gap is particularly relevant if there are great differences in the institutional setting, the economic status or the per-capita income between these countries. If these were the only factors, controlling for formal education and the qualification of individuals should eradicate differences in earnings.

Nevertheless, Aldashev et al. (2012) find a considerable wage gap between native Germans and foreign-born individuals, even after considering endowment differences, and conclude that the imperfect transferability of human capital is a major factor driving wage inequality. This concept can be traced to Chiswick (1978), who stresses the importance of country-specific human capital. Moreover, the larger the distance in terms of language or cultural features between the destination and origin countries, the less transferable the human capital (Nielsen et al. 2004). When arriving in a new country, migrants suffer from disadvantages, even when they have the same demographic characteristics and qualifications as natives (Basilio et al. 2014; Borjas 1985; Chiswick 1978; Chiswick/Miller 2009; Friedberg 2000). These disadvantages are caused by a temporary depreciation of specific human capital due to migration. Country-specific knowledge, language proficiency and labor-market skills, however, should increase with the time spent in the host country, and therefore, differences should disappear over time. The effect should thus be transitory due to this so-called assimilation process (Nielsen et al. 2004). Dustmann (1993), however, cannot support this hypothesis for Germany. His findings suggest that wage inequal-

ity does not decrease over the migrant's employment history in the target labor market, although the expected length of stay in the host country does positively influence the assimilation process.

The existing theories do not appear to fully explain the wage gap between migrants and natives, and therefore, the remaining unexplained gap is usually ascribed to taste-based or statistical discrimination (Agrawal 2013; Arrow 1973; Becker 1957; Borjas 1994; Phelps 1972). However, we argue that some measurable mechanisms that drive wage inequality have been neglected. We thus extend the above-mentioned explanations by focusing on a theory that *generally* explains wage dispersion in the labor market – namely job-shopping theory. To establish a career, employees often change their jobs, resulting in wage growth (Fuller 2008). Differences in the potential from or the incentives and restrictions to such mobility then contribute to diverging wages.

## **2.2 Job mobility and its impact on wage inequality**

The first years of an employee's career are usually characterized by a high number of job changes during the so-called period of job shopping (Schmelzer 2012; Topel/Ward 1992). This type of job mobility influences employment and wage trajectories and thus supplements human capital theory to explain the existence of concave experience-earning profiles. According to Gius (2014), an average worker in the United States has approximately ten different employers throughout his working life. Usually, these changes are connected to wage growth (Fuller 2008). Although the number of changes is generally lower in Germany (Dustmann/Pereira 2008), an equivalent mechanism can be assumed.

Explanations for this pattern are manifold, including continuous job searches, which lead to job changes in cases of higher potential earnings (Burdett 1978; Jovanovic 1979a) or mismatches in the labor market (Jovanovic 1979b). The matching approach defines jobs as an "experience good" and assumes that due to imperfect information and uncertainty regarding the productivity of a worker in the current job, mismatches may occur. Job mobility therefore serves as a mechanism through which workers locate themselves in jobs in which they are able to maximize their productivity (García Pérez/Rebollo Sanz 2005). Individuals who are relatively productive in a particular job will thus remain in that job, whereas individuals with a poor match will quit that job (Schmelzer 2012).

The on-the-job-training approach of Mortensen (1988) assumes that worker productivity is not constant while employed in a particular job. While the productivity of an individual increases with tenure due to training on the job, learning by doing and other forms of investment in job-specific human capital (Mortensen 1988), the growth rate of productivity declines over time. Thus, changing a job and starting a new one implies moving to a steeper earning profile segment.

However, these theories only apply to voluntary changes, while involuntary changes through layoffs imply different triggers and effects. Gibbons and Katz (1991) assume that firms lay off their least productive workers. Potentially, new employers thus interpret layoffs as a signal of lower productivity and offer only low-paid positions. Schmelzer (2012) finds support for signaling theory in his empirical work on Germany. He states that indirect job mobility, i. e., a job change via unemployment, not only has negative effects upon re-entry into the labor market but also has a long lasting consequence for future earnings whereby direct voluntary job mobility implies permanent income rewards. Accordingly, García Pérez and Rebollo Sanz (2005) find positive effects for voluntary changes and long-lasting negative consequences for involuntary changes.

### 2.3 Differences in job mobility patterns

After explaining the general influences on the earning profiles of individuals, we now turn to the question of whether migrants should behave differently in their job mobility patterns than natives should, and if so, whether this different behavior leads to wage differences, hence helping to explain part of the wage gap between natives and migrants.

As shown in the previous section, job transitions have a crucial impact on future earnings, but the effect depends on the type of transition – namely, voluntary or involuntary job changes. If we now assume that migrants' and natives' number of job changes differ and that the effect of job changes depends on the type of change, we expect that part of the wage gap could be explained simply by controlling for the number of changes. However, why should the number of voluntary and involuntary changes differ for natives and migrants?

First, focusing on voluntary job changes, migrants are assumed to have higher search costs. These higher search costs could be caused by a lack of host country specific knowledge, i. e., less information about job opportunities and employment services or weaker language proficiency. Because the intensity of a search is inversely related to the costs of a search (Keith/McWilliams 1999), migrants should have fewer voluntary job changes than natives. Drawing on job-shopping theory, we assume that more voluntary job changes cause higher future earnings. These assumptions lead to our first hypothesis:

*Fewer voluntary job changes for migrants lead to lower wages compared to natives and therefore explain part of the wage gap between them.*

Second – and as a special case of voluntary job changes – migrants should have a lower probability of internally switching positions. For wage growth, internal career progression can be of utmost importance. Because migrants have less knowledge specific to the destination country and fewer relevant network ties (Wegener 1991), we assume the following:

*Fewer internal job changes for migrants lead to lower wages compared to natives and therefore explain part of the wage gap between them.*

For involuntary changes, however, a negative effect on the wage profile must be expected. Observable characteristics such as formal qualifications or work experience are usually relevant information for potential employers. However, according to signaling theory, an involuntary change may reflect the lower ability of the employee and thus provide additional information that may hinder wage increases. Even if the formal qualification is accredited, employers may be unsure regarding the productivity of migrants. Moreover, migrants face a signaling disadvantage, especially right after entry into the labor market, because employers are better able to judge the qualifications of job applicants from their own cultural group (Cornell/Welch 1996). Thus, employment relationships may appear to be a mismatch after a certain amount of time, resulting in higher numbers of separations for migrants, which may further explain part of the growing wage gap. Therefore, our third hypothesis is the following:

*More involuntary job changes for migrants lead to lower wages compared to natives and therefore explain part of the wage gap.*

### **3 Analytical approach**

#### **3.1 Data and sample restriction**

To test the derived hypotheses, we draw on the “ALWA survey data linked to administrative data of the IAB” (ALWA-ADIAB). These data consist of the retrospective survey “Working and Learning in a Changing World” (Antoni et al. 2010), which is linked to administrative data at the individual and firm level (Antoni et al. 2011; Antoni/Seth 2012). The survey was conducted in 2007 and 2008 and contains socio-demographic information and complete life-course data for 10,177 individuals (Kleinert et al. 2011). This survey is representative for the current population in Germany and covers people born between 1956 and 1988.

A potential drawback of the data for our research question lies in the type of survey, as the data were collected by computer-assisted telephone interviews with German speaking respondents. We thus assume that – in terms of integration – we face a positive selection of migrants and therefore potentially underestimate the wage gap. Nevertheless, the longitudinal design and the rich set of variables allow employment trajectories to be measured in more detail than has been done before. ALWA-ADIAB offers the ability to examine mobility patterns on a monthly basis. Moreover, it enables us to differentiate between voluntary, involuntary, internal and other job changes – a unique feature that is particularly relevant for addressing the influences of job transitions.

We restrict our analytical sample to the years from 1993 to the interview date because we lack administrative information for East Germany prior to that date. Moreover, restricting the time frame reduces the risk that event dates are incorrectly remembered by respondents. We also limit our sample to people who have had at least one employment spell and started their career on or after January 1993. We thus exclude left-censored trajectories and circumvent the potential issue that un-

successful employees resign from the labor market and leave us with a biased sample selection. We define employment episodes as major employment spells that are not part of apprenticeships or other training measures. Moreover, we exclude employment episodes containing self-employment and the employment relationships of civil servants or freelancers. These episodes cannot be found in the administrative data, as they are not subject to social security contributions. We ignore employment episodes that were observed during schooling or upon first completing formal training, as we do not assume these to be regular employment episodes.

After restricting our sample, 2,855 employees remain, including 332 migrants. Thus, approximately 12 percent of our sample consists of migrants. We have 256,267 monthly observations of which 199,503 are in employment and 157,777 enter the multivariate analysis with no missing values.

### **3.2 Variables and operationalization**

Our dependent variable is the logarithm of hourly wages. Wages are obtained from the administrative data and are thus highly reliable; however, they are right censored due to the social security contribution limit. Moreover, the spell structures of the retrospective survey and the administrative data are not completely congruent. Therefore, we utilize the method proposed by Reichelt (2015) and – using contract information from ALWA – impute wages above the censoring limit and calculate hourly wages from the combined data set. Moreover, we exclude wages below the marginal employment limit, as these were not reported prior to 1999.<sup>1</sup>

Our main construct of interest is migratory status. We define migrants as all people who are foreign-born and migrated to Germany after the age of six years. We thus ensure that most of the migrants in our sample did not complete all their schooling in Germany.<sup>2</sup>

The main independent variable is experience in the labor market. Due to our data set design, we are able to measure the actual time spent in employment instead of only potential experience. We are also able to utilize the time spent in the host country labor market for migrants, which was – at least to our knowledge – not previously possible in a large-scale analysis of immigrant-native wage gaps. This measure is important because we assume that wages grow and diverge over the career rather than over age or the potential experience in the labor market. Together with exponentiated experience, this measure is able to capture non-linearity in the wage trajectories and model the typical process of slowing wage growth over time.

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<sup>1</sup> As a robustness check, we calculated all analyses using right-censored wages. This check did not substantially change our results.

<sup>2</sup> We also performed robustness checks defining migrants of the first generation as those who migrated at age 16 or older; however, our results did not change substantially.

As wage growth is greatest at the beginning of a career, our primary interest lies in transitions that occur immediately after labor market entrance. We only count job changes after migration because we assume imperfect transferability of human capital to the host country. Therefore, at least to some degree, migrants face a new start in the foreign labor market. We differentiate among four types of job changes. Respondents were asked about the termination of employment episodes. We utilize that information and create dummy variables for the first and second voluntary, involuntary, internal and other changes. The first and second change account for approximately 92 percent of all changes because most employees do not have more than three of the above-defined episodes during the observational period. As Table 1 shows, most job changes are voluntary, which means that the employee terminated the contract. Approximately 18 percent of the episodes are terminated by the employer. Ten percent of the employment episodes are terminated but followed by a new contract at the same employer, and approximately 28 percent were terminated as arranged beforehand. These contracts will most likely encompass fixed-term relations or mutually agreed upon terminations.

**Table 1**  
**Type of job changes**

Type of change	Number	Percentage
Voluntary	1,437	43.78
Involuntary	597	18.19
Internal	332	10.12
Other	916	27.91
Total	3,282	100

Source: Own calculations.

Further independent variables encompass the months spent in unemployment or in labor market inactivity. These variables are included because the effect of an involuntary change might be ascribed to the time spent without a job due to signaling and the depreciation of human capital. While unemployment measures the former, labor market inactivity should measure the latter. Moreover, we include company size to analyze whether any effects from job transitions can be ascribed to the destination of the job change.

Further control variables encompass individual measures such as civil status and interaction terms with the gender variable. We include these variables to ensure that the effects we are measuring cannot be ascribed to differences in the composition of the groups of migrants and natives. Moreover, some factors – such as overqualification, industrial sectors or subsequently attained education – might influence both job mobility behavior and wage trajectories. A full list of the variables that we include in our analysis can be found in Appendix Table 1.

### 3.3 Statistical method

To analyze how the wage gap between migrants and natives develops over time and how job mobility patterns affect the difference in wages, we utilize a Mincer-type regression and adopt the analytical approach of Schmelzer (2012), who analyses wage differentials using person fixed-effects regressions and dummy variables for different types of job mobility:

$$\ln(y)_{it} = \beta_0 + \beta_1 \exp_{it} + \beta_2 \exp_{it}^2 + \beta_3 \exp_{mig,it} + \beta_4 \exp_{mig,it}^2 + \beta_k X_{k,it} + \alpha_i + \epsilon_{it},$$

where  $\ln(y)_{it}$  is the logarithm of the hourly wage of individual  $i$  at time  $t$ ,  $\exp$  measures the actual time in years spent in employment relations, and  $X_{k,it}$  represents all  $k$  control variables.  $\alpha_i$  is the person fixed effect controlling for all time-invariant characteristics, and  $\epsilon_{it}$  is the individual residual at every point in time  $t$ . Because we suspect serial autocorrelation in residuals over time, we utilize Huber-White robust standard errors (Cameron/Trivedi 2010).

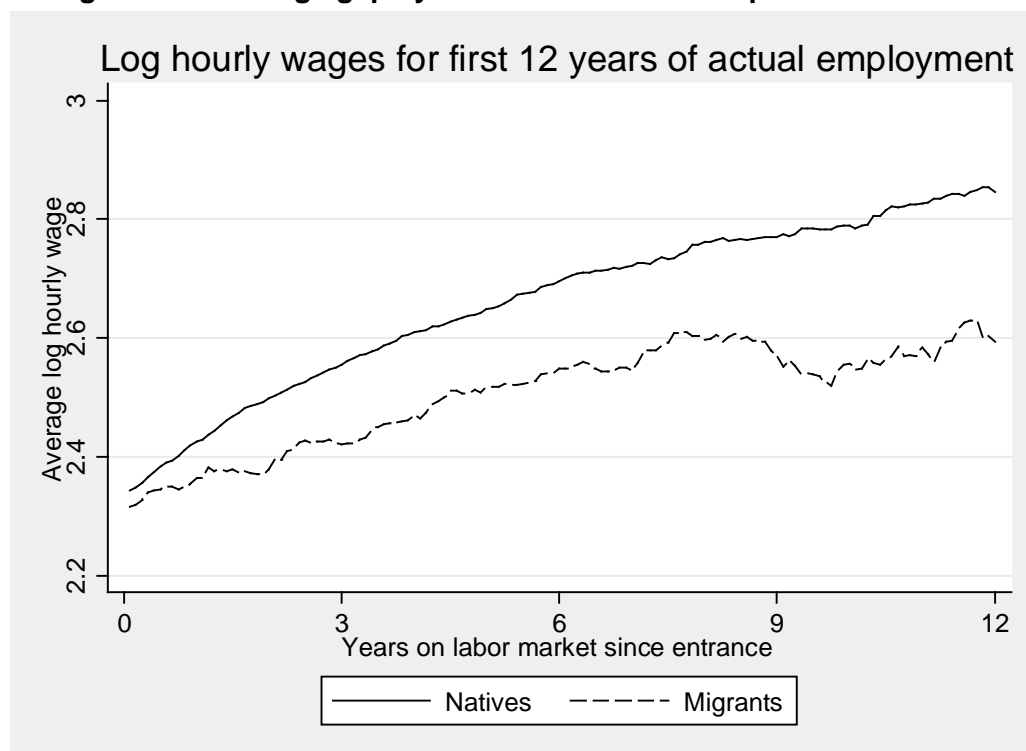
The interaction of migratory status and labor market experience, measured in years, provide an indication of the development of wages over time. The inclusion of dummies for job changes then allows an evaluation of the impact on the wage gap. We estimate the average gap between migrants and natives after 1 and 12 years using different model specifications. We thus obtain information regarding which variables explain portions of the wage development and, therefore, their divergence.

## 4 Results

### 4.1 Descriptive results

Before we turn to the multivariate analyses, we first assess whether we find a wage gap and, if we do, how large it is. Figure 1 describes the trajectories of migrant and native hourly wages after entering the labor market. Starting from a relatively equal value, the trajectories diverge over time. Note that we are using actual experience in the labor market and that migrants can also enter the analysis at a point later in the timeline, depending on how many years they have already spent in employment abroad. After 12 years of labor market experience, the difference in wages is fairly large. Without controlling for any compositional effects, we find a gap of approximately 20 percent, meaning that the hourly wages of migrants only amount to  $\frac{4}{5}$  of natives' wages. Again, we want to emphasize that this gap will most likely constitute the lower bound of the wage gap, as we have a positive selection of migrants on language proficiency.

**Figure 1**  
Immigrant-native wage gap by actual labor market experience



Source: Own calculations.

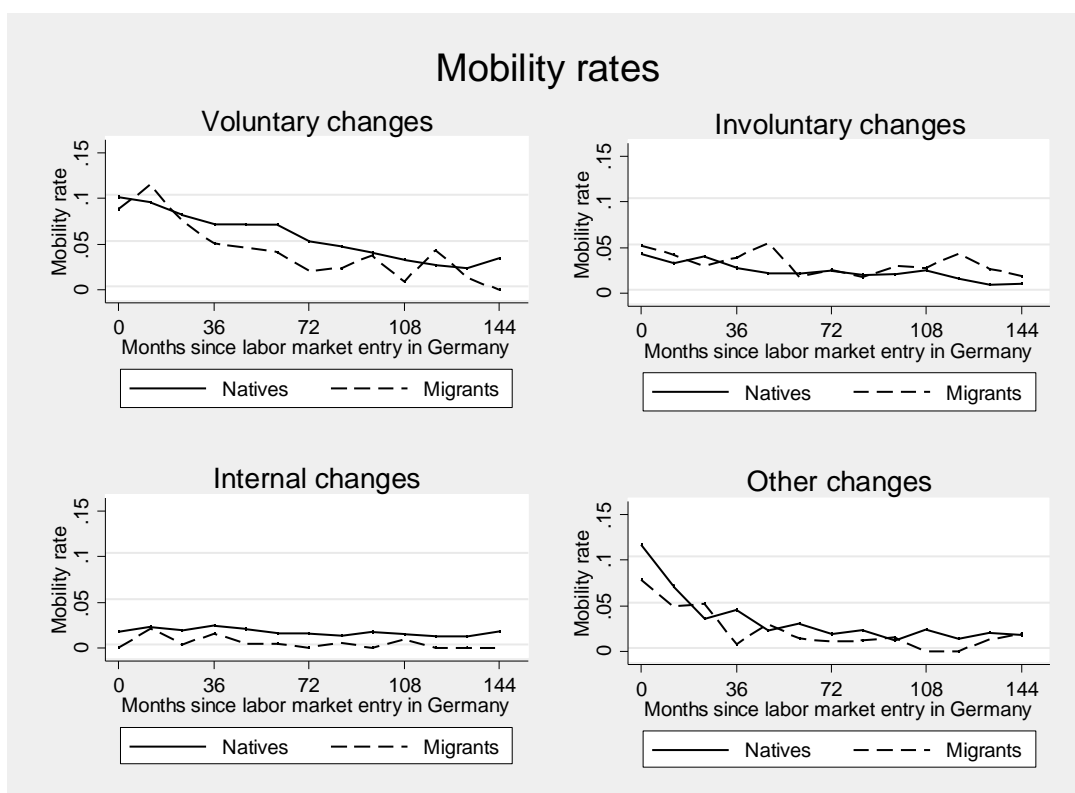
Our primary interest lies in whether the wage gap persists even after controlling for the composition effects of the two groups and in how much of the gap can be explained by differences in job mobility behavior. To assess whether mobility rates indeed differ between the two groups, we first calculate the average probability of having one of the four types of job changes within a year. Figure 2 shows these probabilities for both natives and migrants. Not surprisingly, the probability of voluntarily or involuntarily changing jobs decreases with time in the labor market. In particular, the first finding supports the notion of job shopping in the early years of a career. Internal changes, however, appear to be rather independent of labor market experience, which demonstrates that promotions or other changes within an establishment can occur at any time and appear to be driven by factors other than general labor market experience. Other changes primarily encompass mutually agreed-upon contract terminations. These should mostly entail fixed-term arrangements, which are also more likely at the beginning of the career.

On average, migrants appear to have lower probabilities of voluntary and internal changes. They thus have proportionally fewer changes to other employers and fewer internal transitions. However, the latter are rare events in any case. Using t-tests for mean differences<sup>3</sup>, we can indeed confirm that the chances for these and other types of changes are significantly lower for migrants than for natives. Involuntary changes, however, are significantly more likely, which gives initial support to our

<sup>3</sup> See Appendix Table 2 for test statistics.

assumption that migrants fare worse in terms of job mobility in the German labor market.

**Figure 2**  
**Job mobility rates**



Source: Own calculations.

## 4.2 Multivariate results

Having shown that descriptively migrants confront a substantial wage gap compared to natives and face significant differences in job mobility patterns, we next assess whether these results hold in a multivariate analysis and whether the differences in the number and types of job changes can explain part of the wage gap.

Table 2 presents five model specifications that each regress the logarithm of the hourly wage on different sets of independent variables in a fixed-effects design. Model 1 is the null model, which – apart from dummies for years and East Germany – only comprises actual labor market experience for natives and migrants. Additionally, we add a squared term to capture non-linearities in the wage trajectories. The first finding is that the previously identified wage gap indeed persists and grows throughout the career. After one year, the gap amounts to only approximately 1.7 percent, whereas the difference grows to 9.2 percent after 12 years. Controlling for yearly effects, East Germany and, most importantly, person fixed effects thus explains part of the gap we previously identified; however, we still estimate a significant difference in hourly wages.

In the next step, we include control variables such as family status or children in the household. Therefore, the ages of the children are considered as well. Note that the

effects are estimated as within effects, meaning that the variables measure the effect of a change in the status. After controlling for these individual variables, the estimated gap increases slightly. The explanation for this increase lies in changes in, e. g., the number of children, which differs between migrants and natives and demonstrates significant effects on wages.

In our third model, we additionally include our main variables of interest: dummies for job changes. Differentiating between voluntary, involuntary, internal and other changes, we include variables for the first and the second change. Controlling for these different types of changes, we can explain approximately 21 percent of the immigrant native wage gap after 12 years of actual labor market experience because the gap decreases to approximately 7.7 percent.<sup>4</sup> Voluntary changes to other establishments and changes within the same company significantly increase hourly wages. More precisely, the first voluntary change increases the hourly wage by approximately four percent, and the effect grows for an additional voluntary change. The opposite is true for internal transitions. Here, we find a wage increase of approximately 12 percent for the first change, whereas the second change only increases the wage by approximately seven percent. Of course, internal transitions include but are not limited to promotions, which explains the stark positive effect. To rule out that just one type of transition is driving the reduction in the wage gap, we tested for individual influences of the four different types of job mobility. We find distinct influences for all transitions and thus can conclude that both voluntary changes to another company and internal changes positively affect future earnings. As we demonstrated earlier, migrants, on average, present fewer of these transitions, which is one explanation for the sharp decrease in the immigrant-native wage gap.

Surprisingly, the first involuntary change – a transition type that is more likely for migrants – has no significant effect on the hourly wage. A second involuntary change, however, decreases the hourly wage by approximately nine percent. An explanation for the insignificant effect of the first involuntary change might be found in signaling theory. According to the theory, a layoff event can be seen as a signal that provides additional information for employers about the employee's productivity. The resulting stigma due to the cause of displacement should therefore increase with a rising number of layoffs, which we actually observe when looking at the effect of a second involuntary change.<sup>5</sup> Thus, as natives and migrants have different job mobility patterns, job changes can explain a substantial part of the wage gap.

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<sup>4</sup> As a robustness check, we calculated models including 2-digit occupational codes to ensure that the effects of job changes cannot be attributed to transitions into specific occupations that pay exceptionally low or high wages.

<sup>5</sup> More involuntary changes may further strengthen the negative effects on wages; however, due to the small number of employees with three or more layoffs, we are not able to identify such relationships.

To gain a better understanding of what is driving the effects of the different changes, we include the company size and branches in the fourth model. Again, it is important to remember that the estimated effect reflects the within effect. In fact, our positive and significant effect from the first voluntary change now disappears, and the effect of a second change also decreases. In contrast, the negative effect of a second involuntary change is reinforced by controlling for changes in company size. As Table 2 shows, we find a significant and positive effect from an ascending employment stock. Due to these findings, it appears that voluntary changes often involve moves into larger companies and thus result in higher hourly wages, while involuntary changes instead lead to transitions into smaller companies accompanied by wage cuts. Including company size and economic branches also changes the overall wage gap after 12 years. The increase in the wage gap suggests that migrants do not move into larger companies as often as natives do, which is in line with findings by Barth et al. (2012). However, the change in the wage gap is not overly high. Of course, including company size does not affect the impact of internal changes on the hourly wage because the size remains constant and is thus included in the person fixed-effect.

In addition to the company size and economic branches, the time spent out of employment might influence future earnings and the wage gap. Therefore, in our last model, we include the duration of employment gaps estimated on a monthly basis. Assuming differences in the impact on wages according to the type of gap, we distinguish between unemployment gaps and labor market inactivity. As expected, one additional month of unemployment decreases the hourly wage by 0.3 percent, all else being equal. We observe that these gaps explain part of the negative effect of involuntary changes. The negative signal of involuntary changes thus appears to be partly conveyed by unemployment episodes. However, an additional month without employment subject to social security contributions or outside the labor force – excluding unemployment – increases the wage by approximately 0.4 percent. This positive effect relates to episodes of self-employment, civil service, freelancing and training. However, including the time spent out of employment does not substantially change the overall wage gap.

As Table 2 shows, including job changes generally decreases the wage gap between migrants and natives. A part of the wage gap can thus be explained by the mere number of job changes. However, we should also note that migrants and natives might not only vary in their amount of changes but that the impact of the changes might also vary between them. It can be assumed that they also experience different returns to job mobility. To assess this effect, we estimated an interaction-effects model of the different changes. We do not find significant differences in migrant- or native-specific effects: they appear to function in the same manner for both groups. The results might well be due to the relatively small sample size of migrants; however, we assume that negative signals of involuntary changes and that positive effects from internal and voluntary changes are generally given for all employees – regardless of their migratory status.

**Table 2**  
**Results of fixed-effects regressions**

Explanatory Variables	Fixed-Effects Regressions: Log hourly wage				
	Model 1 Null model	Model 2 Controls	Model 3 Changes	Model 4 Company size and sectors	Model 5 Employment gaps
Labor market experience (in years)					
Natives (ref)	.047*** (.007)	.038*** (.007)	.038*** (.007)	.037*** (.007)	.058*** (.004)
Migrants	-.018** (.008)	-.016** (.007)	-.013* (.007)	-.013* (.007)	-.013* (.007)
Labor market experience <sup>2</sup>					
Natives (ref)	-.002*** (.000)	-.002*** (.000)	-.001*** (.000)	-.001*** (.000)	-.001*** (.000)
Migrants	.001* (.000)	.001 (.000)	.001 (.000)	.001 (.000)	.001 (.000)
Voluntary change (first)			.036** (.018)	.025 (.017)	.020 (.017)
Voluntary change (second)			.067*** (.025)	.046* (.025)	.046* (.025)
Involuntary change (first)			.015 (.025)	.010 (.024)	.024 (.024)
Involuntary change (second)			-.093** (.038)	-.126*** (.037)	-.093** (.039)
Internal change (first)			.116*** (.024)	.116*** (.024)	.107*** (.024)
Internal change (second)			.070* (.040)	.067* (.039)	.062 (.040)
Other change (first)			.023 (.028)	.032 (.025)	.031 (.026)
Other change (second)			-.054 (.043)	-.056 (.040)	-.043 (.040)
Company size (ref: Under 4)					
5 - 9				-.022 (.038)	-.025 (.038)
10 - 19				.077* (.040)	.079* (.040)
20 - 99				.128*** (.037)	.127*** (.037)
100 - 199				.114*** (.041)	.113*** (.040)
200 - 1999				.200*** (.038)	.196*** (.038)
2000 +				.256*** (.050)	.259*** (.050)
Months without employment or unemployment					.004*** (.001)
Months in unemployment					-.003*** (.002)
Controls		✓	✓	✓	✓
Average wage gap (1 year)	1.66 %	1.53 %	1.23 %	1.27 %	1.25 %
Average wage gap (12 year)	9.21 %	9.76 %	7.67 %	8.11 %	8.03 %
N Persons			2,151		
N Person periods			157,777		
R-squared within	.194	.237	.251	.280	.286
R-squared between	.179	.140	.154	.271	.290

Source: Own calculations. Robust standard errors in parentheses.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

## 5 Conclusion

In this article, we investigated the impact of different job mobility patterns on the wage gap between migrants and natives. Drawing on job-shopping theory and assuming that differences in employment trajectories between migrants and natives explain part of the wage gap, this study contributes to research on wage inequality between migrants and natives. Summing up our results, earnings generally improve during the first 12 years as predicted by theory. Furthermore, the findings confirm a flatter earnings profile for migrants than for natives and thus a growing wage gap.

To address the question of whether labor market behavior has explanatory power in analyzing the wage gap between natives and migrants, we first examined the number of job transitions for each individual over his or her entire employment history in Germany. The four different mobility rates confirm our hypothesis: migrants experience fewer voluntary changes than natives do, whereas the opposite is true for involuntary changes - layoffs are more common for migrants.

In a second step, we then assessed whether the results hold in a multivariate analysis and whether the differences in the number and types of job changes can explain part of the wage gap. We therefore regressed the logarithm of the hourly wage on different sets of independent variables in a fixed-effects design. The inclusion of the transition variables confirmed our hypothesis. First, voluntary job changes have a positive effect on the future earnings of an individual, as job-shopping theory suggests, and the effect increases in both magnitude and statistical significance with a second change. Second, involuntary changes negatively affect future earnings. The effects can partly be explained by changes to companies of different sizes. Furthermore, we can also confirm that internal transitions influence wages in a positive manner.

A part of the wage gap can be explained solely by the number of job changes. Adapting the mobility patterns of natives would thus reduce the wage gap in the labor market. However, we are aware that it might not always be possible to influence job changes – especially in the case of involuntary layoffs. Even internal and voluntary changes depend on the labor market situation. Moreover, the effect of job changes might also differ between migrants and natives, and hence, influence the wage gap. Our findings, however, could not confirm any differences. Further, we cannot preclude that group differences, such as qualifications, might drive both wage growth and the effects of job changes to some extent. However, due to small sample size, future research is needed to discover whether migrant- and native-specific effects function in a different manner.

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# Appendix

**Appendix Table 1**  
**Descriptive statistics**

Variable	Mean/Proportion	Std. Dev.	Minimum	Maximum
Log hourly wage	2.590	.482	.355	5.596
Labor market experience	5.243	4.236	.083	29.75
Migrants	.129	.336	0	1
Voluntary change (first)	.252	.434	0	1
Voluntary change (second)	.069	.254	0	1
Involuntary change (first)	.105	.307	0	
Involuntary change (second)	.020	.139	0	1
Internal change (first)	.066	.249	0	1
Internal change (second)	.012	.109	0	1
Other change (first)	.146	.353	0	1
Other change (second)	.026	.160	0	1
Employment gaps	3.160	10.576	0	126
Unemployment gaps	1.261	4.444	0	72
Company Size ( <i>ref: 2000 + employees</i> )				
1 - 4	.052	.222	0	1
5 - 9	.112	.316	0	1
10 - 19	.102	.303	0	1
20 - 99	.214	.410	0	1
100 - 199	.113	.317	0	1
200 - 1999	.259	.438	0	1
2000 +	.147	.354	0	1
Industrial sector ( <i>ref: manufacturing and agricultural</i> )				
Manufacturing and agricultural	.277	.448	0	1
Public service	.055	.228	0	1
Construction	.075	.263	0	1
Trade	.100	.301	0	1
Transport	.030	.170	0	1
Financial Intermediation and real estate	.069	.253	0	1
Education, health and other services	.394	.489	0	1
Employment abroad in months	5.427	25.934	0	276
Transition from previous unemployment	.186	.389	0	1
Subsequently attained education	.067	.251	0	1
Overqualification	.089	.285	0	1
Female	.464	.499	0	1
Partner in household				
Single	.422	.494	0	1
Unmarried	.204	.403	0	1
Married	.375	.484	0	1
Age of child in household ( <i>ref: no child</i> )				
No Child	.696	.460	0	1
Under 3	.131	.337	0	1
3 - 5	.104	.305	0	1
6 +	.152	.359	0	1
East Germany	.117	.321	0	1
Years (1993 - 2008)	-	-	0	1

Case selection is dependent on regression models. Only cases that are relevant to the multivariate analysis are considered. Standard deviations are not adjusted for clustering.

Source: Own calculations.

**Appendix Table 2**  
**Two-sample test statistics**

**Voluntary changes**

Group	Observation	Mean	Std. Error	Std. Deviation	[95% Conf. Interval]	
Natives	17843	0,0658	0,0019	0,2479	0,0622	0,0694
Migrants	2433	0,0551	0,0046	0,2282	0,0460	0,0641
Combined	20276	0,0645	0,0017	0,2457	0,0611	0,0679
diff	0,0107	0,0053	0,0003	0,0211		
diff=mean(0)-mean(1)					t = 2.0193	
Ho: dif f= 0					degrees of freedom = 20274	
Ha: diff < 0			Ha: diff !=0		Ha: diff > 0	
Pr(T<t) =0.9783			Pr(T<t) =0.0435		Pr(T<t) =0.0217	

**Involuntary changes**

Group	Observation	Mean	Std. Error	Std. Deviation	[95% Conf. Interval]	
Natives	17843	0,0256	0,0012	0,1580	0,0233	0,0279
Migrants	2433	0,0349	0,0037	0,1837	0,0276	0,0422
Combined	20276	0,0267	0,0011	0,1613	0,0245	0,0290
diff	-0,0093	0,0035	-0,0162	-0,0025		
diff=mean(0)-mean(1)					t = -2.6751	
Ho: dif f= 0					degrees of freedom = 20274	
Ha: diff < 0			Ha: diff !=0		Ha: diff > 0	
Pr(T<t) =0.0037			Pr(T<t) =0.0075		Pr(T<t) =0.9963	

**Internal changes**

Group	Observation	Mean	Std. Error	Std. Deviation	[95% Conf. Interval]	
Natives	17843	0,0163	0,0009	0,1265	0,0144	0,0181
Migrants	2433	0,0062	0,0016	0,0783	0,0031	0,0093
Combined	20276	0,0150	0,0009	0,1217	0,0134	0,0167
diff	0,0101	0,0026	0,0049	0,0152		
diff=mean(0)-mean(1)					t = 3,8359	
Ho: dif f= 0					degrees of freedom = 20274	
Ha: diff < 0			Ha: diff !=0		Ha: diff > 0	
Pr(T<t) =0,9999			Pr(T<t) =0,0001		Pr(T<t) =0,0001	

**Other changes**

Group	Observation	Mean	Std. Error	Std. Deviation	[95% Conf. Interval]	
Natives	17843	0,0414	0,0015	0,1993	0,0385	0,0443
Migrants	2433	0,0296	0,0034	0,1695	0,0229	0,0363
Combined	20276	0,0400	0,0014	0,1960	0,0373	0,0427
diff	0,0118	0,0042	0,0035	0,0201		
diff=mean(0)-mean(1)					t = 2,7924	
Ho: dif f= 0					degrees of freedom = 20274	
Ha: diff < 0			Ha: diff !=0		Ha: diff > 0	
Pr(T<t) =0,9974			Pr(T<t) =0,0052		Pr(T<t) =0,0026	

Source: Own calculations.

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