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322/2008

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WIFO Working Papers, No. 322
June 2008

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2008/183/W/0

Moving Across Borders: Who is Willing to Migrate or to Commute?

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June 2008

Abstract

This paper analyzes the willingness to commute and migrate across borders. We focus is on differences in the effects of individual characteristics on the willingness to migrate and the willingness to commute. Based on a random utility model we estimate a multinomial probit regression using individual level data on migration and commuting plans in regions of the Czech Republic, Hungary, and Slovakia bordering on Austria. We find that indirect costs of mobility have a smaller impact on the probability of being willing to commute, variables associated with potential earnings have mostly low marginal effects and no evidence of selection by education.

JEL classification numbers: F22, R23, J61, C35

Key words: willingness to migrate, willingness to commute, cross-border commuting, multinomial probit regression

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1 Introduction

Regional mobility of labor can be achieved either through migration or through commuting. A person receiving a job offer in another region can either choose to work there without changing place of residence, in which case she will be a commuter, or she may also choose to change her place of residence and migrate to the new place of work. While this choice between commuting and migration has been repeatedly modeled in the theoretical literature on regional labor mobility (e. g. Zax 1994, Rouwendal 1998, van Ommeren, Rietveld and Nijkamp 2000), only few studies (see Renkow and Hoover 2000, Clark and Withers 1999, Rouwendal 1999, van Ommeren, Rietveld and Nijkamp 1999, Eliasson, Lindgren and Westerlund 2003) have analyzed it empirically. Furthermore, these contributions focus primarily on migration and commuting within a country or an urban area. By contrast, commuting has been almost completely ignored in the literature on international labor mobility (see Borjas 1999 for a recent survey). To our knowledge there is no empirical study to date which has considered the interaction of commuting and migration choices in a cross-border context and only few studies (e. g. Buch, Niebuhr and Stuwe 2008, Schwab and Toepel 2006, Hansen 1994) have considered commuting as a possibility for cross-border labor mobility.

In the context of European integration, however, issues of cross-border commuting and migration are becoming increasingly relevant both from an analytical as well as a policy perspective. Anecdotal evidence and some recent analytical results suggest that cross-border labor markets may be emerging in the European Union. For instance Overmann and Puga (1999) find that regional linkages in unemployment rates are equally strong across national borders as within countries. Furthermore, issues of cross-border

commuting and migration have also received heightened attention by policy makers in the debate prior to the 2004 EU enlargement round. In particular Austrian and German policy makers repeatedly argued that due to the vicinity of major metropolitan centers to the new member states, cross-border commuting flows may be substantial.

In this paper we analyze the willingness to migrate and to commute across borders. We use individual level data collected by the Austrian cross-border Labour Market Monitoring (LAMO) project, which monitors migration and commuting intentions in the regions of the Czech Republic, Hungary, and Slovakia bordering on Austria. We thus extend the literature on the willingness to migrate (see Hughes and McCormick 1985, Burda, Härdle, Müller and Werwatz 1998, Ahn, de la Rica and Ugidos 1999, Drinkwater 2003) by also considering the willingness to commute across borders.

Our particular interest is on whether individual characteristics which influence the willingness to migrate across national borders (such as age, education, language skills, previous migration experience and networks abroad), influence the willingness to commute in a similar manner. To analyze this, we present an analytically simple but appealing model based on random utility theory in section 2 which replicates many of the predictions of more complex models (such as those by Rouwendal 1998, van Ommeren et al. 2000).

In Section 3 we discuss the data used and show that, under appropriate assumptions on the error structure, our model can be estimated using a multinomial probit framework. Section 4 presents results. We find that variables measuring the indirect costs of mobility, such as previous mobility experience, networks abroad, being single and the presence of kids in the household have a smaller impact on the probability of being willing to commute. By contrast, variables associated with potential earnings have mostly

low marginal effects and educational achievement is found to be insignificant altogether. Furthermore, our results indicate substantial nonlinearities in the marginal effects of continuous variables. Section 5 finally concludes the paper.

2 Theory

The starting point of our analysis is that regional mobility of labor can be achieved either through residential migration or through commuting. To highlight that the choice between these two modes of labor mobility is not independent when considering to work abroad, we consider two countries where the home country is composed of J regions and the foreign country f of only one. We consider an environment where labor is initially mobile only within but (due to institutional barriers) immobile across countries, but where cross-border mobility will become an option in the future. Furthermore, we assume that the location of workplaces is given exogenously and that individuals faced with an offer for a workplace act myopically and thus consider wages and land prices in all regions as given.[1]

Consider an individual k living in region i and working in region j of the home country ($i, j \in J$) which is asked whether it would be willing to commute or to migrate. We assume that this individual receives utility from (expected lifetime) income in the region of work (Y_j) and (expected lifetime) amenities in the region of residence (A_i) which also include the (expected lifetime) disutility arising from the rental price of housing. Furthermore, if the place of work and the place of residence of the individual do not co-

[1] This would be a strong assumption in a general equilibrium analysis. It, however, accords well with the empirical part of this paper, since we focus on the willingness to migrate and commute. Issues of endogeneity are therefore of lesser importance in our paper than in empirical applications based on actual mobility outcomes.

incide ($i \neq j$), the individual incurs (pecuniary and non-pecuniary lifetime) commuting costs of d_{ij}. Assuming additively separable utility functions the utility U_S^k of the individual living in region i and working in region j of the home country can then be written as

$$U_S^k = Y_j - d_{ij} + A_i + \varepsilon_S^k \tag{1}$$

with $d_{ij} = 0$ if $i = j$ and ε_S^k a random utility component associated with working and residing in the home country for each individual.

When considering to work abroad the individual expects a job offer associated with a lifetime income Y_f from an employer located in the foreign country f. Accepting this job offer and remaining resident in i (i.e. commuting) would result in a utility of

$$U_C^k = Y_f - d_{if} + A_i + \varepsilon_C^k \tag{2}$$

(where d_{if} are the pecuniary and non-pecuniary costs of cross-border commuting and ε_C^k is a random utility component associated with commuting from i to f). Accepting the offer and migrating to the new workplace abroad would give an expected lifetime utility of:

$$U_M^k = Y_f - M_{if} + A_f + \varepsilon_M^k. \tag{3}$$

M_{if} are the (pecuniary and non-pecuniary) costs of migration from i to f, A_f is the expected lifetime utility value of amenities (net of the rental price of housing) when living abroad, and ε_M^k is a random utility component associated with migration. For the moment we impose no restrictions on the random utility components ε_S^k, ε_C^k and ε_M^k, which can be either thought of

as capturing random heterogeneity in tastes (as in Wall 2001), uncertainty concerning living and working conditions in f and i (see, e. g., Burda 1995) or random draws from a distribution of mobility costs (as in Burda and Funke 1993).

Equations (1), (2) and (3) can be used to compute the differentials for individual k between the utility of staying in the home country (U_S^k) and the utility of commuting (U_C^k) or migrating (U_M^k) to country f:

$$U_C^k - U_S^k = (Y_f - Y_j) - (d_{if} - d_{ij}) + (\varepsilon_C^k - \varepsilon_S^k) \tag{4}$$

$$U_M^k - U_S^k = (Y_f - Y_j) - (M_{if} - d_{ij}) + (A_f - A_i) + (\varepsilon_M^k - \varepsilon_S^k) \tag{5}$$

Equations (4) and (5) show that higher income differentials between the home and foreign countries ($Y_f - Y_j > 0$) increase the utility gain from working abroad, while higher amenities (net of housing prices) in f than in the home country (i.e. $A_f - A_i > 0$) only increase the utility gain from migrating to f. Higher cross-border than within-country costs of commuting ($d_{if} - d_{ij} > 0$) decrease the utility differential between commuting across the border and staying in the home country. The same holds true for the difference $M_{if} - d_{ij}$ in the case of migration: if the costs of moving abroad are higher than the lifetime commuting costs at home, the utility gain from relocating residence to f is diminished.

When deciding on the willingness to work abroad, the household also considers the utility difference between migration and commuting, which is given by:

$$U_M^k - U_C^k = (A_f - A_i) - (M_{if} - d_{if}) + (\varepsilon_M^k - \varepsilon_C^k) \tag{6}$$

From equation (6) it follows that there is a positive utility differential between migration and commuting $\left(U_M^k - U_C^k > 0\right)$ if the foreign country offers more amenities (or a lower rental price of housing), such that $A_f - A_i > 0$, and if migration is associated with lower (pecuniary and non-pecuniary) costs $(M_{if} - d_{if} < 0)$.

Apart from the direct utility gains arising from the income, mobility cost or amenity differentials, the differences in the random utility components in equations (4), (5) and (6) also determine the choice between the willingness to stay, migrate or commute. Defining

$$\Omega_{CS} = (Y_f - Y_j) - (d_{if} - d_{ij})$$
$$\Omega_{MS} = (Y_f - Y_j) - (M_{if} - d_{ij}) + (A_f - A_i)$$
$$\Omega_{MC} = (A_f - A_i) - (M_{if} - d_{if})$$

as the "direct utility gains" from commuting vs. staying (Ω_{CS}), migration vs. staying (Ω_{MS}) and migration vs. commuting (Ω_{MC}), and the "random utility gains" between commuting and staying, and between migration and staying as[2]

$$\xi_C^k = \varepsilon_C^k - \varepsilon_S^k$$
$$\xi_M^k = \varepsilon_M^k - \varepsilon_S^k$$

[2]Note that Ω_{MC} is the difference between Ω_{MS} and Ω_{CS} and $\xi_M^k - \xi_C^k = \varepsilon_M^k - \varepsilon_C^k$.

equations (4) to (6) can be rewritten as:

$$U_C^k - U_S^k = \Omega_{CS} + \xi_C^k \tag{4'}$$

$$U_M^k - U_S^k = \Omega_{MS} + \xi_M^k \tag{5'}$$

$$U_M^k - U_C^k = \Omega_{MC} + \left(\xi_M^k - \xi_C^k\right) \tag{6'}$$

According to equations (4') to (6'), an individual's willingness to commute or migrate across borders depends on the realizations of the random utility variables ξ_M^k and ξ_C^k. This is also shown in figure 1 where the optimum choices between the willingness to commute, migrate and stay are depicted for given "direct" utility gains Ω_{CS} and Ω_{MS} with ξ_M^k drawn on the horizontal axis and ξ_C^k on the vertical axis. An individual will not be willing to work abroad if $\xi_C^k < -\Omega_{CS}$ and $\xi_M^k < -\Omega_{MS}$ (the lower left corner in figure 1). Individuals with realizations of ξ_C^k and ξ_M^k larger than $-\Omega_{CS}$ and $-\Omega_{MS}$, respectively, will choose either to migrate or to commute, depending on the relative size of Ω_{CS} and Ω_{MS} which determines the position of the line $-\Omega_{MC}$. Realizations of $\left(\xi_C^k, \xi_M^k\right)$ below this line induce migration and realizations of $\left(\xi_C^k, \xi_M^k\right)$ above $-\Omega_{MC}$ are associated with commuting (provided $\xi_C^k > -\Omega_{CS}$ and/or $\xi_M^k > -\Omega_{MS}$). Thus the individual will be willing to commute across borders if $\xi_C^k > -\Omega_{CS}$ and $\left(\xi_M^k - \xi_C^k\right) < -\Omega_{MC}$. In this case the direct utility gain from commuting to f compared to working in j exceeds the potential random utility losses from commuting vis-à-vis staying and migration is associated with a negative utility differential compared to commuting. By similar reasoning, individual k is willing to migrate to f if there is a net utility gain from migration, $\xi_M^k > -\Omega_{MS}$, and migration is superior to commuting, $\left(\xi_M^k - \xi_C^k\right) > -\Omega_{MC}$.

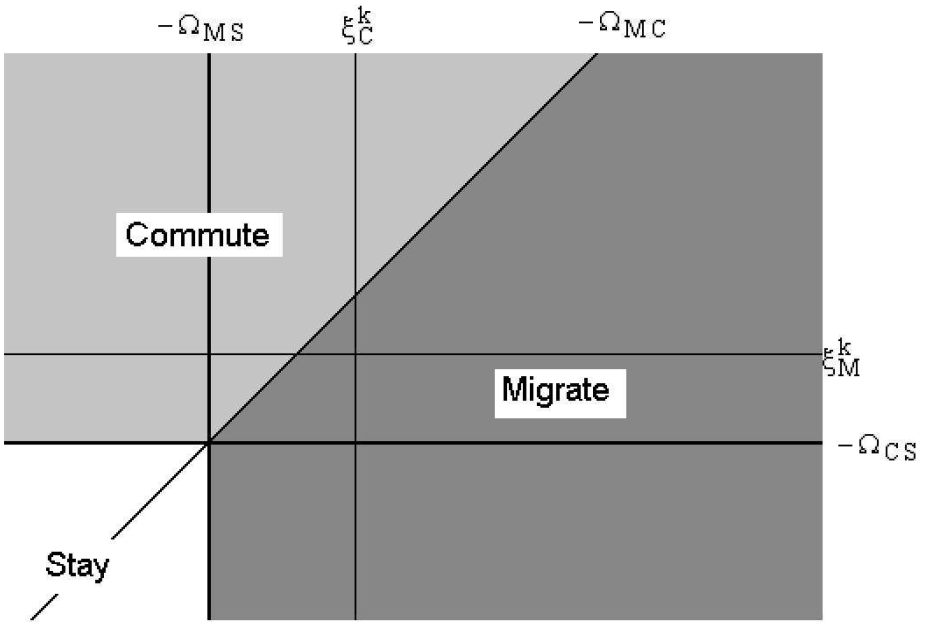

Figure 1: Optimal Choices between Commuting, Migration and Staying in dependence of ξ_C^k and ξ_M^k for given realizations of Ω_{CS} and Ω_{MS}

The figure also illustrates that—as compared to a model in which only cross border migration is possible—the availability of commuting as a travel mode increases the likelihood that a given person is willing to be mobile, while it reduces the likelihood of a person being willing to migrate. To see this, notice that in the absence of the possibility to commute all persons with $\xi_M^k > -\Omega_{MS}$ are willing to migrate, while all others remain immobile. Thus, the possibility of commuting allows all persons with $\xi_M^k < -\Omega_{MS}$ but $\xi_C^k > -\Omega_{CS}$ to become mobile through commuting while all persons for whom $\xi_M^k > -\Omega_{MS}$ and $\left(\xi_M^k - \xi_C^k\right) < -\Omega_{MC}$ are willing to commute rather than to migrate. As a consequence, some individuals unwilling to migrate become mobile if the possibility of commuting is available and some that would otherwise migrate will commute (see also Renkow and Hoover 2000).

We can use equations (4') to (6') to define the probability of the individual being willing to commute from i to f (P_C), the probability of her being willing to migrate to f (P_M) and the probability of her being immobile and staying in i (P_S) as:

$$P_C = \Pr\left(\Omega_{CS} > -\xi_C^k, \Omega_{MC} < -\left(\xi_M^k - \xi_C^k\right)\right) \tag{7}$$

$$P_M = \Pr\left(\Omega_{MS} > -\xi_M^k, \Omega_{MC} > -\left(\xi_M^k - \xi_C^k\right)\right) \tag{8}$$

$$P_S = \Pr\left(\Omega_{MS} < -\xi_M^k, \Omega_{CS} < -\xi_C^k\right) \tag{9}$$

Taking the derivatives of these equations[3] (see Table 1) we find that the comparative statics of our model generally follow those found by more complicated search theoretic models which consider the possibility of commuting (e. g. Rouwendal 1998, van Ommeren et al. 2000). As in these models, higher wage differentials between receiving and sending regions will increase both the probability of being willing to commute and to migrate, while reducing the probability of being immobile (see table 1). By contrast, higher differences in the benefits of residing in the sending and receiving region decrease the probabilities to be willing to commute and to remain immobile but increase the probability of being willing to migrate. Finally, individuals currently commuting in their home country (i. e. individuals with $d_{ij} > 0$) will be more likely to consider working abroad (because the opportunity costs of staying in the home country are higher) while increased commuting and migration costs have negative effects on the likelihood of being willing to commute or to migrate, respectively, and a positive impact on the choice to stay.

[3]See appendix A for a derivation of the derivatives of equations (7) to (9).

	$Y_f - Y_j$	$A_f - A_i$	d_{ij}	d_{if}	M_{if}
P_C	+	-	+	-	+
P_M	+	+	+	+	-
P_S	-	-	-	+	+

Table 1: Sign of partial derivatives of the probabilities to commute, migrate and stay with respect to model variables

3 Data and Empirical Implementation

The individual level data we use were collected within the scope of the Austrian Labor Market Monitoring (LAMO) project. The aim of this project was to gain information on the willingness to commute and migrate in the Central European "Centrope" region, which encompasses the eastern provinces of Austria (Vienna, Lower Austria and Burgenland) as well as the southern parts of the Czech Republic (South Moravia, Vysočina and South Bohemia) and the western Slovakian (Bratislava and Trnava) and Hungarian regions (Győr-Moson-Sopron, Vas and Zala) bordering on Austria. The data were collected in two waves[4] during which 15,791 individuals were interviewed, 11,693 of them living in the "Centrope" regions of the new member states.

These data are especially suitable for our analysis because this region can act as a model for analyzing the willingness to migrate and to commute in an enlarged European Union: there are sufficient economic incentives for cross-border labor mobility (due to large differences in wages and economic development between the "new" EU members and Austria), so that

[4]The first wave took place between November 2004 and February 2005, the second between November 2006 and February 2007 using personal face-to-face interviews. Austrian households were also interviewed in the first wave. We disregard these observations since Austrian households were not surveyed in the second wave. According to the sampling plan, random quota sampling was applied to the working-age population 15 years and older. Quotas were set by municipalities based on a spatial analysis of the region. Municipalities were chosen by characteristics such as size, population growth and structure, employment growth and unemployment rates as well as accessibility. Within municipalities, random sampling was applied (see Hudler-Seitzberger and Bittner (2005) for a detailed description of the sampling plan).

a substantial proportion of potentially mobile labor can be expected. Furthermore, low distances between the most densely populated parts of the region (i. e. the cities of Vienna, Bratislava and Brno) allow for both types of mobility to emerge.

Dependent Variable

The willingness to migrate, to commute, and to stay in the home country is defined from questions asked about preferences concerning cross-border mobility. Interviewees were asked "Would it be conceivable for you to work abroad?", to which respondents could answer "yes" or "no". Furthermore, they were asked whether they would prefer (1) "daily commuting", (2) "weekly commuting", (3) "monthly commuting'" or (4) "living and working abroad". In subsequent questions, respondents were also asked if they had already taken preparatory steps toward working abroad.[5]

We focus on the sample of respondents age 18 to 64[6] which responded to both the question on whether they would be willing to work abroad and which mode of mobility (migration or commuting) they would choose. Those who responded to be willing to work abroad and to have already taken preparatory steps toward doing so were encoded as potentially mobile. Among them, respondents who stated a preference for daily and weekly commuting were categorized as "willing to commute" and those who preferred "living and working abroad" or "monthly commuting" as "willing to migrate". All per-

[5]In the course of the interview, respondents were asked: "Have you already taken preparatory steps to realize your goal of working abroad?" If they reported to have collected information on their preferred receiving country, taken a training course, sold their belongings, learned the receiving country's language, applied for a job, a work or residence permit abroad, found an accommodation or already have a prospective job the respondents were registered as having taken preparatory steps toward working abroad.

[6]This age group was chosen because young persons usually enter the labor market at age 18 (because at this time those who participate in secondary education finish schooling), and leave it at age 65 when they retire.

sons who did not fit into these categories (those who responded that they could not conceive working in another country and/or those who have not taken preparatory steps toward working abroad) are labeled "stayers".

Setting these restrictions and excluding respondents with missing information on the dependent and explanatory variables (see the next section), our final sample consists of 9,063 observations.[7] According to these definitions, about 7.3 % of all respondents are willing to work abroad and have already taken preparatory steps (see table 2). 2.5 % of the respondents are willing to commute, while 4.8 % are willing to migrate. The highest willingness to migrate or commute across the border can be found among respondents from Slovakia: 11.2 % could conceive working abroad, as compared to 7.2 % in Hungary and 5.3 % in the Czech Republic. In addition, the willingness to migrate or commute is particularly high among the young (81.1 % of all prospective migrants and 59.2 % of all prospective cross-border commuters are 35 years or younger).

Explanatory Variables

As we focus on planned migration and commuting intentions only, we do not observe the outcome of a number of important variables. Especially, the expected lifetime wage in the receiving country (Y_f) is not observed, as are the expected lifetime migration and cross-border commuting costs M_{if} and d_{if}. Other variables such as the lifetime value of amenities in the region of residence net of housing costs (A_f and A_i) are hard to observe. Furthermore, there is no information on commuting costs within the country (d_{ij}). In order to link the willingness to migrate and commute to economic plans, assumptions have to be made on the determinants of income at home and

[7] This figure includes 4,436 observations from the first wave and 4,627 interviews conducted in the second wave.

	Stay	Migrate	Commute	Sample	n
General[a]	0.927	0.048	0.025	—	9,063
Country[a]					
Czech Republic	0.947	0.040	0.013	—	4,858
Slovakia	0.888	0.076	0.036	—	2,613
Hungary	0.928	0.030	0.043	—	1,592
Gender[a]					
Male	0.910	0.057	0.033	—	4,430
Female	0.943	0.040	0.017	—	4,633
Education[a]					
Primary	0.914	0.057	0.029	—	676
Vocational	0.958	0.021	0.020	—	3,066
Secondary	0.915	0.060	0.026	—	3,532
Tertiary	0.893	0.076	0.031	—	1,598
Age[a]					
18–25	0.825	0.134	0.040	—	1,666
26–35	0.908	0.061	0.031	—	2,154
36–45	0.953	0.020	0.026	—	1,952
46–55	0.970	0.013	0.017	—	1,896
56–64	0.980	0.014	0.006	—	1,395
Country[b]					
Czech Republic	0.548	0.440	0.283	0.536	4,858
Slovakia	0.276	0.453	0.416	0.288	2,613
Hungary	0.176	0.107	0.301	0.176	1,592
Gender[b]					
Male	0.480	0.576	0.650	0.489	4,430
Female	0.520	0.424	0.350	0.511	4,633
Education[b]					
Primary	0.080	0.096	0.093	0.081	676
Vocational	0.379	0.162	0.296	0.366	3,066
Secondary	0.369	0.460	0.385	0.373	3,532
Tertiary	0.173	0.282	0.226	0.180	1,598
Age[b]					
18–25	0.164	0.510	0.296	0.184	1,666
26–35	0.233	0.301	0.296	0.238	2,154
36–45	0.222	0.091	0.226	0.215	1,952
46–55	0.219	0.055	0.142	0.209	1,896
56–64	0.163	0.043	0.040	0.154	1,395
n	8,398	439	226	9,063	9,063

[a] Proportions computed from row number of observations
[b] Proportions computed from column number of observations

Table 2: Distribution of "stayers", "migrants", "commuters" by selected socio-demographic characteristics

abroad (Y_j, Y_f), the net benefits of residing in a region (A_j, A_f) and the various costs of mobility (M_{if}, d_{if} and d_{ij}).

Firstly, we assume that wages in a region are determined by a vector of individual characteristics X^k, such that income in region r (denoted as Y_r, with $r \in \{f, j\}$) can be written as $Y_r = \beta_r X^k$, where β_r are the region specific returns to these variables[8]. We thus use a set of individual level variables to capture differences in income opportunities. Among these X^k variables are the age of the interviewee, which can be expected to have a negative effect on both the willingness to migrate and to commute (as the potential gain in lifetime incomes $Y_f - Y_j$ is higher for younger individuals), gender as well as highest completed education, which can either increase or decrease the willingness to migrate or commute, depending on whether migrants and commuters are positively or negatively selected. Furthermore, we include a dummy variable for individuals who have not yet finished their education ("student"). To control for language skills we also include dummy variables for the knowledge of German, English, or any other foreign language.

Secondly, we assume that the costs of moving abroad can be proxied by a set of variables V_{if}. To capture individual differences in the costs of commuting or migration (the V_{if} variables), we use both proxies for the direct as well as indirect costs of mobility. To control for indirect costs, we include dummy variables for marital status ("single") and the presence of children in the household ("kids"), since previous research suggest that persons living in larger households will face higher costs of migration (such as job search costs or schooling for other household members) than single households (see Mincer 1978). Furthermore, we include variables which measure whether the respondents have family members or friends residing abroad as proxies for potential network effects (see Straubhaar 2000), which can help to reduce

[8]Such region specific returns can arise from differences in factor endowments or through differences in the transferability of skills across national borders.

mobility (and job search) costs significantly. We also control for whether the individual has already worked abroad.

As a measure of the direct costs associated with commuting or migrating across the border, we employ the road distance between the municipality of residence of the interviewee to the nearest EU-15 border crossing in kilometers[9] as a proxy for the minimum distance to a potential workplace in the EU-15. Distance has proven to be uniformly the most important factor in explaining both migration as well as commuting patterns in many countries (see Fields 1979), and a negative effect on the willingness to migrate can therefore be expected.

Thirdly, we assume that the costs of commuting within the country can be proxied by a dummy variable which indicates whether a person is currently commuting to work in the home country. This "commuter" dummy is included because our model suggests that respondents who are currently commuting should be more willing to migrate and commute and direct information on commuting costs or the distance traveled commuting is not available.

Finally, we assume that the amenities from residing in a region r depend on a set of regional characteristics Z_r, such that $A_r = \gamma Z_r$, with γ denoting the vector of amenity returns to the elements of Z_r. The difference in amenities between the home and foreign country can thus be written as $A_f - A_i = \gamma(Z_f - Z_i)$. Assuming that regions outside the country of residence are perceived as homogeneous, we can proxy the differences in amenities by including a family of regional dummy variables at the NUTS 3

[9]The distance was obtained using the route planner of the Austrian Motorists Association (ÖAMTC).

level of aggregation, Z_{if}.[10] In addition, we include a variable measuring the (subjective) social status of the respondent relative to his/her acquaintances to capture the potential effects of social deprivation (see, e. g., Stark and Taylor 1991) on the willingness to migrate and commute, which can also be thought of as an amenity of the region of residence. We construct a deprivation index by calculating the difference between the individual's subjective evaluation of her social status on an 11 point scale (with 1 representing the best and 11 the worst conceivable social status) and that of her friends and relatives. The measure is thus negative if the individual assesses her own social status as higher relative to that of her peers, and positive if the individual feels deprived of her peers' social status. In addition to these model variables we include a dummy for interviews conducted during the second wave in 2006/07. Interaction terms of the region and wave dummies are also included to account for regionally different changes in the macro-economic environment.

Rewriting equations (1) to (3), taking into account these changes, yields:

$$U_S^k = \beta_j X^k - \alpha_S d_{ij} + \gamma Z_i - \varepsilon_S^k \tag{1'}$$

$$U_C^k = \beta_f X^k - \alpha_C V_{if} + \gamma Z_i - \varepsilon_C^k \tag{2'}$$

$$U_M^k = \beta_f X^k - \alpha_M V_{if} + \gamma Z_f - \varepsilon_M^k \tag{3'}$$

[10]Note that the distance variable is still identified in this specification despite the inclusion of regional dummies since it is defined on the regionally more disaggregated community level.

Denoting $\xi_S^k = \xi_M^k - \xi_C^k$, the utility differentials between the three choices are then given by

$$U_C^k - U_S^k = (\beta_f - \beta_j)X^k - \alpha_C V_{if} + \alpha_S d_{ij} - \xi_C^k \tag{4"}$$

$$U_M^k - U_S^k = (\beta_f - \beta_j)X^k - \alpha_M V_{if} + \alpha_S d_{ij} + \gamma Z_{if} - \xi_M^k \tag{5"}$$

$$U_M^k - U_C^k = -(\alpha_M - \alpha_C)V_{if} + \gamma Z_{if} - \xi_S^k \tag{6"}$$

Considering (4") to (6"), the probabilities of being willing to commute, being willing to migrate and being neither willing to commute nor to migrate[11] in equations (7) to (9), can thus be defined as functions of X^k, V_{if}, d_{ij} and Z_{if} and be estimated as a multinomial probit model using the probability of staying as the base category:

$$P_C = h_C(X^k, V_{if}, d_{ij}, Z_{if}) \tag{7'}$$

$$P_M = h_M(X^k, V_{if}, d_{ij}, Z_{if}) \tag{8'}$$

Under the assumption that ξ_S^k, ξ_M^k and ξ_C^k follow a trivariate normal distribution with an arbitrary variance-covariance matrix Σ, equations (4') to (6') define a standard multinomial probit model (see Maddala 1983).[12] This allows us to estimate the probabilities given by (7), (8) and (9).

[11] This is denoted by $P_n = \Pr(I = n)$, with I an index function for the observed mobility preference (willingness to commute, willingness to migrate and staying, $n \in \{C, M, S\}$).

[12] In contrast to the multinomial logit model, where assumptions on the error distribution force the covariance between choices to be zero (the so called Independence of Irrelevant Alternatives hypothesis), this formulation allows an arbitrary covariance structure across choices. As in the multinomial logit, however, the parameters can only be identified relative to a base category, furthermore since utility levels are not identified the variance of one of the error terms must be set equal to unity.

4 Results

The regression results reported together with descriptive statistics on explanatory variables in table 3 suggest a number of differences between potential cross-border migrants and commuters.[13] Moving first to the variables measuring differences in income opportunities (X^k), we find that the coefficients of the education dummy variables are insignificant throughout. This suggests that both potential commuters and potential migrants are neither positively nor negatively selected among the native population. English language knowledge increases the probability of being willing to migrate and at the same time reduces the probability of being willing to commute. Knowledge of the German language, by contrast, increases the probability of being willing to commute significantly more than the willingness to migrate while knowledge of other languages increases only the probability of being willing to migrate. This can be explained by the fact that German speaking countries are the only ones that can be reached by daily commuters from the surveyed region. Both age and being female have a significant negative effect on both the probability of being willing to migrate and the probability of being willing to commute. This is consistent with the results of Madden (1981), White (1986) and Clark, Huang and Withers (2003), who all find that ceteris paribus women are less likely to commute or, when commuting, travel shorter distances.

Variables which measure the indirect costs of mobility (the V_{if} variables) affect the willingness to migrate more strongly than the willingness to commute. The presence of kids in the household is insignificant for potential commuters, but significantly negative for potential migrants and the dummy variable for single households is significantly higher for potential migrants

[13] Alternative specifications and robustness checks can be found in appendix B.

than commuters. Furthermore, the presence of networks and previous mobility experience increase the willingness to commute less strongly than the willingness to migrate. This suggests that the presence of children and a spouse in the household increases cross-border migration costs more strongly than commuting costs, while the benefits of previous mobility and networks abroad are larger for potential migrants than commuters.

As expected, distance (as a measure for direct mobility costs) is a stronger deterrent to cross-border commuting than to cross-border migration while persons who feel deprived relative to their relatives and acquaintances are more likely to be willing to commute rather than to migrate. This can be explained by the fact that people may choose to work abroad and use the higher income to increase their social status relative to their reference group at home, rather than also moving their residence. Doing so may also entail changing reference groups, which has an a priori ambiguous effect on social status.

Furthermore, contrary to our theoretical expectations, we find that current commuting reduces (rather than increases) the willingness to migrate and is insignificant in the commuting equation. Finally, the dummy variable for interviews conducted in the second wave is significantly negative only for the willingness to commute. This suggests that in the time period from 2004/2005 to 2006/2007 only the willingness to commute across borders has fallen in the regions under investigation.

While these results point to strong differences between potential commuters, migrants and stayers—rooted primarily in differences in the costs of commuting and migration—the coefficients reported in table 3 have the interpretation of changes in relative probabilities. These do not necessarily lend themselves to assessing the quantitative impact of the variables. There-

Variable	Migrant	Commuter	Mean (Std. dev.)
Age	-0.033^{***}	-0.022^{***}	39.615
	(0.004)	(0.005)	(13.090)
Female	-0.173^{***}	-0.390^{***}	0.511
	(0.075)	(0.092)	(0.500)
Vocational educ.	0.012	0.050	0.366
	(0.160)	(0.184)	(0.482)
Secondary educ.	0.089	-0.004	0.373
	(0.143)	(0.175)	(0.484)
Tertiary educ.	0.273^{*}	0.164	0.180
	(0.164)	(0.199)	(0.384)
Student	0.004	0.031	0.103
	(0.112)	(0.157)	(0.304)
English	0.461^{***}	-0.237^{***}	0.357
	(0.097)	(0.118)	(0.479)
German	0.177^{***}	0.459^{***}	0.452
	(0.080)	(0.101)	(0.498)
Other foreign lang.	0.206^{***}	-0.119	0.646
	(0.095)	(0.112)	(0.478)
Single	0.585^{***}	0.300^{***}	0.383
	(0.099)	(0.115)	(0.486)
Kids	-0.241^{***}	0.100	0.425
	(0.085)	(0.100)	(0.494)
Network	0.739^{***}	0.712^{***}	0.435
	(0.082)	(0.099)	(0.496)
Previous mobility	0.988^{***}	0.772^{***}	0.097
	(0.091)	(0.111)	(0.296)
Distance	-0.000	-0.007^{***}	50.834
	(0.002)	(0.002)	(28.797)
Commuter	-0.191^{***}	0.126	0.243
	(0.095)	(0.102)	(0.429)
Deprivation	0.043^{*}	0.117^{***}	0.370
	(0.023)	(0.027)	(1.557)
Second wave	-0.400	-0.762^{***}	0.511
	(0.248)	(0.386)	(0.500)
Constant	-2.521^{***}	-2.384^{***}	—
	(0.306)	(0.361)	—
Log-likelihood	-2146.622		
Observations	9063	9063	

Table 3: Multinomial probit regression of migration and commuting willingness. *** significant at 1 %, ** significant at 5 %, * significant at 10 % level. Standard errors in parentheses. Region dummies and region–wave interactions not reported.

fore we also computed (for continuous variables) marginal effects as well as

	$\Pr(I=M\|\bar{\Psi},\psi_k)$		$\Pr(I=C\|\bar{\Psi},\psi_k)$		$\Pr(I=S\|\bar{\Psi},\psi_k)$	
Variable	$\Delta\psi_k$	S. E.	$\Delta\psi_k$	S. E.	$\Delta\psi_k$	S. E.
Continuous var's[a]						
Age	-0.001^{***}	(0.000)	-0.001^{***}	(0.000)	0.001^{***}	(0.000)
Distance	0.000	(0.000)	-0.001^{***}	(0.000)	0.001^{**}	(0.000)
Deprivation	0.001	(0.001)	0.002^{***}	(0.001)	-0.003^{***}	(0.001)
Dummy var's[b]						
Female	-0.005^{**}	(0.002)	-0.007^{***}	(0.002)	0.012^{***}	(0.003)
Vocational educ.	0.000	(0.005)	0.001	(0.004)	-0.001	(0.006)
Secondary educ.	0.003	(0.005)	0.000	(0.003)	-0.003	(0.006)
Tertiary educ.	0.010	(0.007)	0.003	(0.004)	-0.013	(0.008)
Student	0.000	(0.004)	0.001	(0.003)	-0.001	(0.005)
English	0.017^{***}	(0.004)	-0.005^{**}	(0.002)	-0.012^{***}	(0.005)
German	0.005^{*}	(0.003)	0.009^{***}	(0.002)	-0.014^{***}	(0.003)
Other foreign lang.	0.006^{**}	(0.003)	-0.003	(0.002)	-0.004	(0.004)
Single	0.021^{***}	(0.004)	0.005^{**}	(0.003)	-0.026^{***}	(0.005)
Kids	-0.008^{***}	(0.003)	0.002	(0.002)	0.005	(0.003)
Network	0.025^{***}	(0.003)	0.014^{***}	(0.002)	-0.039^{***}	(0.004)
Previous mobility	0.054^{***}	(0.008)	0.020^{***}	(0.005)	-0.074^{***}	(0.010)
Commuter	-0.006^{**}	(0.003)	0.003	(0.002)	0.003	(0.003)
Second wave	-0.012	(0.008)	-0.015^{**}	(0.009)	0.027^{**}	(0.012)

[a] $\Delta\psi_k$ denotes marginal effect on probability $\partial \Pr(I=n|\bar{\Psi},\psi_k)/\partial\psi_k$, $n \in \{C,M,S\}$ $\psi_k \in \Psi = \{X^k, V_{if}, d_{ij}, Z_{if}\}$ and $\bar{\Psi}$ is the mean vector of Ψ

[b] $\Delta\psi_k$ denotes discrete change in probability $\Pr(I=n|\bar{\Psi},\psi_k=1) - \Pr(I=n|\bar{\Psi},\psi_k=0)$, $n \in \{C,M,S\}$

Table 4: Marginal effects and discrete change in probabilities of commuting, migration and staying by independent variables. Marginal effects and discrete probability changes computed at mean of independent variables ($\bar{\Psi}$) based on multinomial probit regression (see table 3). *** significant at 1 %, ** significant at 5 %, * significant at 10 % level. Region dummies and region–wave interactions not reported.

(for dummy variables) discrete changes in the probabilities of being willing to commute, willing to migrate, or stay which are reported in table 4.

According to these results, variables measuring the indirect costs of mobility—which have a strong impact on the willingness to migrate in previous research—have a smaller impact on the willingness to commute. An otherwise average person with previous mobility experience has a 5.4 percentage points higher probability to be willing to migrate but an only 2 percentage points higher probability of being willing to commute than an average per-

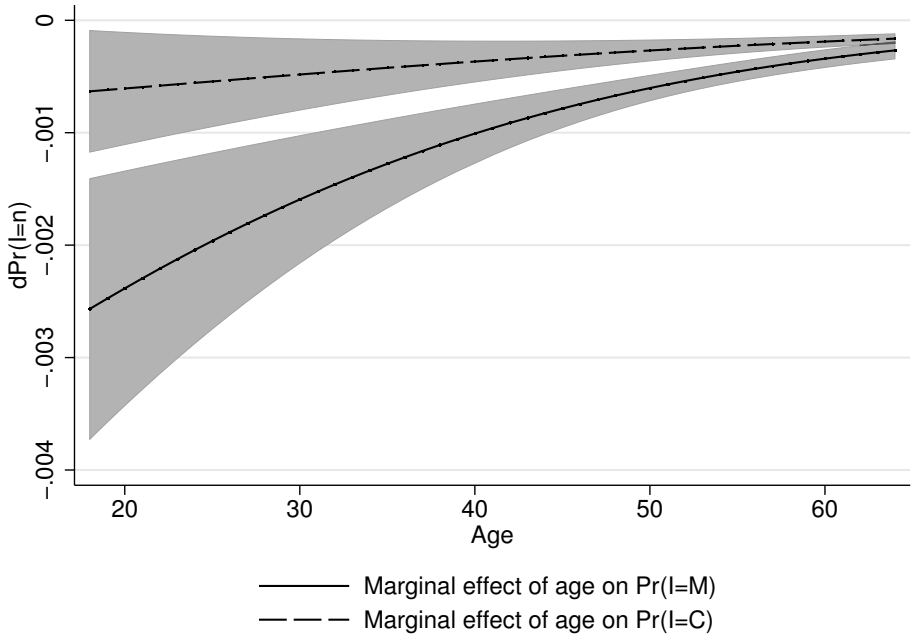

Figure 2: Marginal effects of age on the probabilities of migration and commuting vs. staying. Marginal effects based on multinomial probit regression (table 3). Shaded areas represent 95 % confidence interval of marginal effect

son without such an experience. Similarly, the presence of networks abroad increases the probability of being willing to migrate by 2.5 percentage points as compared to 1.4 percentage points for the commuting propensity. The average single is 2.1 percentage points more willing to migrate than individuals living in a partnership, while they are only 0.5 percentage points more willing to commute and the presence of kids in the household has a significant negative marginal effect on the willingness to migrate only. In contrast, variables associated with potential earnings have relatively low marginal effects for both the willingness to migrate and the willingness to commute (age, gender and language knowledge) or are insignificant altogether (such as the educational achievement variables).

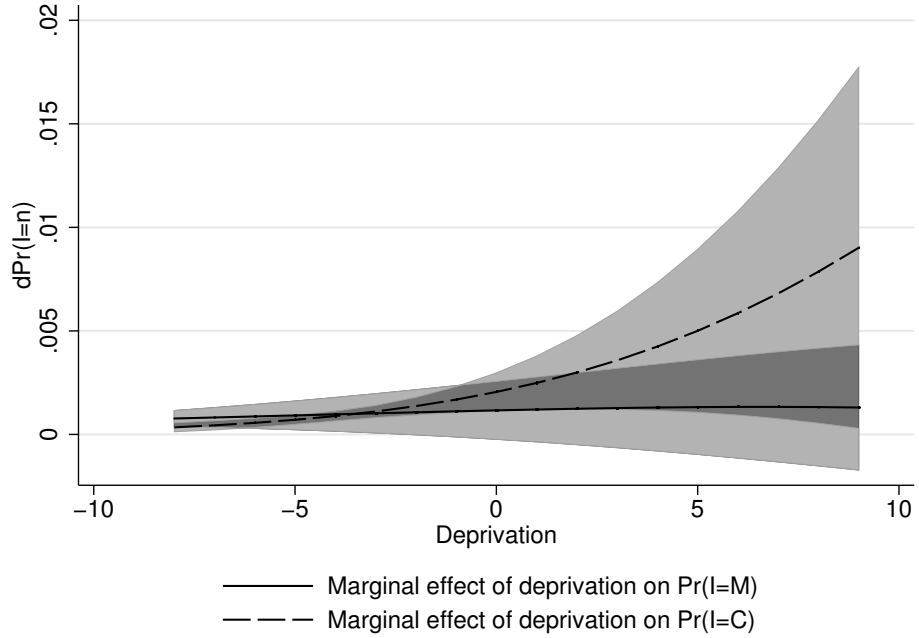

Figure 3: Marginal effects of deprivation on the probabilities of migration and commuting vs. staying. Marginal effects based on multinomial probit regression (table 3). Shaded areas represent 95 % confidence interval of marginal effect

The marginal effects in table 4, however, only measure the percentage point increase in the probability of being willing to commute, willing to migrate or to stay arising from an incremental change of a continuous variable for an average individual. Because of the nonlinear fashion of the estimator, these are not constant. Therefore, they were evaluated for all observed values of the continuous variables (see figures 2 to 4). In addition, 95 % confidence intervals were also calculated and included as shaded areas, with darker sectors marking overlapping confidence intervals of the marginal effects on $\Pr(I = M)$ and $\Pr(I = C)$.

Figure 2 shows that the marginal effects of age on the probabilities of being willing to migrate and commute are significantly negative over the

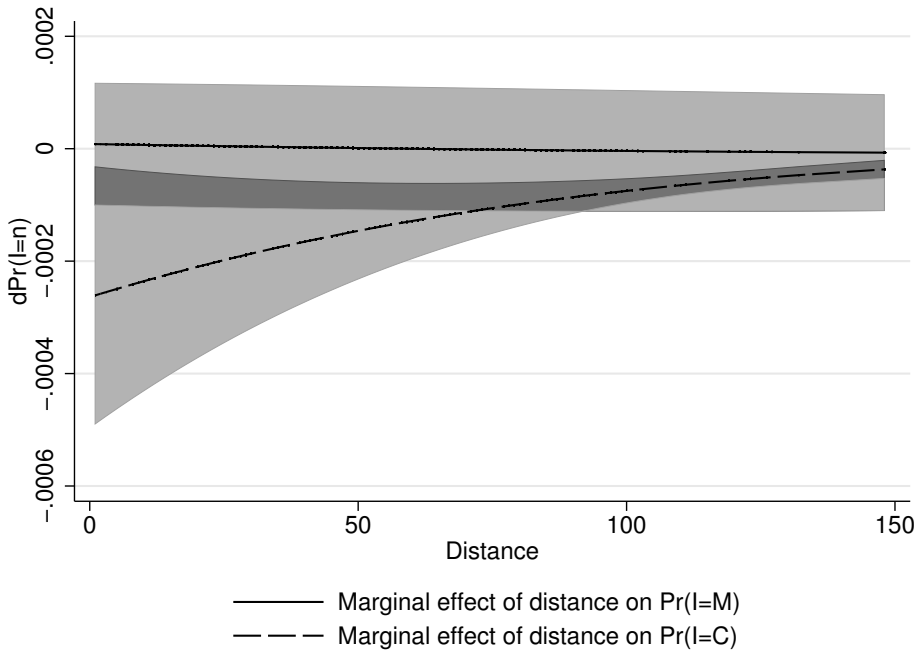

Figure 4: Marginal effects of distance on the probabilities of migration and commuting vs. staying. Marginal effects based on multinomial probit regression (table 3). Shaded areas represent 95 % confidence interval of marginal effect

whole range. The marginal effect is, however, much larger for the propensity to migrate than for the propensity to commute: the probability of being willing to migrate is highest for young individuals (about 0.055 for an average person age 18) but decreases sharply with age. The negative impact of an incremental year on the willingness to migrate is thus highest for young individuals, and declines with age. The marginal effect on the willingness to commute on the other hand is also highest for young individuals, but decreases less steeply with age.

The marginal effect of relative deprivation on the probability of being willing to commute (see figure 3) increases steeply with subjective deprivation: the effect is largest for highly deprived individuals. On the other hand,

the marginal effect on the propensity to migrate is only significant at low negative deprivation values, and becomes insignificant for deprived individuals. Finally, the marginal effect of distance on the propensity to commute is highest for individuals living close to the EU-15, but the impact of an incremental kilometer of distance to the EU-15 declines the further away the individual lives from the border (see figure 4). The marginal effect of distance on the willingness to migrate on the other hand is insignificant and not distinguishable from zero.

5 Conclusions

In this paper we analyze the relationship between the willingness to commute and to migrate in a cross-border context. Our focus is on whether individual characteristics which impact on the willingness to migrate across national borders (such as age, education, language skills, previous migration experience and networks abroad) impact in a similar manner on the willingness to commute across borders. Using individual level data collected by the Austrian cross-border Labour Market Monitoring (LAMO) project we find that potential cross-border commuters differ from cross-border migrants in a number of respects.

In particular, variables measuring the indirect costs of mobility have a smaller impact on the probability of being willing to commute than on the willingness to migrate. This holds true for previous mobility experience, the presence of networks abroad, being single and the presence of kids in the household, which has a significant negative marginal effect on the willingness to migrate only.

Furthermore, gender differences in the willingness to commute are larger than in the willingness to migrate (although women are both significantly

less willing to commute and to migrate). The willingness to migrate is positively influenced by English and other foreign language knowledge while the willingness to commute is more strongly associated with German language skills. In contrast, other variables associated with potential earnings have relatively low marginal effects for both the willingness to migrate and the willingness to commute and our educational achievement variables are insignificant altogether. Thus, according to our results, potential cross-border commuters and migrants are neither positively nor negatively selected.

Nonlinearities exist in the marginal effects of continuous variables: the marginal effect of age on the willingness to migrate and to commute is lower for older individuals. The effect is, however, much more pronounced for the migration propensity. The willingness to commute decreases much more rapidly with distance to the nearest potential workplace abroad while it has no influence on the willingness to migrate. Furthermore, we find social deprivation to have a positive impact on commuting propensities but not so much on the probability of being willing to migrate.

Aside from these results, which are interesting from a migration theory point of view, our theoretical and empirical results also hold some important messages for the particular case of East-West mobility analyzed. These may be of relevance for future policy initiatives. In particular, from our theoretical model it can be shown that cross-border migration forecasts based on models which do not take into account the possibility of commuting may overestimate the amount of migration but underestimate the amount of cross border mobility in regions where commuting is a viable alternative to migration. This thus questions the reliability of migration potential estimates in border regions. Finally, our results also suggest that, even after controlling for other characteristics, only the willingness to commute has fallen signifi-

cantly since enlargement, while there is still a large potential of cross-border migrants in the region under investigation. In particular, from our theoretical model it can be shown that cross-border migration forecasts based on models which do not take into account the possibility of commuting may overestimate the amount of migration but underestimate the amount of cross border mobility in regions where commuting is a viable alternative to migration. This thus questions the reliability of migration potential estimates in border regions. Finally, our results also suggest that, even after controlling for other characteristics, only the willingness to commute has fallen significantly since enlargement, while there is still a large potential of cross-border migrants in the region under investigation.

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A Derivatives of the Model

Starting from equations (7) to (9)

$$
\begin{aligned}
P_C &= \Pr\left(\Omega_{CS} > -\xi_C^k, \Omega_{MC} < -\left(\xi_M^k - \xi_C^k\right)\right) \\
P_M &= \Pr\left(\Omega_{MS} > -\xi_M^k, \Omega_{MC} > -\left(\xi_M^k - \xi_C^k\right)\right) \\
P_S &= \Pr\left(\Omega_{MS} < -\xi_M^k, \Omega_{CS} < -\xi_C^k\right)
\end{aligned}
$$

noting that

$$
\begin{aligned}
\frac{\partial P_C}{\partial \Omega_{CS}} &= \frac{\partial \Pr\left(\Omega_{CS} > -\xi_C^k, \Omega_{MC} < -\left(\xi_M^k - \xi_C^k\right)\right)}{\partial \Omega_{CS}} > 0 \\
\frac{\partial P_C}{\partial \Omega_{MC}} &= \frac{\partial \Pr\left(\Omega_{CS} > -\xi_C^k, \Omega_{MC} < -(\xi_M^k - \xi_C^k)\right)}{\partial \Omega_{MC}} < 0 \\
\frac{\partial P_M}{\partial \Omega_{MS}} &= \frac{\partial \Pr\left(\Omega_{MS} > -\xi_M^k, \Omega_{MC} > -\left(\xi_M^k - \xi_C^k\right)\right)}{\partial \Omega_{MS}} > 0 \\
\frac{\partial P_M}{\partial \Omega_{MC}} &= \frac{\partial \Pr\left(\Omega_{MS} > -\xi_M^k, \Omega_{MC} > -(\xi_M^k - \xi_C^k)\right)}{\partial \Omega_{MC}} > 0 \\
\frac{\partial P_S}{\partial \Omega_{CS}} &= \frac{\partial \Pr\left(\Omega_{MS} < -\xi_M^k, \Omega_{CS} < -\xi_C^k\right)}{\partial \Omega_{CS}} < 0 \\
\frac{\partial P_S}{\partial \Omega_{MS}} &= \frac{\partial \Pr\left(\Omega_{MS} < -\xi_M^k, \Omega_{CS} < -\xi_C^k\right)}{\partial \Omega_{MS}} < 0
\end{aligned}
$$

the derivatives of (7) to (9) with respect to any variable ψ_k are given by:

$$
\begin{aligned}
\frac{\partial P_C}{\partial \psi_k} &= \frac{\partial P_C}{\partial \Omega_{CS}} \frac{\partial \Omega_{CS}}{\partial \psi_k} + \frac{\partial P_C}{\partial \Omega_{MC}} \frac{\partial \Omega_{MC}}{\partial \psi_k} \\
\frac{\partial P_M}{\partial \psi_k} &= \frac{\partial P_M}{\partial \Omega_{MS}} \frac{\partial \Omega_{MS}}{\partial \psi_k} + \frac{\partial P_M}{\partial \Omega_{MC}} \frac{\partial \Omega_{MC}}{\partial \psi_k} \\
\frac{\partial P_S}{\partial \psi_k} &= \frac{\partial P_S}{\partial \Omega_{CS}} \frac{\partial \Omega_{CS}}{\partial \psi_k} + \frac{\partial P_S}{\partial \Omega_{MS}} \frac{\partial \Omega_{MS}}{\partial \psi_k}
\end{aligned}
$$

Furthermore, noting from the definition of Ω_{MS}, Ω_{CS} and Ω_{MC} that

$$\frac{\partial \Omega_{CS}}{\partial (Y_f - Y_j)} = \frac{\partial \Omega_{CS}}{\partial d_{ij}} = 1$$
$$\frac{\partial \Omega_{CS}}{\partial d_{if}} = -1$$
$$\frac{\partial \Omega_{MS}}{\partial (Y_f - Y_j)} = \frac{\partial \Omega_{MS}}{\partial d_{ij}} = \frac{\partial \Omega_{MS}}{\partial (A_f - A_j)} = 1$$
$$\frac{\partial \Omega_{MS}}{\partial M_{if}} = -1$$
$$\frac{\partial \Omega_{MC}}{\partial (A_f - A_j)} = 1$$
$$\frac{\partial \Omega_{MC}}{\partial M_{if}} = -1$$

and that all other partial derivatives are zero gives the following derivatives for the model variables:

$$\frac{\partial P_C}{\partial (Y_f - Y_i)} > 0, \ \frac{\partial P_C}{\partial d_{ij}} > 0$$
$$\frac{\partial P_C}{\partial (A_f - A_i)} < 0, \ -\frac{\partial P_C}{\partial M_{if}} < 0, \ \frac{\partial P_C}{\partial d_{jf}} < 0$$
$$\frac{\partial P_M}{\partial (Y_f - Y_i)} > 0, \ \frac{\partial P_M}{\partial d_{ij}} > 0$$
$$\frac{\partial P_M}{\partial (A_f - A_i)} < 0, \ -\frac{\partial P_M}{\partial M_{if}} < 0, \ \frac{\partial P_M}{\partial d_{jf}} > 0$$
$$\frac{\partial P_S}{\partial (Y_f - Y_i)} < 0, \ \frac{\partial P_S}{\partial d_{ij}} < 0$$
$$\frac{\partial P_S}{\partial (A_f - A_i)} < 0, \ -\frac{\partial P_S}{\partial M_{if}} < 0, \ -\frac{\partial P_S}{\partial d_{jf}} < 0$$

B Robustness

This appendix discusses some alternative specifications to the multinomial probit regression shown in table 3. First of all, the "student" dummy and the educational achievement dummy variables are insignificant for both the willingness to migrate and the willingness to commute. Alternative 1 in table B1 shows a regression excluding these variables alongside the specification used in the main text. As can be seen, there are only minor differences in coefficients between the two specifications

for both the migration and the commuting equation. A likelihood-ratio test for the null hypothesis of no difference between the specifications shows ($\chi^2(8) = 6.82$, p-value: 0.557) that this hypothesis cannot be rejected. Thus we can conclude that there are no selection effects at work in the sample under investigation.

To dispel concerns that our results are due to misspecifications of the regression model, the definition of the migration and commuting willingness, the definition of the receiving region or the sample we estimated four additional alternative specifications to check for the robustness of the results. First we ran an additional regression (Alternative 2 in table B2) in which we included an interaction term of the "female" and "kids" dummies to assess the potential impact of co-linearity of these variables on the regression results. Then (Alternative 3) we changed the definition of the willingness to migrate or commute to a less strict criterion and recoded all those as willing to migrate or commute who answered "yes" to the question of whether they could conceive working abroad, without requiring them to have taken preparatory steps. Next (Alternative 4 in table B3), due to a concern that without further restricting the receiving regions the results from the estimations above may be biased due to people contemplating to go to relative distant locations which cannot be reached through commuting, we focus on people who are willing to commute or migrate to Austria only, while all persons which either did no know where they wanted to move to or wanted to move to other countries than Austria were coded as not being willing to migrate or commute. Finally (Alternative 5), we estimated a specification in which we focus on the age group of the 25 to 64 year olds, to assess the impact of our age limit on estimation results.

These specifications are highly consistent with the results reported in the main part of the paper. The only significant differences are that when an interaction term between "female" and "kids" is included in the regression the dummy variable for females loses significance in both equations for the willingness to migrate as well as for the willingness to commute and the dummy variable for the presence of kids in the household is no longer significant for the willingness to migrate. The interaction effect, however, also remains insignificant for the willingness to migrate and the fit of the model (as measured by the log likelihood) does not improve substantially so

	Preferred		Alternative 1[a]	
Variable	Migrant	Commuter	Migrant	Commuter
Age	-0.033^{***}	-0.022^{***}	-0.031^{***}	-0.021^{***}
	(0.004)	(0.005)	(0.004)	(0.005)
Female	-0.173^{***}	-0.390^{***}	-0.162^{***}	-0.391^{***}
	(0.075)	(0.092)	(0.075)	(0.092)
Vocational educ.	0.012	0.050		
	(0.160)	(0.184)		
Secondary educ.	0.089	-0.004		
	(0.143)	(0.175)		
Tertiary educ.	0.273^{*}	0.164		
	(0.164)	(0.199)		
Student	0.004	0.031		
	(0.112)	(0.157)		
English	0.461^{***}	-0.237^{***}	0.542^{***}	-0.204^{*}
	(0.097)	(0.118)	(0.088)	(0.107)
German	0.177^{***}	0.459^{***}	0.199^{***}	0.469^{***}
	(0.080)	(0.101)	(0.079)	(0.098)
Other foreign lang.	0.206^{***}	-0.119	0.202^{***}	-0.117
	(0.095)	(0.112)	(0.095)	(0.112)
Single	0.585^{***}	0.300^{***}	0.564^{***}	0.295^{***}
	(0.099)	(0.115)	(0.097)	(0.113)
Kids	-0.241^{***}	0.100	-0.258^{***}	0.099
	(0.085)	(0.100)	(0.085)	(0.100)
Network	0.739^{***}	0.712^{***}	0.744^{***}	0.714^{***}
	(0.082)	(0.099)	(0.082)	(0.099)
Previous mobility	0.988^{***}	0.772^{***}	1.006^{***}	0.781^{***}
	(0.091)	(0.111)	(0.090)	(0.110)
Distance	-0.000	-0.007^{***}	-0.000	-0.007^{***}
	(0.002)	(0.002)	(0.002)	(0.002)
Commuter	-0.191^{***}	0.126	-0.186^{***}	0.129
	(0.095)	(0.102)	(0.093)	(0.100)
Deprivation	0.043^{*}	0.117^{***}	0.040^{*}	0.117^{***}
	(0.023)	(0.027)	(0.023)	(0.027)
Second wave	-0.400	-0.762^{***}	-0.401	-0.763^{***}
	(0.248)	(0.386)	(0.248)	(0.386)
Constant	-2.521^{***}	-2.384^{***}	-2.558^{***}	-2.391^{***}
	(0.306)	(0.361)	(0.276)	(0.318)
Log-likelihood	-2146.622		-2150.030	
Observations	9063	9063	9063	9063

[a] Estimated excluding education and "student" dummies

Table B1: Robustness: preferred specification and alternative specification 1. *** significant at 1 %, ** significant at 5 %, * significant at 10 % level. Standard errors in parentheses. Region dummies and region–wave interactions not reported.

	Alternative 2[a]		Alternative 3[b]	
Variable	Migrant	Commuter	Migrant	Commuter
Age	−0.033***	−0.023***	−0.047***	−0.035***
	(0.004)	(0.005)	(0.003)	(0.003)
Female	−0.093	−0.166	−0.292***	−0.429***
	(0.093)	(0.124)	(0.055)	(0.059)
Vocational educ.	0.016	0.048	−0.036	0.031
	(0.160)	(0.184)	(0.110)	(0.118)
Secondary educ.	0.089	−0.008	−0.188*	−0.112
	(0.143)	(0.175)	(0.104)	(0.115)
Tertiary educ.	0.275*	0.163	0.020	−0.082
	(0.164)	(0.199)	(0.120)	(0.132)
English	0.462***	−0.243**	0.557***	0.016
	(0.097)	(0.118)	(0.070)	(0.076)
German	0.178**	0.465***	0.465***	0.606***
	(0.080)	(0.101)	(0.059)	(0.064)
Other foreign lang.	0.204**	−0.117	0.028	−0.020
	(0.095)	(0.113)	(0.067)	(0.072)
Student	−0.003	0.007	0.311***	0.081
	(0.112)	(0.157)	(0.090)	(0.110)
Single	0.589***	0.311***	0.479***	0.154**
	(0.099)	(0.116)	(0.071)	(0.075)
Kids	−0.141	0.297**	−0.330***	−0.026
	(0.112)	(0.124)	(0.062)	(0.066)
Female×Kids	−0.211	−0.486***		
	(0.157)	(0.184)		
Network	0.741***	0.719***	0.590***	0.599***
	(0.082)	(0.099)	(0.057)	(0.061)
Previous mobility	0.984***	0.767***	0.771***	0.422***
	(0.091)	(0.111)	(0.078)	(0.087)
Distance	−0.000	−0.008***	0.002	−0.007***
	(0.002)	(0.002)	(0.001)	(0.001)
Commuter	−0.194**	0.117	−0.083	0.194***
	(0.095)	(0.102)	(0.066)	(0.066)
Deprivation	0.044*	0.118***	0.073***	0.078***
	(0.023)	(0.027)	(0.017)	(0.018)
Second wave	−0.400	−0.756**	−0.390**	−1.052***
	(0.248)	(0.385)	(0.164)	(0.215)
Constant	−2.551***	−2.440***	−0.837***	−0.600***
	(0.307)	(0.362)	(0.217)	(0.230)
Log-likelihood	-2142.682		-4587.797	
Observations	9063	9063	9063	9063

[a] Including interaction term between "female" and "kids"
[b] Estimated using "general" willingness to migrate or commute as dependent variable

Table B2: Robustness: alternative specifications 2 and 3. *** significant at 1 %, ** significant at 5 %, * significant at 10 % level. Standard errors in parentheses. Region dummies and region–wave interactions not reported.

	Alternative 4[a]		Alternative 5[b]	
Variable	Migrant	Commuter	Migrant	Commuter
Age	−0.012*	−0.012**	−0.028***	−0.021***
	(0.007)	(0.005)	(0.005)	(0.005)
Female	−0.118	−0.329***	−0.112	−0.388***
	(0.133)	(0.107)	(0.094)	(0.107)
Vocational educ.	−0.027	0.243	0.286	0.005
	(0.251)	(0.225)	(0.356)	(0.267)
Secondary educ.	−0.290	0.116	0.315	−0.011
	(0.236)	(0.221)	(0.358)	(0.272)
Tertiary educ.	−0.242	0.162	0.508	0.100
	(0.275)	(0.247)	(0.363)	(0.285)
Student	−0.028	−0.330	−0.141	−0.205
	(0.208)	(0.204)	(0.221)	(0.345)
English	−0.191	−0.401***	0.627***	−0.163
	(0.166)	(0.139)	(0.118)	(0.137)
German	1.041***	0.652***	0.250**	0.608***
	(0.179)	(0.120)	(0.100)	(0.117)
Other foreign lang.	−0.073	−0.246*	0.082	−0.282**
	(0.161)	(0.129)	(0.118)	(0.129)
Single	0.543***	0.283**	0.569***	0.276**
	(0.173)	(0.129)	(0.108)	(0.124)
Kids	−0.152	0.207*	−0.251**	0.151
	(0.150)	(0.116)	(0.107)	(0.118)
Network	0.441***	0.635***	0.681***	0.722***
	(0.144)	(0.114)	(0.103)	(0.115)
Previous mobility	0.459***	0.522***	1.056***	0.787***
	(0.162)	(0.128)	(0.106)	(0.123)
Distance	−0.003	−0.007***	0.000	−0.006**
	(0.003)	(0.003)	(0.002)	(0.003)
Commuter	−0.249	0.165	−0.044	0.150
	(0.174)	(0.114)	(0.109)	(0.113)
Deprivation	0.033	0.113***	0.062**	0.133***
	(0.042)	(0.031)	(0.028)	(0.030)
Second wave	0.306	−0.728	−0.395	−0.925*
	(0.384)	(0.500)	(0.333)	(0.510)
Constant	−3.800***	−3.218***	−3.198***	−2.566***
	(0.526)	(0.428)	(0.490)	(0.458)
Log-likelihood	-1009.015		-1453.324	
Observations	9063	9063	7670	7670

[a] Estimated using willingness to migrate or commute to Austria as dependent variable

[b] Estimated for sample aged 25 to 64

Table B3: Robustness: alternative specifications 4 and 5. *** significant at 1 %, ** significant at 5 %, * significant at 10 % level. Standard errors in parentheses. Region dummies and region–wave interactions not reported.

that we give preference to our original specification. Furthermore, excluding young individuals between 18 and 24 aside from leading to insignificance for some of the variables (the dummy for females, other foreign language knowledge and current commuting in the migration equation) adds few additional insights to the results reported in the baseline specification.

Focusing on the "general" willingness to migrate or commute (i.e including also persons who answered that they were willing to migrate or commute without having taken any preparatory steps) also has only minor impacts on the results. The only important changes are that those who speak German are now also significantly more likely to be willing to migrate in this specification (but the impact remains smaller than for commuters) and that the dummy for the second wave also indicates a significant reduction of the "general" willingness to migrate over time. Focusing only on persons willing to migrate or commute to Austria—as expected—primarily changes the impact of foreign language skills on the willingness to migrate and commute, with persons having German language knowledge now also being significantly more willing to migrate and all other foreign languages losing significance in the migration equation. Other variables however, remain largely unaffected.

These results show that the main effects discussed in this paper remain largely unchanged even if there are changes in the regression specification, sample or target region specifications or a broader definition of the dependent variable. Thus, we can conclude that the conclusions drawn from the empirical application are robust to alternative specifications.

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