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ARE IMMIGRANTS MORE MOBILE THAN NATIVES? EVIDENCE FROM GERMANY*

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ABSTRACT. Low rates of internal migration in many European countries contribute to the persistence of significant regional labor market differences. I use the *Mikrozensus*, a large annual sample of households living in Germany, to further our understanding of the underlying reasons. This paper makes two main contributions: first, the paper quantifies the disutility of migrating. To this end, I estimate conditional logit models of the migration decision across the German federal states. Second, I then focus on the differences between immigrants and natives. I find significantly higher responsiveness to labor market differentials in the immigrant population than in the native population. Unobserved moving costs for immigrants are estimated to be only about 31 percent of this same cost for natives. The findings bear on the assessment of the economic impact of immigration, and the paper contributes to the current immigration-related policy debates that feature prominently in many European countries, and that likely will continue to be important in light of the ongoing EU expansion and the resulting east–west migration.

1. INTRODUCTION

This paper studies the interaction between regional labor market disparities and the role of immigration in the labor market and makes two main contributions to this literature. First, when there are sizeable differences between regions with respect to labor market characteristics, as is the case in many European countries, internal migration might be one way to achieve efficiency-enhancing convergence. However, rates of internal migration are often low. For example, a study by the German Institute for Employment Research (Brixy and Christensen, 2002) finds that in a sample of unemployed individuals, 63 percent would "by no means" be willing to change their place of residence for a job. Similarly low willingness to migrate has been documented for Italy by Faini et al. (1997). They find that almost 40 percent of the unemployed would not take a job outside the town in which they currently reside. Evidence for low mobility also exists for the U.K. (Gregg, Machin, and Manning, 2004; Andrews, Clark, and Whittaker, 2011). Thus, labor migration and consequently the convergence due to labor migration will likely be slow in these countries. The first contribution of this paper is to quantify the low mobility of the population by assigning a monetary value to the unobserved cost of migration. I also investigate differences between age groups in their responsiveness to labor market differentials, which have been found to be important in explaining observed behavior at the aggregate level (Hunt, 2006). Because of a very large and detailed data set, I can significantly add to existing analyses of this kind.

Second, questions related to immigration feature prominently in current policy debates in many European countries, and likely will continue to be important in light of the ongoing EU expansion toward Eastern Europe and the resulting east–west migration.

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This paper focuses on the within-country migration of immigrants after their initial international migration. It has been hypothesized that immigrants are "likely [...] the most mobile of workers" (Friedberg and Hunt, 1995, p. 31), which would imply that a large immigrant population may contribute to an acceleration of convergence in response to regional economic shocks. Immigrants constitute a self-selected group of individuals from the country of origin (Borjas, 1987; Chiswick, 2000) and may differ systematically, for example, with respect to risk aversion, not only from individuals in their native country, but also from individuals in their host country. Immigrants have chosen to incur presumably large costs to move from their native country to the host country, and therefore it may be that they are the most mobile individuals with regards to internal migration as well. However, little is known about the differences between immigrants and natives with respect to their internal migration behavior. This paper seeks to fill this existing gap in this literature and its second main contribution is to test empirically whether differences exist between natives and immigrants in their propensity to migrate.

The few studies that do empirically analyze the differences between natives and immigrants with respect to their internal migration behavior find considerable heterogeneity across immigrant groups. Notably, a study by Bartel and Koch (1991) examines internal migration decisions of U.S. immigrants. They find that the internal mobility rate, measured as the percentage of individuals who change the SMSA (standard metropolitan statistical area) between 1975 and 1980, is higher for immigrants from Asia than the internal mobility of natives. Other groups' mobility rates are lower, most notably among the immigrants from Central and South America. However, Bartel and Koch (1991) do not find significant effects of regional economic characteristics on the probability of internal migration. Kritz and Nogle (1994) also use data from the 1980 census, but consider different geographic units than Bartel and Koch (1991). Looking at intra- and interstate migration they broadly confirm the findings in Bartel and Koch (1991). In particular, they find that the probability of internal migration is higher for Asian immigrant groups than for natives, while they find that immigrants from Mexico and Cuba are less likely than natives to migrate internally.

While there is little work that focuses on a comparison of natives and immigrants with respect to their internal migration behavior, there exist two related, but separate strands of the literature. The first related literature considers internal migration of natives as a response to immigration, while the second studies internal migration of immigrants. In the literature that considers the internal migration of natives as a response to immigration some papers find significant effects of immigration on native (out-)migration (e.g., Frey, 1995; Borjas, 2006; Partridge, Rickman, and Ali, 2008, for the rural U.S.), while others find little effect (e.g., Card, 2001). Differences in the findings can partly be explained by differences in data used or in differences in geographic aggregations. The suggested link between immigration and native outmigration is often seen in the effect of immigration on wages, this effect itself is still being discussed, both theoretically and empirically (see, e.g., Friedberg and Hunt, 1995; Card, 2005; Ottaviano and Peri, 2006, 2012; Borjas, Grogger, and Hanson, 2008). For Germany, Pischke and Velling (1997) cannot find evidence for a displacement effect of immigrants, while De New and Zimmermann (1994) find an effect on wages. There is also a literature that studies internal (secondary) migration patterns of immigrants within the U.S. (e.g. Kritz and Nogle, 1994; Newbold, 1999). The purpose of these papers is to understand whether existing regional concentrations of immigrants are accentuated through internal migration of immigrants, for example, due to network effects, which could potentially explain internal migration even in the absence of wage differentials.

The analysis proceeds in several steps. I first demonstrate that immigrants are more likely to move within Germany than natives. Because I can control for a large number

of observable individual characteristics I can rule out that selection based on standard socioeconomic characteristics is underlying these differences. In a second step, I then provide some direct evidence for other, typically unobserved, reasons why migration behavior may differ between these two groups: According to survey data, foreigners are on average less connected to the area that they live in. In addition, the survey data also shows that, by their own assessment, immigrants are more willing to move. The third step of the analysis then quantifies the differences in the reaction to labor market conditions of the two groups under study based on an explicit model of migration decisions. To this end, I first calculate predicted incomes as well as unemployment probabilities that each individual would face in each of the 16 German *Bundesländer* (the German federal states). I then use these predicted values and other state characteristics to estimate conditional logit models of the individual's migration decision between these German federal states. The results of this analysis concur with the reduced form analysis and the direct survey evidence presented in the first part of the paper. They show much higher responsiveness to labor market differentials by the immigrant population than by the native population. The results are statistically and economically significant. Further, I estimate the unobserved moving costs for immigrants to be only 37 percent of the corresponding costs for natives.

The definition of immigrants is not straightforward (see, e.g., the discussion in Pischke and Velling, 1997) and it is useful to clarify the terminology early on.[1] In this paper, "immigrant" refers to individuals who are foreign born and nonnationals, as opposed to "foreigners," which refers to all resident nonnationals, that is, both immigrants and individuals born in Germany but not German citizens. On the other hand, "natives" are defined as German citizens who are also born in Germany.

Studies of the economic impact of immigration typically focus on the effect of immigration on the host country's labor market, in particular on wages and employment of natives.[2] However, regional labor markets in most countries show considerable diversity. Convergence between markets would typically result in efficiency gains, and it is therefore important to ask what determines convergence, who contributes to convergence, and how the rate of convergence can be increased. Borjas (2001) investigates the effect of regional differences in welfare and wage levels on the initial migration of newly arriving immigrants to the U.S. and studies the resulting efficiency gains. Bartel (1989) estimates the determinants of location choice of new immigrants to the U.S. Regarding the role of labor flows as a means to achieve convergence of economic conditions across regions, Blanchard and Katz (1992) demonstrate the importance of labor migration within the U.S. Treyz et al. (1993) find that in the U.S. the employment probability has a larger impact on net migration than wage rates. On the other hand, Decressin and Fatás (1995) find that in Europe, migration is a less important mechanism in the adjustment process to a shock, and it is rather the participation rate that adjusts in reaction to a shock.[3] Methodologically, the paper that is closest to the present paper is a study by Davies, Greenwood, and

[1]Official statistics from the *Statistische Bundesamt* (the German Federal Statistical Office) follow a definition based on nationality, irrespective of the place of birth. This definition is shared by most other European countries, while in the U.S. immigrants are defined as foreign born, independent of nationality. Angrist and Kugler (2001) explore possible differences in these definitions and conclude that for most European countries the groups of nonnationals and recently arrived foreign born residents are "roughly coincident" (Angrist and Kugler, 2001, p. 14).

[2]For an overview of the field of the economics of immigration see, for example, Friedberg and Hunt (1995) or LaLonde and Topel (1997).

[3]Decressin (1994) studies determinants of migration between West German states before German reunification. He concludes that the unemployment and income variables do not significantly predict migration flows. Puhani (2001) finds that within- and cross-border labor mobility is unlikely to accommodate

Li (2001) who estimate conditional logit models of migration between U.S. states, based on aggregate data, using the full population.

The present analysis of differences in labor market behavior between natives and immigrants is also related to a recent paper by Dustmann,Glitz, and Vogel (2010). While in the present paper the focus is on differences between natives and immigrants with respect to migration, Dustmann et al. (2010) study differences between immigrants and natives in how *wages* and *unemployment* probabilities change with changing economic conditions. Studying Germany and the U.K., they find evidence for a larger reaction of unemployment for immigrants than for natives, but no difference in wage responses.

In a setting of high unemployment rates, especially in policy debates, immigration is often seen as placing an additional burden on host countries' labor markets. As indicated in the brief literature review, the empirical evidence is mixed. In addition, any discussion of economic gains and costs of immigration will also have to take into account differences between immigrants and natives in labor market behavior, as for example mobility. If in fact immigrants are more mobile than natives (with respect to internal migration) in response to changing economic conditions, which is what I find, this constitutes a positive economic impact of the immigrant population for the host country, which should be taken into account.

Germany is an important case study because of its large regional disparities and its large size of the immigrant population. Yet the findings are also of interest to other countries with large immigrant populations, such as the U.S., in which internal migration is a major determinant of regional demographic changes (e.g., Borjas, Bronars, and Trejo, 1992; Newbold, 1999) and a contributor to regional growth, and especially for other European countries in light of the ongoing EU expansion toward Eastern Europe and the expected resulting east–west migration (e.g., Bauer and Zimmermann, 1999).

The remainder of the paper is structured as follows: In the following section, I describe the data and labor market background. Section 3 presents reduced form evidence that demonstrates that immigrants are more likely to migrate than natives within Germany. The next section provides a discussion of potential reasons for why immigrants might be more mobile than natives with respect to internal migration. This section also provides direct survey evidence in support of some hypotheses that are mentioned in the literature. In Section 5, I present the model that is used to test between various hypotheses, and that will allow me to quantify the difference in migration responsiveness between immigrants and natives. Then the results of the estimation of this model are presented and discussed. The last section concludes.

2. THE DATA

I draw data from two data sources. First, I use individual level data from the German *Mikrozensus* ("microcensus" from now on). This survey is mandated by German law and run by the German Federal Statistical Office. It is a repeated cross-section that is run every year for a 1 percent subsample of the population living in Germany, thus providing me with a very large sample size of about 800,000 observations for each year (before sample selection criteria are applied). Through a special arrangement with the German Federal Statistical Office, I am also able to use additional, more restricted, information from the microcensuson internal migration that is available for a 0.45 percent subsample

unemployment shocks between West Germany, France, and Italy. Hunt (2006) focuses on differences in the responsiveness to labor market conditions depending on the age of the individual. She finds that the young are very sensitive to wages in the region of origin, while they are relatively insensitive to unemployment rates in the origin region.

of the population. For the estimation of the conditional logit models mentioned later, I use the full matrix of migration flows (i.e., inflows as well as outflows) between the 16 German states as implied by the 0.45 percent subsample.[4]

In the reduced-form part of the analysis, I can consider any change of residence, that is, even the geographically smallest migration behavior. However, the conditional logit analysis is carried out at the state level (but still allowing for within-state migration). This is done, first, because of data requirements. Second, one might expect that it is more likely that migration is necessary in response to shocks to larger regions, while the rational reaction in response to shocks to smaller spatial units (e.g., as defined by the Insitut für Arbeitsmarkt- und Berufsforschung) may be commuting rather than migrating. I pool the microcensus data for the years 1996–2003. Second, I use data from the German Socio-Economic Panel (GSOEP), an annual household panel survey, for a subset of the analysis.[5]

Background

The German labor market exhibits large regional disparities with respect to key characteristics, as for example, unemployment rates and hourly wages. This is especially true if one compares east versus west German states. However, also within eastern and western states there are large differences. For example, the average unemployment rate in 1998 in the western states (including West Berlin) was 10.5 percent, while it was 19.5 percent in the eastern states. But unemployment was as low as 8.0 percent in Baden-Württemberg, the western state with the lowest unemployment rate, and was more than twice that percentage, namely 16.6 percent, in Bremen, the western state with the highest unemployment rate. Over the decade from 1991 to 2001, the resident nonnational population in Germany has increased by almost a quarter: from 5.88 million to 7.32 million (Statistisches Bundesamt, 2002). In 1999, the approximate midpoint of the time period used in this study, 7.34 million people, that is 9 percent of the total German population, belonged to this group. Among them, the largest group, namely 2.11 million, came from Turkey. The second and third largest groups were coming from (former) Yugoslavia and Italy, with 0.719 and 0.612 million people, respectively. However, there is some heterogeneity between the German federal states, with the largest absolute numbers of foreigners in Nordrhein-Westfalen (1,995,000) and Baden-Württemberg (1,267,000). In relative numbers, two federal city-states, Bremen and Hamburg, have the highest proportion of foreigners, with foreigners constituting 15.2 percent of the total population in these two federal states. On the other extreme, Mecklenburg-Vorpommern's foreign population constitutes only 1.7 percent of the total population in 1999, with only 26,000 foreigners.

3. REDUCED FORM EVIDENCE USING MICROCENSUS DATA

For the following analysis based on microcensus data, I keep only individuals who are German citizens and born in Germany, the subsample that I will call "natives," as well as nonnationals (those without German citizenship) that were not born in Germany, the subsample that I will refer to as "immigrants." Thus, I exclude nonnationals that

[4]The 1 percent subsample does not allow the researcher to identify the federal state of origin, only whether an individual moved across borders within the last year. For confidentiality reasons, the variable regarding state of origin is only available to researchers under special arrangements.

[5]Because migration is relatively infrequent (see later for more specific evidence), less than 900 immigrants migrate across federal state borders in the GSOEP sample of 18- to 60-year-old individuals that is used in the analysis later, which would make estimation of the conditional logit models difficult. Therefore, the microcensus is used to answer the central questions of the paper.

were born in Germany and German nationals that were born outside of Germany. I also drop individuals that have dual citizenship (i.e., German and another citizenship).[6] Consequently, the analysis in this section is based only on the groups immigrants and natives in their most narrow definition.

I further restrict the sample as follows: (1) I use the sample of individuals of age 18–60. Dropping older individuals deals with issues of self-selection into early retirement that one might encounter if individuals up to age 65 are included. Note that I also do some of the analysis separate by age group. (2) I also drop farm households. In addition to the obvious expectation that they are very immobile, this is done because income data are not available for farm households. (3) Individuals who migrated to Germany from abroad during the last year are dropped from the analysis. (4) I drop individuals who are currently in school (including university). My goal is to study the role of labor market characteristics, and migration related to education would confound the results. Later, I also perform some robustness checks with a sample that focuses on household heads that are labor market participants (i.e., including unemployed) and not working part time.

The microcensus provides information on (a) whether an individual changed her "place of residence" as well as (b) whether the individual migrated from another German federal state. I start with the analysis of the broader definition of migration. The dependent variable is thus a dummy variable which is one if an individual changed her "place of residence" within the last 12 months. Therefore, this part of the analysis does take into account all possible moves, not only migration across federal state borders.

Because of the large number of observations, I can control very flexibly for household characteristics and separately identify a large number of indicator variables. Therefore, I create indicator variables for schooling and higher educational as well as vocational training levels (four indicator variables, omitted category is "dropped out of school")[7], three indicators for marital status (omitted category is "single"), and indicator variables for each of 10 household size groups. I further create indicator variables for 10 different income classes, split at the deciles of the income distribution. Income is measured at the individual level from the microcensus as follows: For each individual, the data provide her (net) income bracket, with fairly narrow brackets for the relevant income range. I take the midpoint of a bracket as the income estimate. Incomes are deflated to year 2000 Deutsche Mark (DM) values. I pool data for 1996–2003, and also include year dummies.

Table 1 shows results from probit regressions (shown are the marginal coefficients). Column 1 shows that immigrants are 9 percentage points more likely than natives to change their place of residence over a one-year time horizon. Because of missing values for income and unemployment variables the sample is reduced if more controls are added. To make sure that differences across columns are driven only by differences in the specification, column 2 first restricts the sample to those observations for which all further controls are available. The coefficient is smaller, showing a 6.6 percentage points higher probability to migrate.

Adding controls to this baseline result, namely age, marital status, education, household size indicators (10 indicators), and income categories (10 groups) reduces the difference between immigrants and natives somewhat, namely to 5.8 percentage points (column 3). This indicates that immigrants are more likely to have observable

[6]These sample restrictions drop about 4.4 percent of the full sample.

[7]The indicators are aggregating different schooling levels as follows: "Finished school" indicates that the individual has any degree from a school. "Vocational training" implies a lower level of vocational training (the German levels "Praktikum" or "Lehre" or "Berufsfachschule") while "Higher vocational training" comprises the German levels "Meister" and "Fachschule." "Tertiary degree" includes all college-level degrees.

TABLE 1: Reduced Form Results from the Microcensus

Dependent Variable = 1 if Individual Changed Place of Residence over the Previous Year								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Immigrant	0.090**	0.066**	0.058**	0.057**				
	(0.001)	(0.002)	(0.001)	(0.001)				
Recent immigrant					0.202**	0.169**	0.091**	0.089**
					(0.003)	(0.003)	(0.002)	(0.002)
Male			0.007**	0.005**			0.007**	0.005**
			(0.001)	(0.001)			(0.001)	(0.001)
Age (/100)			−0.494**	−0.495**			−0.484**	−0.486**
			(0.020)	(0.0120)			(0.019)	(0.019)
Age squared			0.0141	0.0112			0.010	0.007
			(0.024)	(0.024)			(0.024)	(0.024)
Married			0.015**	0.015**			0.015**	0.015**
			(0.001)	(0.001)			(0.001)	(0.001)
Widowed			0.030**	0.028**			0.030**	0.027**
			(0.003)	(0.003)			(0.003)	(0.003)
Divorced			0.055**	0.052**			0.054**	0.052**
			(0.001)	(0.001)			(0.001)	(0.001)
Finished school			−0.005*	−0.003			−0.011**	−0.010**
			(0.002)	(0.002)			(0.002)	(0.002)
Vocational training			−0.010**	−0.008**			−0.019**	−0.017**
			(0.002)	(0.002)			(0.002)	(0.002)
Higher voc. training			−0.006**	−0.005*			−0.015**	−0.013**
			(0.002)	(0.002)			(0.002)	(0.001)
Tertiary degree			0.009**	0.011**			−0.001	0.0003
			(0.002)	(0.002)			(0.002)	(0.002)
Unemployed last yr				0.028**				0.028**
				(0.001)				(0.001)
Household size Indicators (10)			Yes	Yes			Yes	Yes
Income category Indicators (10)			Yes	Yes			Yes	Yes
Year indicators (8)				Yes				Yes
Observations	1,266,045	942,920	942,920	942,920	1,266,045	942,920	942,920	942,920

Notes: Omitted education category is "dropped out of school." Standard errors in parentheses; *significant at 5 percent; **significant at 1 percent; shown are marginal coefficients.

characteristics, such as being of relatively young age, who are associated with higher probability of migrating. However, these characteristics can only explain less than 1 percentage point of the difference between immigrants and natives observed in the baseline. Although the survey is not a panel, there is some limited amount of information about the individual's situation one year ago. One is the migration information that I exploit. Another is whether the individual was unemployed a year ago, which I include in column 4. The indicator variable for unemployment last period has the expected sign, that is, individuals who were unemployed a year ago are more likely to have moved. However, even after controlling for a large number of characteristics, the difference is still 5.7 percentage points in the most comprehensive specification.

Many of the immigrants in Germany have been in the country for many years. For policy purposes, however, we might be interested in the effect of current and future immigration. To approximate the labor market behavior of these immigrant flows, I study recent immigrants, defined as those who have been living in Germany for less then

10 years at the time of the microcensus. The baseline results (Table 1, column 5) show a much larger propensity of recent immigrants to migrate than both immigrants as a whole and natives have. Note that recent immigrants are now compared to natives and nonrecent immigrants. Based on the full sample (column 5), recent immigrants are about 20 percentage points more likely to have changed their place of residence than the group of natives and nonrecent immigrants. Comparing columns 1 and 5, this implies that the probability to change the place of residence within a year is much larger for recent immigrants than for the group of all immigrants. However, once all observable characteristics are taken into account, this effect is approximately cut by half. Nevertheless, even after controlling for a large set of characteristics, recent immigrants are still about 9 percentage points more likely to migrate than the group of natives and nonrecent immigrants, more than 50 percent higher than the difference that is observed between all immigrants and natives.[8]

I perform a number of additional robustness checks to this analysis. First, the above analysis considers any move, including short-distance migration within a state. In Appendix A, I also show that significant differences exist if I consider only migration across borders of the federal state (see Table A1). The baseline probability that an individual migrates to a different federal state is smaller, which also translates into smaller differences between immigrants and natives. However, the difference is still statistically highly significant, and is larger in relative terms than before. Specifically, the coefficient on the immigrant dummy in those regressions is 0.003, the coefficient on the recent immigrant dummy variable is 0.005. In unreported regressions, I also investigate whether the difference between immigrants and natives is restricted to a specific age group. Immigrants are significantly more likely to migrate than natives over the whole age distribution. However, I do find somewhat smaller differences between immigrants and natives for the oldest age group individuals (>45 years old), where the estimate for the coefficient on the immigrant dummy variable is 0.038. The largest difference is estimated for the group of 25- to 34-years-olds, where the estimated coefficient is 0.076. Further, I check the robustness of the results using a more restricted sample. For the "restricted sample," I keep only the head of the household (defined as the reference person in the household). Further, I only keep individuals whose main source of income is either wage income or unemployment insurance. I drop individuals that are either working part-time or not participating in the labor market at all. The results (not reported here) indicate that the main findings are robust: The coefficient on the immigrant dummy is smaller than in the baseline results, but it is still positive and statistically significant, namely 0.002; for the recent immigrant dummy variable the estimate is 0.004.

Finally, I have also investigated whether individual immigrant groups are driving the results. I use the data to identify the eight countries from which the largest number of immigrants come and replace the immigrant dummy and instead include in the regressions a set of eight dummies for country of origin and, in addition, I include a vector of variables that indicate for each of these eight groups the share of immigrants from that country in a state (relative to all individuals living in a state). The sample is limited to natives and to the immigrants from those eight countries and I also add fixed effects for each federal state in those regressions, to control for other state-level characteristics, which may be correlated with the immigrant share in the groups considered. In unreported results, I find a positive (and statistically significant) coefficients on all country-of-origin dummies,

[8]I have also estimated probit regressions separately for natives and immigrants. In results that are not reported, I find larger differences between the three groups with respect to the education variables and the role of the family situation of the individual. Comparing recent and nonrecent immigrants, I find, as might be expected, that the migration behavior of nonrecent immigrants is more similar to that of natives than the migration behavior of recent immigrants.

which indicates that immigrants from all these countries are more likely to migrate than native Germans and that the results do not depend on a specific immigrant group or immigrants from a small number of countries. The inclusion of variables that proxy for country-of-origin networks shows that some of these are statistically significant, but it does not affect the main results qualitatively.

Summarizing, the results in this section demonstrate that immigrants are significantly more likely to migrate within Germany than natives and that observable individual characteristics cannot fully explain the differences. The estimates imply that, after controlling for socioeconomic and demographic characteristics, the probability of migration is between 5.8 and 9 percentage points higher for immigrants than for natives. The relative importance of labor market characteristics and unobservable cost of migration in explaining the differences between immigrants and natives will be explored further in the following sections.

4. WHY COULD THERE BE DIFFERENCES BETWEEN NATIVES AND IMMIGRANTS WITH RESPECT TO INTERNAL MIGRATION?

Why may the probability of migration be larger for immigrants than for natives as demonstrated in the earlier empirical work, even after controlling for observable individual characteristics? First, immigrants may have lower social and cultural ties that are specific to the region they are living in (e.g., Dekker and Bolt, 2005). Second, immigrants constitute a self-selected group of individuals from the country of origin (e.g. Borjas, 1987). They may differ systematically not only from other individuals in their native country but also from other individuals in their host country, in particular these differences may be with respect to inherently unobservable characteristics (such as risk aversion, or a taste for migration). Immigrants have chosen to incur the migration costs already to move from their native country to the host country and therefore will have characteristics that reduces the cost of migration relative to other individuals in their country of origin. Hence, this self-selected group may also be the group of individuals with very low migration costs with regards to internal migration, relative to the same cost for natives.

In terms of the model laid out below, the first reason mentioned in the preceding paragraph would mean that the utility that an immigrant gains is not as much affected by the specific region/federal state the individual lives in as it is for natives. In other words, immigrants and natives differ with respect to the strength of their tastes for living in certain regions, which gives rise to nonmonetary incentives to migrate. The second reason provided in the preceding paragraph would mean that unobservable characteristics that systematically differ between natives and immigrants yield the observed patterns.

Data from the GSOEP allow me to provide some suggestive evidence related to the attachment to the region of current residence. In the GSOEP survey round of 2000, individuals were asked "To what extent do you feel connected to the place and area that you live in?" Table 2 presents the responses of individuals who are more than 20 years of age. GSOEP distinguishes between foreigners and Germans based on citizenship. The table demonstrates that Germans are more than twice as likely to have "very strong" ties to the place and area they live in (27.6 percent of natives have "very strong" ties, while only 11.8 percent of foreigners have "very strong" ties). On the other hand, foreigners are much more likely to respond that they are "not much" or "not at all" connected to the place and area they live in.

Thus, indeed these data suggest that foreigners are less concerned about noneconomic aspects of their current place of residence. Consequently, they should be more inclined to move away from that place. A question from GSOEP for the same individuals can shed

TABLE 2: Survey Evidence Based on GSOEP

	Foreigner	Natives
Do you have ties to the local area?		
Very strong	11.8%	27.6%
Strong	50.1%	50.8%
Not much	33.3%	18.9%
Not at all	4.8%	2.7%
Observations	1,386	10,353
Would you move away due to family or job related reasons?		
Yes	32.6%	22.5%
Possibly	25.3%	31.5%
No	42.0%	46.0%
Observations	1,385	10,350

Source: GSOEP data.

additional light on this issue. Individuals were asked: "Would you consider moving away, for example, because of family or job related reasons?" Table 2 summarizes the responses, again for those individuals of age 20 or more. The table shows that 32.6 percent of foreigners would consider moving away, while only 22.5 percent of natives would consider doing so. Forty-six percent of natives would not consider moving away, while 42 percent of foreigners would not consider moving away.

Unfortunately, this direct survey evidence does not allow us to disentangle how important family reasons are versus job reasons. To learn more about the differences between natives and foreigners in their responsiveness to labor market conditions, I next resort to a structural econometric analysis of the migration decisions.

5. MODELING MIGRATION DECISIONS

To be able to model the determinants of migration decisions explicitly, and to be able to quantify the differences between immigrants and natives in responsiveness to labor market conditions as well as differences in the unobserved cost of migration, I consider now an explicit basic structural model of migration decisions. As a consequence of the last section, namely the conclusion that economic as well as potentially unobserved, noneconomic criteria determine the decision to migrate, I model this decision based on a comparison of utility levels attainable in different states and destinations. Assume that for individual i the utility of living in destination d is given by

$$U_d^i = \beta X_d^i + \epsilon_d^i, \tag{1}$$

where X_d^i are specific characteristics of choice d for an individual i, and ϵ_d^i is an individual specific component of utility in destination d.[9] Further assume that the error term ϵ_d^i is drawn i.i.d. from the Weibull distribution. This assumption gives us the conditional logit model. The utility maximizing individual i will choose destination d such that: $U_d^i \geq U_j^i$ for all $j \in \{1, \ldots, J\}$, where J is the total number of destinations. In the present setup, J will be equal to 17. This is because an individual living in state o (origin) can choose among the following potential destinations: First, the individual could choose to migrate

[9]Note that we are considering internal migration and the individual already lives in a certain state. Consequently, destination characteristics may differ across individuals, depending on their current residence (the distance between state of current residence and destination state is one example), which is why X_d^i is indexed with an i.

to 1 of the 15 other German federal states (there are 16 German federal states). Second, the individual could decide to stay within state of origin, o. In this case, there are two choices (destinations): either not to move at all, or move within the state of origin, o. Thus, there are a total of 17 different choices. Given the distributional assumption for the errors ϵ_d^i, the probability that an individual i chooses destination d is

$$\text{prob}\left(U_d^i \geq U_j^i, \forall j \neq d\right) = \frac{e^{\beta X_d^i}}{\sum_{h=1}^{J} e^{\beta X_h^i}}.$$

The parameters of the model can be estimated via maximum likelihood.

More specifically, assume that the utility that an individual i gets by choosing to migrate to destination d can be expressed as:

$$\begin{aligned} U_d^i = {} & \widetilde{\beta}\widetilde{X}_d^i + \gamma_1 distance_d^i + \gamma_2 \left(distance_d^i\right)^2 \\ & + \delta \cdot I\{migrating\ within\ state\} + \eta \cdot I\{migrating\ across\ state\} + \epsilon_d^i, \end{aligned} \tag{2}$$

where $\widetilde{X}_d^i$ is a vector of destination characteristics, that are allowed to be specific to individual i.[10] $distance_d^i$ is the physical distance between the state of origin of individual i and destination d, and $I\{migrating\ within\ state\}$ and $I\{migrating\ across\ state\}$ are two indicator functions. $I\{migrating\ within\ state\}$ is equal to one for individual i if the individual's choice of state is the state that he already resides in, but the choice implies that he moves within the state. $I\{migrating\ across\ state\}$ is an indicator function which is equal to one for individual i if the individual's choice of state is different from the state that he already resides in. While the previous discussion of the cost of migration has not distinguished between these two types of migration, one may expect that the cost of migration in fact differs depending on whether migration is within state or across state. The empirical setup allows for these two to differ, and the empirical work will show that indeed migration across state appears to be significantly more costly than migration within state. Because the importance of all variables may well differ between immigrants and natives, I will also estimate the conditional logit model separately for these two groups.

The key economic elements of interest in the vector of $\widetilde{X}_d^i$ are monthly income per capita (measured in units of DM 1,000, deflated to base year 2000) and the unemployment probability. In the few similar studies that I am aware of, which use aggregate data (e.g., Davies et al., 2001), these characteristics are assumed to be constant for all individuals in a state. Because of the large individual level data set, here I can significantly improve on that approach and take into account the heterogeneity of individuals, for example, with respect to education and age. More specifically, I use the microcensus data to estimate wage and unemployment regressions separately for each state. The estimated parameters at the state level are then used to predict the income, conditional on being employed, and the probability of being unemployed for each individual in each state given the individual's characteristics. To predict income and unemployment, I use different specifications, as will be explained later, and results are robust.

The *distance* variable is measured as the shortest road distance between the capital cities of the states (in 100 km). This variable is included to capture the hypothesized changes in the cost of migration (e.g., due to cultural barriers, and information costs) if migration is to a state further away. Finally, there is a fundamental difference between moving and not moving. I capture this by the two dummy variables that indicate whether the individual moved over the last year, namely $I\{migrating\ within\ state\}$ and

[10]The tilde above β and X is used to indicate that these are different β and X than the ones used in Equation (1).

$I\{migrating\ across\ state\}$. Note that for the 17th destination, which is the hypothetical destination that implies migration within a state, all characteristics, such as unemployment rate or expected income, are the same as for the state of origin. Distance between the origin and this destination is zero.

The key interest is in the role of variables that vary at the individual level. To capture observable and unobservable characteristics that do not vary across individuals who choose a given state, I also add to most specifications (destination-) state-fixed effects. These pick up, for example, variables related to the size of the state (either in terms of population or area), which are likely to have an impact on the probability of choosing a state. For example, if individuals pick a state randomly, with probabilities proportional to population size, more individuals would migrate to larger states. Note that the state-fixed effects also control for unobserved state-level amenities, cultural differences, as well as existing immigrant concentrations within a state.[11] The omitted state is Schleswig-Holstein (the northernmost state of Germany). In some specifications I also use an West–East dummy, which is equal to one if an individual migrates from a western state to an eastern state or Berlin. The reason for investigating this separately is that there has been a fairly large return migration into federal states that were part of the former German Democratic Republic beginning in the mid-1990s (see e.g., Hunt, 2006). This migration may not be explained by other observable characteristics, such as income or unemployment, but may rather be due to time and place specific circumstances after German Reunification.

Income and Unemployment Prediction

As mentioned earlier, I predict the income that an individual would be able to get (conditional on being employed) and the unemployment probability for each individual for each state. This approach allows for heterogeneity of income and unemployment in the conditional logit. To this end, I use Mincer-type regressions and regress, respectively, the logarithm of income and an indicator for whether an individual is unemployed, on a number of individual level characteristics.[12] For this purpose, I use only employed individuals who are not working part-time, with positive recorded income, for whom wage income is the main income source (but predict income and unemployment for all individuals who remain in the sample for the conditional logit analysis).

Native and immigrant-specific estimates are obtained by estimating income and unemployment regressions separately for immigrants and natives for each state. I have confirmed that results do not change in important ways when I use an alternative specification in which I still estimate income and unemployment regressions separately for each state, but simply including a dummy variable to capture differences between immigrants and natives.[13]

[11]Note again that these state-fixed effects are also allowed to differ between immigrants and natives when I estimate the conditional logit model separately for these two groups.

[12]In particular, I include age, age squared, an indicator whether the individual is male or female, indicators for whether the individual has a higher schooling degree (at the level of the so-called "Abitur" or "Fachhochschulreife"), whether the individual has a lower level schooling degree (at the level of the "Hauptschule" or "Realschule" or "Oberschule"), lower vocational training ("Praktikum" or "Lehre" or "Berufsfachschule"), higher vocational training ("Meister" or "Fachschule"), or a tertiary degree.

[13]All the regression coefficients are in line with priors. In particular, in the income regression I find that males earn higher incomes, income increases with age, and income is increasing with educational level. Comparing natives with immigrants, the results show that the age–earnings profile is somewhat less nuanced for immigrants. Further, at lower levels of education the increases due to education are smaller for immigrants than for natives.

Using the estimates from the wage and unemployment regressions, I predict for all individuals in the sample (i.e., not just those in that state) what their income and their unemployment probability in a state would be.[14]

Conditional logit versus nested logit

Underlying the conditional logit model laid out is the assumption that the independence of irrelevant alternatives (IIA) holds. This assumption is tested in the empirical work later. To take the concern about the conditional logit into account, the nested logit can be used, which relaxes the IIA assumption partially. More precisely, in the nested logit IIA still holds within a "nest," but the assumption of IIA across nests is relaxed. One problem for implementation of the nested logit model is that there are many possible choices of nests that could be used. To show robustness of the results, I report in the Appendix B results using a somewhat natural specification, where the three nests are (i) East, (ii) West, and (iii) "no migration."

6. CONDITIONAL LOGIT ESTIMATION RESULTS

Determinants of Internal Migration in the Total Population

This section presents the structural estimates of the parameters that determine migration decisions according to the model spelled out in Equation (2). I use the same sample selection criteria that I employed for the probit models (mainly this implies that I restrict the analysis to 18- to 60-year-olds who are either natives or immigrants, according to the above definitions, and who are not currently in school). Computational constraints require that I cannot work with the full sample that remains.[15] Instead, I draw a 15 percent random subsample for estimation of the conditional logit models when I look at the pooled sample of natives and immigrants. This still leaves me with a sample size of 179,334 individuals. For the estimates based on only the immigrant (or recent immigrant) subsample, I can make use of the full (100 percent) sample, which increases the precision of the estimates. Finally, for the analysis with the "household head/labor market participants" sample, which restricts the sample to household heads that are labor market participants, I am able to use a 30 percent sample from the microcensus. In each table, I note which random sample is used.

The results of the baseline regressions using the pooled data for natives plus immigrants are reported in Table 3. The estimates have the expected signs: A higher unemployment probability in a state reduces the probability that an individual chooses that state, while higher expected income in a destination increases the probability of choosing that destination. The probability of choosing a certain state decreases with the distance between the state of origin and the potential destination. The migration dummies are large in absolute size and highly significant. This indicates that, even taking into account income, unemployment, and distance, there is still a large negative effect that is due to

[14]One may be concerned that individuals might not move to a state at all if they do not have employment secured before they move, but (1) this could be relevant for households as only one member of the household may have secured employment before migrating, and (2) unemployment probabilities are indicators of future probabilities of unemployment, even if an individual is currently employed.

[15]The computational problem that prevents me from using the full sample of more than one million individual observations that I used in the probit analysis is that the data set increases in size by a factor of 17 for the conditional logit estimation, because for each individual the data set now adds an observation for each state. This requires large amounts of computer memory. Because of confidentiality requirements I am only able to access and work with the data remotely, and computational constraints at the German Federal Statistical Office could not be overcome.

TABLE 3: Conditional Logit Results: Baseline Results

	Baseline (1)	Add State Effects (2)	Add West–East Indicator (3)	Using Expected Income (4)	Using Expected Income (5)	Only Singles (6)	Only Head of Household (7)
Predicted destination income	0.317**	0.293**	0.290**			0.268**	0.253**
(in DM 1,000)	(0.049)	(0.050)	(0.052)			(0.088)	(0.057)
(Predicted destination income)*				0.306**	0.509**		
(1-Probability of unemployment)				(0.051)	(0.036)		
Probability of unemployment	−2.732**	−2.382**	−2.369**	−1.865**		−2.752**	−2.670**
	(0.274)	(0.283)	(0.289)	(0.336)		(0.500)	(0.408)
Migrate within state	−2.667**	−2.386**	−2.385**	−2.386**	−2.392**	−1.775**	−2.255**
	(0.009)	(0.041)	(0.041)	(0.041)	(0.041)	(0.066)	(0.052)
Migrate cross-state	−4.137**	−4.080**	−4.080**	−4.079**	−4.082**	−3.609**	−4.002**
	(0.037)	(0.037)	(0.037)	(0.037)	(0.037)	(0.059)	(0.048)
Distance (in 100 km)	−1.601**	−1.610**	−1.608**	−1.611**	−1.606**	−1.442**	−1.571**
	(0.029)	(0.029)	(0.030)	(0.029)	(0.029)	(0.043)	(0.037)
Distance (in 100 km) squared	0.150**	0.153**	0.153**	0.153**	0.153**	0.135**	0.150**
	(0.003)	(0.003)	(0.004)	(0.003)	(0.003)	(0.005)	(0.004)
Hamburg		−0.112	−0.112	−0.109	−0.119	0.154	−0.010
		(0.061)	(0.061)	(0.061)	(0.061)	(0.092)	(0.077)
Niedersachsen		0.417**	0.417**	0.416**	0.417**	0.428**	0.386**
		(0.050)	(0.050)	(0.050)	(0.050)	(0.079)	(0.063)
Bremen		−0.146*	−0.146*	−0.143*	−0.147*	0.104	−0.068
		(0.063)	(0.063)	(0.063)	(0.063)	(0.097)	(0.079)
Nordrhein-Westfalen		0.279**	0.280**	0.279**	0.273**	0.352**	0.268**
		(0.046)	(0.046)	(0.046)	(0.046)	(0.073)	(0.058)
Hessen		0.254**	0.255**	0.254**	0.248**	0.320**	0.288**
		(0.049)	(0.049)	(0.049)	(0.049)	(0.079)	(0.063)
Rheinland-Pfalz		0.209**	0.209**	0.207**	0.207**	0.265**	0.202**
		(0.050)	(0.050)	(0.050)	(0.050)	(0.080)	(0.064)
Baden-Württemberg		0.362**	0.363**	0.360**	0.358**	0.462**	0.337**
		(0.048)	(0.049)	(0.048)	(0.049)	(0.077)	(0.062)
Bayern		0.711**	0.711**	0.709**	0.707**	0.802**	0.646**
		(0.047)	(0.047)	(0.047)	(0.047)	(0.074)	(0.060)
Saarland		−0.066	−0.066	−0.064	−0.071	−0.012	−0.096
		(0.064)	(0.064)	(0.064)	(0.064)	(0.104)	(0.082)
Berlin		−0.134*	−0.133*	−0.130*	−0.141**	0.0299	−0.007
		(0.053)	(0.053)	(0.053)	(0.053)	(0.083)	(0.067)
Brandenburg		0.108	0.108	0.107	0.088	0.077	0.011
		(0.057)	(0.057)	(0.057)	(0.057)	(0.090)	(0.072)
Mecklenburg-Vorpommern		0.114	0.115	0.114*	0.093	0.105	0.129
		(0.065)	(0.065)	(0.065)	(0.064)	(0.101)	(0.083)
Sachsen		−0.023	−0.023	−0.024	−0.032	−0.117	−0.008
		(0.052)	(0.052)	(0.052)	(0.052)	(0.081)	(0.066)
Sachsen-Anhalt		0.440**	0.440**	0.440**	0.407**	0.426**	0.418**
		(0.054)	(0.054)	(0.054)	(0.054)	(0.086)	(0.069)
Thüringen		0.266**	0.267**	0.265**	0.261**	0.205*	0.241**
		(0.061)	(0.061)	(0.061)	(0.061)	(0.097)	(0.079)
West–East			−0.021				
			(0.100)				
Observations	179,254	179,254	179,254	179,254	179,254	44,910	97,788
Microcensus sample	15%	15%	15%	15%	15%	15%	15%
Log-likelihood	−60511	−60083	−60083	−60082	−60098	−22470	−36239

Notes: Standard errors in parentheses; *significant at 5 percent; **significant at 1 percent; omitted state is Schleswig-Holstein.

the fact that there are other undesired effects of migration due to unobserved differences between origin and destination (i.e., even if the destination of that move would have the same predicted income and unemployment and would be—a hypothetical—0 km away). The West–East dummy that is used in the specification of column (3) is insignificant and I omit it in the later specifications. I investigate the robustness of the baseline results to using expected income (column 4), which is calculated as predicted income (i.e., income conditional on being employed) times (one minus the unemployment probability). The results are also robust to leaving out the unemployment probability in the model with expected income (column 5), using a sample with only singles (column 6), or using only heads of a household (column 7).

As mentioned previously, the conditional logit model assumes independence of irrelevant alternatives (IIA). Whether this assumption holds, can be tested by comparing the unrestricted model (including all states) with a restricted model, in which one state is omitted. The tests of this assumption, performed based on restricted models in which I omit one state at a time, reject this assumption. However, these results are of somewhat limited use since I have a very large number of observations, which makes the probability of rejection of the IIA assumption high even if the "practical differences" between the restricted and the unrestricted model are small. Looking more closely at the results shows that despite the statistically significant differences, the absolute differences in estimated parameters are small. To take the possibility of a violation of the IIA assumption into account, I also estimated nested logit models.

One problem for implementation of the nested logit model is that there are many possible choices of nests that could be used. In Appendix B, I report results using a somewhat natural first specification, where the three nests are (i) East, (ii) West, and (iii) "no migration." The nested logit results turn out not to be very different from the conditional logit results. This is in line with prior findings in the migration literature, for example, by Christiadi and Cushing (2007), who also compared different specifications and concluded that nested logit and conditional logit do not show very different results. In sum, I focus in the main paper on the conditional logit analysis because (1) a rejection of IIA is very likely given the very large number of observations, (2) the results are not different when choosing the above-mentioned nests, and (3) because of the uncertainty about how to specify the nests for a nested logit analysis.

The Unobserved Cost of Migration

Using the marginal rate of substitution between an attribute of a state and the income that an individual can obtain in that state given her characteristics, it is possible to assign a monetary value to the trade-offs between income and other relevant variables that affect the migration decision. For example, the trade-off between income and distance, that is, the income change necessary to compensate for a change in the migration cost associated with the distance variable, can be calculated as follows (with γ_1, γ_2, and $\widetilde{\beta}_{Income}$ being the parameters on distance, distance squared, and income, respectively):

$$\frac{dIncome}{dDistance} = -\frac{\frac{\partial U}{\partial Distance}}{\frac{\partial U}{\partial Income}}$$

$$\Leftrightarrow dIncome = -\frac{(\gamma_1 + 2\,\gamma_2\,Distance)}{\widetilde{\beta}_{Income}} dDistance.$$

Analogously, to calculate a measure of the unobserved costs of migration,[16] that is, the disutility associated with migrating within a state (or leaving the state of origin), I calculate the change in annual income that is required to leave the probability of migrating within a state (or migrating to another state) unchanged.[17] The unobserved cost of migration can therefore be calculated as follows:

$$dIncome = \frac{\delta}{\widetilde{\beta}_{Income}} \qquad \text{(migration within a state)},$$

$$dIncome = \frac{\eta}{\widetilde{\beta}_{Income}} \qquad \text{(migration across a state)},$$

where δ and η are the parameters on the two migration indicator variables (see Equation (2)). Note that the coefficients reported are not marginal coefficients in the sense that they predict changes in choices in response to changes in covariates. However, they are marginal coefficients in the sense that they predict changes in utility in response to changes in covariates, which is what is required to perform the calculations that are proposed in this section.

Using the parameter estimates from the baseline specification that includes state effects (column 2) in Table 3, this implies, first, for the cost of distance: The (monthly) income change required to compensate for the first kilometer is about DM 55,[18] while at a distance of 100 km migrated already each additional kilometer of migration has to be compensated by DM 44.

The estimated measure of the unobserved cost of migration to a different state, in terms of monthly income, is estimated to be DM 13,925 (in 2000 values, approximately US$7,000), while the cost of migration within the state is estimated at DM 8,143 (approximately US$4,000). This is the monetary incentive that an individual has to be given to make her migrate, everything else equal. This number may seem quite high but it is consistent with the overall very low migration rates (less than 2 percent for across-state migration in the data from the official registration records for the total population). Thus, the average cost of migration indeed needs to be fairly large to be able to explain these low migration rates in the presence of significant regional disparities across German states. Only few individuals will have idiosyncratic characteristics that influence the migration decision, that is, in terms of the model draws of ϵ_d^i, such that they reduce migration costs sufficiently to make internal migration attractive.

To judge these numbers, it may also be useful to compare them to the only other existing estimate that I am aware of. Davies et al. (2001) estimate the unobserved costs of cross-state migration in the U.S. However, they use a somewhat different empirical setup and the data they have available are different (in particular, they do not have microdata available for their work and they implicitly assume that income and unemployment rates

[16]Note that one cannot term the "measure for the unobserved cost of migration" simply the "unobserved cost of migration." The income variable is annual income and the trade-off between not-moving and income will include discounted future income as well. Calculating the total unobserved cost would involve estimating the expected future income due to the migration. Nevertheless, the measure used here allows for an internally consistent comparison between natives and foreigners.

[17]Since the indicator variables are equal to one if the individual migrates (either within or across federal state borders), this number is negative and it can be interpreted as the amount of income that the individual would be willing to give for not having to move.

[18]Recall that the income variable is measured in DM 1,000 and the distance variable is measured in 100 km. Thus, to calculate the cost for the first kilometer moved: $(-(-1.610 + 2\times 0.153 \times 0.01)/0.293)\times 0.01=0.055$, that is, DM 55.

TABLE 4: Conditional Logit Results: Natives and Immigrants

	Interactions (1)	Natives (2)	All Immigrants (3)	Recent Immigrants (4)	Nonrecent Immigrants (5)
Predicted destination income	0.206**	0.230**	0.474**	0.462**	0.654**
(in DM 1,000)	(0.0551)	(0.055)	(0.064)	(0.069)	(0.164)
Probability of unemployment	−2.371**	−2.434**	−2.335**	−2.394**	−2.814**
	(0.310)	(0.311)	(0.328)	(0.367)	(0.785)
Migrate within state	−2.410**	−2.446**	−1.408**	−0.822**	−2.190**
	(0.041)	(0.043)	(0.059)	(0.073)	(0.119)
Migrate cross-state	−4.241**	−4.242**	−2.726**	−2.059**	−4.065**
	(0.041)	(0.041)	(0.036)	(0.043)	(0.089)
Distance (in 100 km)	−1.529**	−1.532**	−2.017**	−2.068**	−1.667**
	(0.031)	(0.031)	(0.037)	(0.045)	(0.077)
Distance (in 100 km) squared	0.145**	0.145**	0.195**	0.201**	0.155**
	(0.004)	(0.004)	(0.005)	(0.006)	(0.011)
Immigrant ×	0.631**				
(Predicted destination income)	(0.145)				
Immigrant ×	−0.119				
(Probability of unemployment)	(0.768)				
Immigrant × (migrate cross-state)	1.427**				
	(0.104)				
Immigrant × (migrate within state)	0.650**				
	(0.037)				
Immigrant × distance	−0.538**				
	(0.105)				
Immigrant × (distance squared)	0.054**				
	(0.014)				
State-fixed effects included	Yes	Yes	Yes	Yes	Yes
Observations	179,254	170,682	57,576	24,249	33,327
Microcensus sample	15%	15%	100%	100%	100%
Log-likelihood	−59886	−55004	−31824	−19933	−11175

Notes: Standard errors in parentheses; *significant at 5 percent; **significant at 1 percent.

are constant across all individuals in a state). These authors find unobserved cost of migration of between US$170,000 to approximately US$240,000 of (annual) per-capita income. Annualizing my findings, I get for cross-state migration a required income change of approximately US$7,000 × 12 = US$82,000. Thus, the present findings are considerably lower, even after taking into account differences between the U.S. and Germany in average annual incomes.

Are Immigrants More Mobile than Natives?

I now turn to testing for differences between natives and immigrants. To test if there are differences between the internal migration behavior of natives and immigrants, I first interact the key labor market variables with the immigrant indicator variable (column 1 of Table 4). Second, I run the earlier pooled regressions separately for natives and immigrants, as well as for recent and nonrecent immigrants (columns 2–5 of Table 4).

The results show some striking and statistically significant differences between natives and immigrants. First, consider column (1) of Table 4, in which I only allow the coefficients on predicted income and unemployment, as well as the distance and migration variables to vary with immigrant status, and restrict the state dummies to be the

same across the two groups. Here I find that the response of immigrants to differences in per capita income between states is larger than the response of natives. Further, the coefficient on the destination unemployment rate is larger in absolute value for immigrants, suggesting that immigrants in Germany are more likely to respond to unemployment differentials than natives. Finally, the coefficient on the migration dummy variables (*migrating within/across state borders*) is larger in absolute terms for natives than for immigrants. All interaction terms except the interaction of immigrant with unemployment rate are statistically significant. Moving to the conditional logit results estimated separately for natives and immigrants, I find again that the coefficient on the migration dummy variables are larger in absolute terms for natives than for immigrants, confirming the earlier findings that natives are less likely to move at all. Further, the coefficients on the unemployment variable again indicate that immigrants are more likely to respond to unemployment differentials than natives. The coefficients for the income variable is significantly larger in the immigrant sample.[19]

One might expect labor market variables to be even more important once we focus on sample that focuses more on labor market participants. Therefore, I now analyze the "restricted sample" that was introduced before, which in particular excludes members of the sample households that are not participating in the labor market or working part time. For this sample I also keep only the head of the household and drop individuals for whom wage income is not the main source of income. Because these sample restrictions reduce the number of observations significantly, I can now use a larger sample from the full microcensus. For the analysis with the "restricted sample" I am able to use a 30 percent sample from the microcensus, which in particular increases substantially the precision of the estimates in the separate estimation of the conditional logit models for immigrants and recent immigrant.

The results, which are reported in Table 5, show the following: In all specifications and samples the indicator variables for cross- and within-state migration are smaller in absolute size, and the coefficient on the unemployment variable is larger in absolute size than before. This suggests that overall the propensity to migrate and the reaction to differences in labor market characteristics is larger in this more narrowly defined sample. The only exception to this is the coefficient on the income variable, which is now smaller for the sample of natives than it was in the previous regressions. The results further indicate that the main findings regarding the differences between natives and immigrants are robust. In fact, for the unemployment and income variables the absolute difference between the coefficients for natives and immigrants increases compared to the results using the broader sample.[20]

In sum, the results of this subsection are consistent with the hypothesis that immigrants are more mobile with respect to internal mobility than natives. This difference, as measured through the migration dummy variables, is statistically significant. In addition, I also find that economic variables are stronger determinants of internal migration decisions for immigrants than for natives. There are economically significant differences

[19]While not all differences between individual coefficients are statistically significant, the joint statistical significance of the differences in the separate regressions is tested and confirmed using a Chow-test. The H_0: coefficients are equal, is strongly rejected, with p-values < 0.0001 for all three two-way comparisons, that is, natives compared to immigrants, natives compared to recent immigrants, and all immigrants compared to the group of recent immigrants.

[20]In unreported results, I also investigate robustness to the exclusion of the three small "city states" (Berlin, Bremen, Hamburg). For these states, commuters can easily cross state borders, thus migration and commuting are fairly similar. Re-estimating the baseline specifications confirms the main results even after excluding all observations involving these three states.

TABLE 5: Conditional Logit Results, Robustness Checks with the "Restricted Sample" (for Details about the Sample Restrictions See Text)

	Interactions (1)	Natives (2)	All Immigrants (3)	Recent Immigrants (4)	Nonrecent Immigrants (5)
Predicted destination income	0.183**	0.195**	0.526**	0.469**	0.669**
(in DM 1,000)	(0.046)	(0.046)	(0.097)	(0.110)	(0.209)
Probability of unemployment	−2.975**	−3.012**	−3.548**	−3.537**	−4.080**
	(0.370)	(0.371)	(0.583)	(0.714)	(1.097)
Migrate within state	−2.262**	−2.281**	−1.368**	−0.693**	−1.965**
	(0.041)	(0.042)	(0.098)	(0.132)	(0.168)
Migrate cross-state	−4.105**	−4.106**	−2.938**	−2.145**	−3.962**
	(0.040)	(0.040)	(0.061)	(0.076)	(0.122)
Distance (in 100 km)	−1.482**	−1.483**	−1.877**	−1.897**	−1.715**
	(0.030)	(0.030)	(0.057)	(0.070)	(0.108)
Distance (in 100 km) squared	0.139**	0.139**	0.183**	0.186**	0.162**
	(0.004)	(0.004)	(0.007)	(0.009)	(0.015)
Immigrant ×	0.754**				
(predicted destination income)	(0.159)				
Immigrant ×	−0.717				
(probability of unemployment)	(0.971)				
Immigrant × (migrate cross-state)	1.089**				
	(0.119)				
Immigrant × (migrate within state)	0.541**				
	(0.038)				
Immigrant × (distance)	−0.469**				
	(0.110)				
Immigrant × (distance squared)	0.054**				
	(0.014)				
State-fixed effects included	Yes	Yes	Yes	Yes	Yes
Observations	162,836	155,480	24,523	8,457	16,066
Microcensus sample	30%	30%	100%	100%	100%
Log-likelihood	−60244	−56355	−12766	−6811	−5612

Notes: Standard errors in parentheses; *significant at 5 percent; **significant at 1 percent.

between natives' and immigrants' reactions to income as well as unemployment differentials across states in all specifications. In the estimation by group (Table 4, columns 3 and 4), we find statistically significant differences with respect to income.[21] It is noteworthy that the finding that economic variables are significant determinants of internal migration decisions of immigrants is in contrast to Bartel and Koch (1991) for the U.S.[22]

[21]Likelihood ratio tests also confirm that the importance of economic variables is larger for the sample of immigrants than for the natives. The goodness of fit of the regressions increases more for immigrants than for natives when income or unemployment or both are included to the baseline regression that excludes these variables.

[22]A potentially important reason for this difference, in addition to the fact that Bartel and Koch (1991) study internal migration in the U.S., is that that these authors focus on push factors, that is, conditions in the origin, while the present method compares the conditions in the origin to conditions in all potential destinations. They assume that the push factors such as wage and unemployment rates are constant for all individuals in a region of origin.

TABLE 6: The Estimated Trade-Offs for Natives and Foreigners

	Measure of Unobserved Cost of Migration (Monthly Income Change, in DM)	
	Within State	Across State
Total population	8,143	13,925
Natives	10,635	18,443
Immigrants	2,970	5,751
Recent immigrants	1,780	4,457
Nonrecent immigrants	3,349	6,216

Notes: DM 1 approximately = US$0.50 (1999), results are based on estimates in column (2) of Table 3 and columns (3)–(5) of Table 4.

The Unobserved Cost of Migration of Natives and Immigrants

Following the same approach as before I measure the unobserved cost of migration using the estimates from columns (3)–(5), respectively, of Table 4. The results are summarized in Table 6, which repeats the earlier results for the total population for comparison.

Table 6 summarizes the key results: cross- and within-state migration is less costly for immigrants than for native Germans. The measure of unobserved cost of migration for cross-state migration is estimated to be about 3.2 times larger for natives than for immigrants: for natives it is approximately DM 18,400 (US$9,200) while for immigrants it is approximately DM 5,750 (US$2,875); that is, the measure of unobserved cost of migration for immigrants is 31 percent of the cost for natives. Recent immigrants show even lower cost of migration than the group of immigrants as a whole.

Analysis by Age

As we have seen earlier, the age variables are both statistically and economically significant predictors of migration decisions in the reduced form probit analysis. To further investigate the differences in the propensity to migrate over the life cycle, and the role that labor market characteristics play for this, I re-estimate the baseline conditional logit regression separately for each age group. The analysis by age group is also motivated by recent findings by Hunt (2006). Hunt uses state-level data and GSOEP data to demonstrate that important differences in migration behavior between different age groups can help explain the puzzle that in aggregate data, unemployment often does not predict migration behavior. By looking at different age groups separately, she finds that this is indeed only true for young cohorts, but not for the older cohorts. Here, I can use a much larger sample of individual level data to shed additional light on this question from a somewhat different angle. I also split the age distribution more finely than Hunt does (she uses ages 18–24, 25–49, 50–64). To the extent that these two sides of the migration decision can be separated, Hunt (2006) studies more the push factors, with a focus of conditions in their origin, while I study pull factors with a focus that is somewhat more on the question: what conditions in potential destinations attract individuals?

In line with previous findings for the push factors, I find that the younger age groups (18- to 24-year-olds and 25- to 34-year-olds) are more responsive to income differentials than older individuals (results not shown). I also find that 25- to 34-year-olds have larger responsiveness to expected unemployment rates than the youngest individuals in the sample. On the other hand, I find that unemployment rates appear to be least important for migration decisions for the oldest age group. Repeating this analysis by age separately for immigrants and natives reveals that the observed pattern regarding the role of

TABLE 7: Conditional Logit Results: By Age and Separate for Natives and Immigrants

	Age 18–25 Natives (1)	Age 18–25 Immigrants (2)	Age 25–34 Natives (3)	Age 25–34 Immigrants (4)	Age 35–44 Natives (5)	Age 35–44 Immigrants (6)	Age 45+ Natives (7)	Age 45+ Immigrants (8)
Predicted destination	0.396	0.714**	0.665**	0.599**	0.438**	0.362**	0.180	0.350*
Income (DM 1,000)	(0.324)	(0.232)	(0.120)	(0.108)	(0.111)	(0.121)	(0.116)	(0.148)
Probability of	−4.823**	−1.902*	−3.592**	−2.348**	−2.780**	−2.863**	−0.855	−2.162**
unemployment	(0.812)	(0.923)	(0.621)	(0.573)	(0.769)	(0.698)	(0.647)**	(0.766)
Migrate within state	−1.323**	−0.325	−1.713**	−0.982**	−2.572**	−1.606**	−3.509	−2.217**
	(0.120)	(0.170)	(0.070)	(0.097)	(0.086)	(0.115)	(0.106)**	(0.142)
Migrate cross-state	−3.166**	−1.609**	−3.643**	−2.368**	−4.267**	−2.958**	−5.154	−3.566**
	(0.106)	(0.088)	(0.064)	(0.058)	(0.080)	(0.075)	(0.099)**	(0.096)
Distance (in 100 km)	−1.571**	−2.251**	−1.451**	−1.946**	−1.643**	−1.935**	−1.612	−2.107**
	(0.0797)	(0.103)	(0.047)	(0.057)	(0.062)	(0.072)	(0.078)	(0.107)
Distance squared	0.147**	0.221**	0.137**	0.188**	0.157**	0.188**	0.153**	0.198**
	(0.0107)	(0.014)	(0.006)	(0.008)	(0.008)	(0.010)	(0.011)	(0.016)
State-fixed effects included	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	11,398	4,711	39,794	18,134	50,010	16,166	69,540	18,565
Microcensus sample	15%	100%	15%	100%	15%	100%	15%	100%
Log-likelihood	−6872	−4361	−19898	−12570	−14438	−8300	−11027	−5769

Notes: Standard errors in parentheses; *significant at 5 percent; **significant at 1 percent.

income as a pull factor is not unique to natives (Table 7). Immigrants, too, show a relatively larger response to income differentials across states when they are young, and smaller responsiveness when they are old. Both natives and immigrants have the lowest responsiveness to unemployment differentials in the older age groups. The parameter estimates on the migration-related dummies are smaller in absolute size for immigrants across all age groups. Combined with the larger responsiveness to income differences this implies that for all age groups the unobserved cost of migration is smaller for immigrants.

7. CONCLUSION

Convergence of wage levels and of other labor market characteristics can yield substantial efficiency gains (e.g., Borjas, 2001). However, it is known that flows of labor (and capital) do not respond to labor market differentials instantaneously (e.g., Barro and Sala-i-Martin, 1992; Decressin and Fatás, 1995). A major impediment to labor flows is migration costs, and it is important to understand the determinants and the magnitude of these migration costs for different subgroups of the population. Of particular policy relevance are differences between natives and immigrants.

In this paper, I show that immigrants are more likely than natives to migrate internally within Germany. This is true even after controlling for a large number of individual-specific characteristics. Thus, selection based on observable characteristics can explain some, but not all of the observed differences in the aggregate. I further present econometric evidence, based on a basic structural model of migration decisions, for significant differences in migration costs between natives and immigrants in Germany. Immigrants are significantly more responsive to labor market-specific income differentials than natives. Further, I estimate that the unobserved cost of migration for immigrants is only about 31 percent of the cost for natives. The findings of overall high migration costs are consistent with low migration rates in the population, while the observed differences

between natives and immigrants confirm relatively unexplored conjectures in the literature. Using GSOEP data, I can provide some additional qualitative evidence that suggests that ties to the region in which immigrants live in Germany are weaker than the ties of natives to their region, which in turn suggests a potential explanation for the quantitative findings.

The findings bear on policy. In the presence of high unemployment rates, immigration is sometimes seen as placing an additional burden on the labor markets of receiving countries. However, in the case of Germany, the large migration responsiveness of immigrants to labor market differentials can be expected to have positive macro effects as it increases the speed of convergence between regions and accelerates adjustments in response to regional shocks. Thus the results suggest that, in addition to wage and employment effects, as a third dimension, internal migration should be studied to estimate the effects of immigration on a host country's labor market. The findings in this paper have implications for other countries with similar regional disparities across labor markets and significant presence of immigrants and are of relevance to all West European countries for an assessment of the economic impact of the immigrant flows that are expected in the wake of the EU expansion toward Eastern Europe.

APPENDIX A: ROBUSTNESS CHECKS: MIGRATION ACROSS STATE BORDERS

This appendix shows reduced form results that consider only migration across borders of the federal state (see Table A1). The dependent variable is a dummy variable, which is one if an individual moved within the last 12 months from another German federal state to the current federal state of residence, and zero otherwise. The baseline probability that an individual migrates to a different federal state is smaller, which also translates into smaller differences between immigrants and natives. The difference between immigrants and recent immigrants is larger in relative terms than before.

TABLE A1: Reduced Form Results from the Microcensus: Migration across Federal States

Dependent Variable = 1 if Individual Moved to a Different Federal State over the Previous Year	(1)	(2)	(3)	(4)	(5)	(6)
	All	All	All	Natives	Immigrants	Recent Immigrant
Immigrant	0.003**	0.003**				
	(0.001)	(0.001)				
Recent immigrant			0.005**			
(<10 years)			(0.001)			
Male	<0.0001	0.0001	0.0001	<0.0001	0.002*	0.003
	(0.0001)	(0.0001)	(0.0002)	(0.0002)	(0.001)	(0.003)
Age (/100)	−0.069**	−0.054**	−0.054**	−0.057**	−0.012	0.098
	(0.005)	(0.006)	(0.006)	(0.006)	(0.034)	(0.105)
Age squared	0.0242**	−0.001	−0.002	0.002	−0.064	−0.238
	(0.006)	(0.007)	(0.008)	(0.008)	(0.044)	(0.144)
Married	−0.003**	0.001**	0.001**	0.001**	0.002	0.001
	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.001)	(0.003)
Widowed	0.0005	0.002*	0.002*	0.00215*	−0.001	−0.005
	(0.001)	(0.001)	(0.001)	(0.001)	(0.004)	(0.012)
Divorced	0.0037**	0.004**	0.004**	0.004**	0.001	0.0013
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.006)
Finished school	0.002**	0.001	0.001	0.002	0.0002	0.004
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.005)
Vocational training	0.002**	0.001	0.001	0.001	0.002	0.006
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.005)
Higher voc. training	0.005**	0.003**	0.002*	0.003*	0.008*	0.024*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.004)	(0.012)
Tertiary degree	0.0152**	0.009**	0.008**	0.009**	0.013**	0.022**
	(0.001)	(0.001)	(0.001)	(0.002)	(0.003)	(0.008)
Unemployed last year		0.005**	0.005**	0.005**	0.005**	0.010**
		(0.0004)	(0.0004)	(0.0004)	(0.002)	(0.004)
Household size indicators (10)		Yes	Yes	Yes	Yes	Yes
Income category indicators (10)		Yes	Yes	Yes	Yes	Yes
Observations	1,219,639	937,712	937,712	893,497	44,215	14,872
Log-likelihood	−66133	−48385	−48374	−45573	−2792	−1626

Notes: Standard errors in parentheses. *significant at 5 percent; **significant at 1 percent; shown are marginal coefficients.

APPENDIX B: NESTED LOGIT RESULTS

TABLE B1: Nested Logit Results: Baseline Results, Based on Three Nests: East, West, no Migration (Stay)

	All (1)	Natives (2)	All Immigrants (3)	Recent Immigrants (4)	Nonrecent Immigrants (5)
Predicted destination income	0.228**	0.176**	0.285**	0.259**	0.469**
(in DM 1,000)	(0.049)	(0.053)	(0.051)	(0.056)	(0.140)
Probability of unemployment	−1.978**	−2.056**	−1.666**	−1.522**	−2.321**
	(0.271)	(0.301)	(0.254)	(0.289)	(0.653)
Migrate within state	−2.376**	−2.438**	−1.475**	−0.940**	−2.169**
	(0.041)	(0.043)	(0.052)	(0.065)	(0.101)
Migrate cross-state	−3.851**	−4.032**	−2.120**	−1.616**	−3.449**
	(0.047)	(0.052)	(0.043)	(0.047)	(0.115)
Distance (in 100 km)	−1.501**	−1.444**	−1.469**	−1.549**	−1.319**
	(0.030)	(0.032)	(0.039)	(0.049)	(0.080)
Distance (in 100 km) squared	0.139**	0.133**	0.135**	0.145**	0.117**
	(0.004)	(0.004)	(0.005)	(0.006)	(0.0111)
Hamburg	−0.126*	−0.145*	0.228**	0.208**	0.306*
	(0.059)	(0.063)	(0.063)	(0.077)	(0.136)
Niedersachsen	0.404**	0.397**	0.401**	0.488**	0.237*
	(0.048)	(0.051)	(0.061)	(0.074)	(0.130)
Bremen	−0.162**	−0.150*	0.074	0.088	0.024
	(0.061)	(0.065)	(0.067)	(0.082)	(0.144)
Nordrhein-Westfalen	0.292**	0.268**	0.741**	0.834**	0.385**
	(0.045)	(0.048)	(0.056)	(0.069)	(0.117)
Hessen	0.257**	0.246**	0.709**	0.840**	0.343**
	(0.048)	(0.051)	(0.056)	(0.069)	(0.119)
Rheinland-Pfalz	0.208**	0.187**	0.513**	0.673**	0.112
	(0.049)	(0.052)	(0.058)	(0.069)	(0.125)
Baden-Württemberg	0.371**	0.337**	0.884**	1.048**	0.379**
	(0.048)	(0.051)	(0.056)	(0.069)	(0.117)
Bayern	0.716**	0.670**	1.054**	1.206**	0.651**
	(0.046)	(0.049)	(0.056)	(0.069)	(0.119)
Saarland	−0.088	−0.054	−0.348**	−0.286**	−0.424**
	(0.063)	(0.066)	(0.077)	(0.093)	(0.163)
Berlin	−0.082	−0.143*	0.374**	0.567**	0.034
	(0.053)	(0.056)	(0.063)	(0.079)	(0.129)
Brandenburg	0.148**	0.123*	−0.476**	−0.247*	−0.505*
	(0.057)	(0.059)	(0.089)	(0.103)	(0.220)
Mecklenburg-Vorpommern	0.111*	0.093	−0.775**	−0.507**	−0.882**
	(0.063)	(0.067)	(0.100)	(0.109)	(0.270)
Sachsen	−0.009	−0.049	−0.288**	−0.065	−0.382*
	(0.051)	(0.054)	(0.079)	(0.092)	(0.187)
Sachsen-Anhalt	0.444**	0.410**	−0.195*	0.080	−0.441*
	(0.054)	(0.056)	(0.081)	(0.092)	(0.205)
Thüringen	0.268**	0.261**	−0.969**	−0.783**	−0.728**
	(0.060)	(0.064)	(0.109)	(0.125)	(0.254)
Observations	179,254	170,682	57,576	24,249	33,327
Microcensus sample	15%	15%	100%	100%	100%
Log-likelihood	−60007	−54941	−31647	−19844	−11147

Notes: Standard errors in parentheses; *significant at 5 percent; **significant at 1 percent; omitted state is Schleswig-Holstein.

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