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Mobility of German university graduates: Is (regional) beauty in the eye of the beholder?

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Abstract

We study the regional mobility of German university graduates, relating location choices to employment opportunities, regional characteristics and graduates' own geographic roots. About half of the students remain in the university region or return to their home region. In addition, graduates are significantly more likely to move to a region resembling their home region in settlement structure and dialect than to a dissimilar region. This finding, which is robust to controlling for employment opportunities and geographic distance, indicates that graduates have a strong desire to find employment in regions similar to those where they originally grew up.

1. Introduction

In the 2008 French blockbuster movie *Bienvenue chez les Ch'tis*, a postal clerk from southern Provence is forced to move to the northernmost part of the country, which in his view is not only unbearably cold but also inhabited by an uncultivated tribe whose members speak an incomprehensible idiom. The plot of the movie illustrates a phenomenon found in many countries: natural and (perceived or real) cultural differences restrict inter-regional mobility, allowing economic disparities and labor market imbalances may persist over time. But dissimilar regional culture is not the only type of difference between regions that affects individual location choices. For instance, a straightforward plot for a sequel to the movie might have a *Ch'ti* move to Paris. This would feature differences between metropolitan and rural regions, which may well lead to clashes of culture similar to those induced by the north-south divide.¹ In the present paper, we make a scholarly attempt to assess the relevance of both types of regional differences. We analyze to what extent location choices by highly skilled Germans reflect the similarity of potential destinations to an individual's home region both in terms of cultural boundaries and in terms of its degree of urbanization. The underlying conjecture is that how individuals evaluate regional features may strongly depend on the type of region where they were socialized. While hardcore urbanites may find that life is unbearable without urban amenities, people who grew up in rural regions may value the space and tranquility found there and not miss fancy nightclubs or edgy galleries. In this sense, then, regional attractiveness may be in the eye of the beholder.

Economic consequences of restricted inter-regional mobility are pronounced. Similar to other countries, Germany's economy is characterized by substantial and persistent regional disparities. In the industrial south, unemployment rates are much lower, and average wages much higher, than in the more agrarian north. In addition, an even more drastic east-west divide is present more than 20 years after Germany's reunification. To give an example: in August 2012 the northeastern Uckermark region had an official unemployment rate of 15.3 %, whereas the southern (but also rural) Hohenlohekreis had an unemployment rate of 3.1 % (source: Bundesagentur für Arbeit). Regional differences in real wages are likewise substantial. Average hourly real wages in East Germany are about 20 % lower than in the West. At the level of districts (Landkreise), hourly real wage averages (including social security payments) in 2009 varied even more drastically, from a low of € 17.30 to a high of € 40.60 (Ragnitz, 2012).

¹ Older readers may also think of *Crocodile Dundee* (1986) for another illustration from the world of movies.

As the German economy is challenged by the need to replace an ageing workforce with considerably smaller younger population cohorts, regional stocks of human capital are increasingly seen as key to future regional development. In this situation, both analysts and policy makers are keenly interested in individual mobility patterns, particularly those of highly skilled workers. From the perspective of regional policy makers, less than perfect mobility is a mixed blessing. On the one hand, it may lead to inefficiencies in the allocation of labor across regions, as individuals do not exploit all opportunities for efficiency-enhancing moves. Attracting human capital from other regions is considerably more complicated when individuals put more weight on non-monetary considerations. On the other hand, restrictions to individual mobility also limit the outflow of indigenous population members, increasing the payoff (and thus the incentives) to subsidizing regional human capital formation (Justman and Thisse, 1997). Put more simply: depending on how mobile workers are, policy makers may want to focus more on attracting workers from other regions or on educating indigenous students (e.g., by subsidizing regional universities or handing out scholarships to students attending university in their home region).

The objective of the present paper is to contribute to a better understanding of location decisions made by highly skilled individuals. To this purpose, we study empirical patterns of regional mobility (at the level of German planning regions or Raumordnungsregionen (ROR)) for recent graduates of German universities. We focus on this group of individuals for four reasons. First, upon graduation they are required to make a decision as to whether and, most importantly for our purposes, where to enter into an employment relation. Since all graduates have to make this decision, self-selection issues are less concerning for this group than for alternative samples such as individuals switching jobs (Dahl and Sorenson, 2010a). Second, based on prior findings (e.g., Bound et al., 2004; Groen, 2004; Arntz, 2010; Abel and Deitz, 2012), we would expect these young and highly educated people to be among the most mobile segments of the labor force. Third, labor market entry of university graduates is considered a relevant channel of knowledge transfer from public research to the private sector (Cohen et al., 2002). Mobility of university graduates should therefore be of substantial economic relevance. Fourth, unusually rich information about graduates is available from alumni tracer studies. For the present paper, we utilize information for about 27,000 graduates leaving 44 German universities in 2007-2009. In addition to controls for distance, moving back to the home region, the available data also include information about potential jobs in a region, settlement structure of regions and broad dialect areas which earlier studies have found to be a major predictor of post-graduation moves.

We find that graduates are likely to either stay in the university region home or to return to their home region. Roughly half of the students enter the labor market in one of these two regions. Interestingly, while controlling for distance of destination regions and including a proxy for the number of potential jobs in a region, we find that graduates are significantly more likely to move to regions resembling their home region in terms of settlement structure and dialect zone. We interpret this as evidence that graduates have a strong desire to work in regions similar to those where they originally grew up. In contrast, a similarity to the university region is apparently sought less by graduates, suggesting that different factors are important in choosing temporary (university region) vs. more long-term (employment region) locations.

The remainder of the paper is organized as follows: In the next section, we present some earlier findings on individual mobility and motivate our empirical analysis. Section 3 develops the conceptual framework underlying the study. Section 4 introduces the data, and Section 5 presents the empirical results. The discussion of findings in Section 6 concludes the paper.

2. Prior empirical findings on individual mobility

2.1 What drives individual mobility?

Economic models of migration dating back to Sjaastad (1962) argue that individuals will leave their home if benefits exceed costs of migration. Higher expected future earnings (expected wages times the probability of being employed) at another location are the major benefit driving the decision to move as well as the choice among potential target locations. As future earnings accrue over an extended period of time, while costs of migration are often incurred at the time of moving, location choices essentially constitute investment decisions. Important components of migration costs include monetary moving costs, opportunity costs of search and travel time, but also utility losses from living farther apart from family and friends and/or in an environment that is culturally dissimilar or perceived as less attractive.

While originally developed for international migration, the basic idea of migration models can also be applied to labor mobility within countries. Most components of domestic migration costs are smaller than those of international migration, which suggests that labor mobility within countries should react to smaller wage differentials than required to induce international migration. Yet as noted above, there are nonetheless substantial inter-regional

variations in employment and prospects wages, suggesting the presence of substantial obstacles to domestic labor mobility.

Prior empirical work has identified a variety of factors limiting individual mobility that might otherwise be induced by dissimilar labor market prospects across regions. A robust finding is that intra-country mobility decreases with increasing geographic distance between origin and destination (e.g., Davies et al., 2001).² As direct moving costs vary relatively little with distance, this is likely to reflect “social attachment to place” (Dahl and Sorenson, 2010a); i.e. the desire to stay close to family and friends. This will then induce a “home bias” toward regions where an individual has lived and/or worked in the past, and where many of that individual’s relatives and friends still live.

Falck et al. (2012) show that the desire to stay close to family and friends is only one of several factors why distant destinations are less likely to be chosen, and that cultural differences further discourage individual mobility across regions. They use differences in historical dialects to proxy for cultural boundaries within Germany. Controlling for geographic distance as well as travel times, their gravity model of migration flows across districts (Landkreise) finds a significant effect of historic linguistic boundaries on present-day mobility patterns.

Both social ties and cultural similarity are subjective and vary for individuals from different home regions. In contrast, Florida (2003) emphasizes the importance of objective regional characteristics in conditioning individual location choices. Florida distinguishes different groups of individuals, suggesting particular importance of the “creative class” (i.e., individuals whose jobs primarily consist in producing new ideas or solving complex problems). He argues that to attract creative individuals, regions must offer a diverse and tolerant atmosphere as well as rich urban amenities such as museums, galleries, bars, boutiques and the like.

Florida (2003) does not entertain the possibility that depending on where a person has lived before, different regional traits may be evaluated differently by different types of people. It is conceivable that not all (creative or highly skilled) individuals are attracted by the same objective features of regions, but that they evaluate and weight different regional characteristics in entirely different ways. Most importantly, we expect the individual

² Note, however, that individuals in their working ages may be more sensitive to economic factors than, e.g., retirees (Chen and Rosenthal, 2008).

assessment of regional characteristics to be conditioned by an individual's past experience. We specifically conjecture that individuals prefer locations that are of a similar type as those where they were brought up and studied. (Experimental findings of endowment effects and status quo bias could be invoked to justify this conjecture; cf. Kahneman et al., 1990, 1991). Based on this conjecture, the subsequent empirical analysis not only studies whether university graduates have a tendency to remain in their university region or go back home to their high school region. We also investigate whether they preferably move to regions similar (but not identical) to their university and high school regions.

2.2 Prior findings on the mobility of employees

Davies et al (2001) analyze individual domestic (non-) migration at the level of U.S. states based on data from the U.S. Internal Revenue Service for the years 1986 to 1996, using a conditional logit approach and controlling for non-migration. In their model with state fixed effects, indicators of states' economic performance are included as destination-to-origin ratios. Demographic variables are not taken into considerations. Davies et al. (2001) find a negative effect of geographic distance, which is attenuated at larger distances. Relative per-capita income of the destination state increases, and relative unemployment decreases, the likelihood of mobility between two U.S. states.

Dahl and Sorenson (2010a, 2010b) study mobility patterns of Danish employees. To account for the fact that (not) changing jobs is a decision conditioned by individual characteristics, which may introduce a bias to generally studying the decisions of people changing jobs, their primary analyses are based on a sample of employees that had to find new jobs after their employer closed down. Based on linked employer-employee data, these authors do two things allowing them to assess individual choices in unusual detail. First, the Danish data include information about where an individual's parents, siblings, and former classmate lives, as well as for an identification of marital status and former moves. Accordingly, Dahl and Sorenson cannot only identify a home bias in employment choice, but also provide direct evidence of social attachment to family and friends. Second, based on regressing regional wages on the characteristics of individuals working in the respective regions, Dahl and Sorenson develop a counterfactual measure of how much a given individual could expect to earn in a given region. Controlling for the distance to present and prior places of residence, Dahl and Sorenson conclude that social factors such as a region's distance from

where an individual's parents live help account for domestic migration choices. These findings are more pronounced for blue-collar workers (2010a) than for a sample of scientists and engineers (2010b).

Building on and extending prior work by Hunt and Mueller (2004) for North America, Arntz (2010) uses a 2 % sample of German employees from social insurance statistics to trace mobility decisions of male employees (25-45 years of age) switching jobs or finding new jobs after unemployment spells between 1995 and 2001, as well as characteristics of their destination regions (at the level of 27 regions aggregated from Raumordnungsregionen). Her paper provides a particularly interesting reference to our findings not only because it analyzes German data but also because mobility patterns and determinants are studied separately for low- and high-skilled employees. She finds that destination choices of high-skilled workers are affected by wage levels but not unemployment rates. More distant regions are less often migrated to, and destination choices involving mobility from Western to Eastern Germany are significantly less frequent. Arntz (2010) also provides evidence that high-skilled employees may be sensitive to urbanization, amenities (child care) and climate in their mobility decision.

2.3 Prior findings on mobility of university graduates

Based on individual-level data and accounting for potential influences of unobserved location preferences on college choices, Groen (2004) finds a statistical significant but not very strong link between studying in a U.S. state and being employed in the same state. A related paper by Bound et al. (2004) shows that the "production" of graduates in U.S. states is only modestly related to the regional stock of human capital, which is attributed to interstate mobility. An even weaker relationship is obtained by Abel and Deitz (2011) for the level of U.S. metropolitan areas.

A recent study by Krabel and Floether (2012) based on the same data source as the present paper (but only using data of 2007 graduates) focuses on graduates' decision to stay in the university region (at the ROR level) or to leave that region. The study finds that graduates are relatively more likely to leave peripheral regions than metropolitan areas or urban agglomerations. However, the analysis identifies "push factors" increasing the likelihood to move after graduation, it does not study what regions mobile graduates are attracted to.

3. Conceptual framework and empirical approach

Our empirical approach is based on a random utility model (Mac Fadden, 1973; cf. also Davies, 2001) assuming that individuals make utility-maximizing choices among potential destination regions. Following the discussion in the previous section, we expect individual utility from migrating to a specific destination to include both monetary and non-monetary aspects. The utility that individual i who graduated in subject j derives from locating in region k is given by

$$U_{ijk} = \beta'x_{ijk} + \varepsilon_{ijk}$$

where x_{ijk} is a vector of choice-specific characteristics (which may differ for different groups of individuals), β is a constant vector of coefficients and ε_{ijk} denotes a Weibull-distributed iid random disturbance process. Choosing region k from the set of available options implies that $U_{ijk} > U_{ijn}$ for all $n \neq k$. The probability of individual i choosing region k is then given by

$$P(y_i = k) = P(U_{ijk} > U_{ijn}) \forall n \neq k.$$

Under the assumed Weibull distribution of disturbances, this probability is given by the conditional logit model

$$P(y_i = k) = \frac{\exp(\beta'x_{ijk})}{\sum_n \exp(\beta'x_{ijn})}.$$

Conceptually, the conditional logit model treats non-migration (destination = present location) as one of the possible destination choices an individual faces. However, it is the only choice an individual can make without incurring moving costs, which provides an inherent advantage to the present location (Davies, 2001). In our empirical analysis, this will be taken into consideration by including a dummy variable denoting the region where an individual graduated. For analogous reasons, we also include a binary variable indicating whether or not graduates return to their home regions (regions where they graduated from high school) when entering the labor market.

An alternative to the conditional logit framework is the nested logit model (McFadden, 1981), which has the advantage of accounting for both individual- and region-specific determinants of location choice. The nested logit model conceptualizes migration as a sequential process. In the first stage, individual characteristics condition the decision of migrating away from the present location. In the second stage, regional characteristics

condition the choice among potential destinations. Assuming this sequential choice seems less adequate in the context of university graduates. In addition, the nested logit is computationally demanding, and could not have been adopted for the large set of destinations we will study below.

The major disadvantage of the conditional logit model is the underlying assumption that choices are independent of irrelevant alternatives (IIA; cf. McFadden, 1973). This assumption is difficult to test empirically when the set of potential choices is large (cf. Davies, 2001). We conducted the standard Hausman tests and found no evidence suggesting that the IIA assumption is violated in our data (see below for details).

4. Data and variables

4.1. The KOAB database

Our analysis is based on a large-scale survey of German university graduates of alumni years 2007, 2008 and 2009 when entering the labor market after graduating from university. This survey is part of the KOAB (Kooperationsprojekt Absolventenstudien) project. KOAB is a collaborative effort of the International Centre for Higher Education Research (INCHER-Kassel) located at the University of Kassel and a large number of higher education institutions in Germany – including both universities and universities of applied sciences ("Fachhochschulen"). The project is structured such that INCHER-Kassel is in charge of survey design and coordination, while individual universities conduct the survey for their own graduates. The survey instrument has a core that is identical for all universities, which is complemented by elective modules. Relying on information from the core survey we are able to use information about 24,722 students from 44 universities. To limit heterogeneity in the sample, we exclude universities of applied sciences from our analysis.

For consecutive waves of the survey, implementation was conducted approximately one and a half years after graduation. For example, graduates who finished their studies in the winter term 2006/2007 or in the summer term 2007 (referred to as graduates of year 2007) were surveyed in November/December 2008. This time frame was chosen such that graduates are likely to have entered the labor market when the survey was implemented.

Prior to survey implementation graduates were contacted by e-mail (or by postal service if the e-mail address was unknown) to inform them about the survey. Graduates could

answer the survey either online or by postal service, with up to three reminders sent to those who did not respond initially. The survey contains questions on field of study and details about the first occupation after graduation, i.e. employment status and area in which graduates have entered employment. We utilize the information where graduates have studied and where graduates have entered the labor market. Further, we utilize graduates' field of study in order to assess the number of jobs provided in a potential work region given the field of study of a graduate, the number of jobs in each region classified in economic sectors and the share of graduates entering any economic sector.

4.2 Variables

Location choice refers to the region where graduates worked at the time of the KOAB survey, which is around 12 to 24 months after graduation. Information about the university from which an individual graduated, as well the region where they graduated from high school, was also taken from the KOAB dataset. Information about the location of employment as well as the location of high school graduation⁴ is available regional codes for automobile registration, which closely correspond to districts (Landkreise). We aggregated this information to the level of planning regions (Raumordnungsregionen or ROR). Planning regions are functional regions formed by aggregating districts such that inter-regional commuter flows are minimized.

We expect employment opportunities to be a major determinant of graduates' location decisions. To proxy for the regional labor market situation, we compute the following measure for each region:

$$\sum_{j=1}^N \text{Share of Graduates from field } i \text{ entering Sector } j * \text{Jobs in Sector } j$$

where j denotes the different economic sectors (two-digit NACE classes with 88 different economic sectors).

To illustrate this measure, assume that an individual graduates in field A. Of all graduates of field A being employed, 50% take a job in economic sector 1 (i.e. insurance), 30% enter economic sector 5, and 20% enter a job in sector 20. Then the measure computes for each region the number of jobs in sector 1 multiplied with 0.5 plus the number of jobs in sector 5 multiplied with 0.3 plus the number of jobs in sector 20 multiplied with 0.2. This

⁴ Precisely: *Ort der Hochschulzugangsberechtigung*.

proxy accounts for the number of jobs a graduate might get given his or her field of study. Thus, this proxy accounts for study-specific job opportunities in each region (ROR). The underlying information was provided by the Federal Employment Agency. As a second indicator of regional labor market performance, we include the average gross salary paid by employers within the region relative to the university region where the respective individual graduated. This measure is included to pick up inter-regional variation in wage levels.

To measure geographical distance, we use travel time by car from a graduate's university county to the geographical center of the county with the highest population share in each planning region (in minutes). Travel time enters the model specification in both linear and squared terms because we expect decreasing marginal disutility of longer distances. To account for agents' tendency to remain close to family and friends, (Dahl and Sorenson, 2010a; 2010b), we use two binary variables indicating, respectively, that a potential destination region is an individual graduate's home region or her university region. A further binary variable indicates whether a destination region is a neighboring region to the university region. Information about geographical distances was obtained by the Bundesinstitut für Bau-, Stadt- und Raumforschung (BBSR).

As we are interested in structural characteristics of regions we utilize the classification developed by the, BBSR to group German planning regions (ROR) according to their settlement character ("differenzierte siedlungsstrukturelle Regionstypen 2008"). The BBSR distinguishes seven types of regions based on the population of the region's largest city as well as the population density in its environs. This classification is highly suited for our purposes as it not only indicates whether or not a large city is present in a region, but also whether the surroundings of that city are densely populated (such as in the Ruhr and Rhein-Main areas; Type 1) or of a more rural character (such as the regions surrounding Berlin, Hamburg and Munich; Type 2). Rural regions are classified according to population density, which is a commonly used indicator of urbanization (or the lack thereof). In the empirical analysis, we use four dummy variables denoting more central (Types 1 and 2) and more peripheral (Types 6 and 7) destination regions, with regions of intermediate degrees of urbanization providing the omitted reference category, and also two dummy variables indicating whether a potential destination region is of the same type as the region where individuals graduated from high school and from university.

Following Falck et al. (2012) we also include information on regional dialects to denote cultural boundaries within Germany. We restrict ourselves to distinguishing three

dialect regions taking the so-called Speyerer Linie and the Benrather Linie. The former denotes the Southern border of the Upper German dialects – differentiating Upper German from while the latter differentiates Upper German (Oberdeutsch) dialects from Low German (Niederdeutsch) dialects. We include dummy variables indicating whether destinations are in the same dialect region as the regions where individuals graduated from high school and from university. If two dialects are spoken in a graduate’s home region (e.g., when the Speyerer Linie crosses the home region) then a graduate is defined as remaining in the home dialect zone when moving to a region speaking either of the two dialects of his or her home region. Finally, we include 15 Länder dummies to control for unobserved regional heterogeneity at the level of federal states, which are responsible for university policies, including, e.g., tuition fees.

5. Results

Descriptive information about mobility patterns is provided in Table 1. We distinguish five different types of mobility pattern a graduate might exhibit, considering both mobility when starting to study and mobility from university to work. Homebodies attend university in their home region and also start work in this region. Graduates who study in their home region and then leave for their first job are referred to as mobile to work. Individuals attending university outside their home region and then staying in the university region are called mobile to study. Graduates who return to their home region after having studies elsewhere are called returners while graduates who move to different regions in both stages are called Wanderer.

Table 1: Mobility patterns

Home Region	University Region	Work Region	Share	TYPE
A	A	A	20.3%	Homebody
A	A	C	14.37%	Mobile to work
A	B	A	11.15%	Returner
A	B	B	23.39%	Mobile to study
A	B	C	30.75%	Wanderer

As emerges from Table 1 roughly 40% of graduates stay in the university region (Mobile to study + Homebody). Thus, a substantial share of graduates leaves the university region afterwards. However, roughly one out of six graduates who leaves the university

region is a returner who moves back to the home region. The largest share of graduates is given by the wanderers moving both from home region to university region as well as university region to work destination.

Our analysis of the conditional logit models is given in Table 2. Models (1) and (2) denotes our baseline models (without and with dummies for federal states) focusing on effects of regional labor market performance, distance as well as attachment to home region, university region and neighboring regions. Models (3) and (4) are the same models as in (1) and (2), except for the additional inclusion of regional types of destination region. To account for dialect zones we provide models including all variables of the baseline model and additional measures of similarity of dialects of a potential destination region and a graduate's home region, respectively graduates' university region in models (5) and (6). In analogy, we extend the baseline models by our measures capturing the similarity of destination region and home region, respectively the university region with respect to regional settlement structure in models (7) and (8). Finally, the full model is given in column (9).

Table 2: Conditional Logit estimates on Destination Region of First Employment after Graduation (ODD RATIOS)

VARIABLES	(1) BASELINE	(2)	(3) REG_TYPE	(4)	(5) SIMILARITY	(6) DIALECT	(7) SIMILARITY	(8) REG_TYPE	(9) TUTTL_alle
Travel time (linear)	0.986*** (0.000376)	0.987*** (0.000386)	0.987*** (0.000390)	0.986*** (0.000381)	0.988*** (0.000394)	0.987*** (0.000386)	0.988*** (0.000392)	0.987*** (0.000381)	0.989*** (0.000408)
Travel time (squared)	1.000*** (8.08e-07)	1.000*** (8.12e-07)	1.000*** (8.23e-07)	1.000*** (8.15e-07)	1.000*** (8.15e-07)	1.000*** (8.10e-07)	1.000*** (8.20e-07)	1.000*** (8.13e-07)	1.000*** (8.36e-07)
Employment opportunities	1.000*** (8.26e-07)	1.000*** (1.09e-06)	1.000*** (1.11e-06)	1.000*** (8.75e-07)	1.000*** (1.08e-06)	1.000*** (8.21e-07)	1.000*** (1.09e-06)	1.000*** (8.26e-07)	1.000*** (1.10e-06)
Home region	5.043*** (0.100)	5.099*** (0.102)	5.082*** (0.102)	5.124*** (0.102)	4.595*** (0.0929)	4.520*** (0.0906)	4.418*** (0.104)	4.375*** (0.103)	3.940*** (0.0935)
University region	6.250*** (0.237)	6.655*** (0.261)	6.639*** (0.262)	6.469*** (0.250)	6.870*** (0.268)	6.613*** (0.250)	6.385*** (0.255)	6.011*** (0.234)	6.664*** (0.266)
Adjacent to univ. region	1.951*** (0.0547)	2.089*** (0.0600)	2.136*** (0.0616)	2.064*** (0.0585)	2.061*** (0.0590)	1.941*** (0.0541)	2.133*** (0.0615)	1.977*** (0.0555)	2.140*** (0.0616)
Average wage level	1.002*** (3.28e-05)	1.002*** (5.66e-05)	1.002*** (6.74e-05)	1.002*** (3.53e-05)	1.002*** (5.67e-05)	1.002*** (3.27e-05)	1.002*** (5.69e-05)	1.002*** (3.28e-05)	1.002*** (6.74e-05)
schleswig_holstein		1.737*** (0.121)	1.361*** (0.0982)		1.500*** (0.105)		1.699*** (0.118)		1.166** (0.0846)
bremen		1.271*** (0.0928)	0.768*** (0.0580)		1.113 (0.0814)		1.284*** (0.0938)		0.691*** (0.0520)
hamburg		1.854*** (0.0920)	1.344*** (0.0692)		1.584*** (0.0793)		1.859*** (0.0922)		1.149*** (0.0594)
niedersachsen		1.502*** (0.0585)	1.326*** (0.0554)		1.347*** (0.0534)		1.486*** (0.0579)		1.203*** (0.0511)
meck_pom		2.878*** (0.237)	3.274*** (0.309)		2.621*** (0.215)		2.836*** (0.235)		3.013*** (0.284)
brandenburg		2.168*** (0.155)	1.195** (0.0934)		1.965*** (0.140)		2.042*** (0.147)		1.068 (0.0833)
berlin		2.350*** (0.142)	1.510*** (0.0942)		2.458*** (0.147)		2.356*** (0.142)		1.601*** (0.0990)
sachs_anhalt		1.921*** (0.148)	1.870*** (0.156)		1.770*** (0.137)		1.836*** (0.142)		1.699*** (0.142)
sachsen		2.823*** (0.216)	1.666*** (0.137)		2.752*** (0.211)		2.759*** (0.211)		1.637*** (0.135)
thuringen		2.084***	2.119***		2.115***		1.993***		2.097***

		(0.147)	(0.164)		(0.150)		(0.141)		(0.163)
hessen		1.182***	1.326***		1.133***		1.158***		1.266***
		(0.0430)	(0.0548)		(0.0417)		(0.0422)		(0.0529)
nrw		1.360***	1.339***		1.241***		1.331***		1.239***
		(0.0487)	(0.0616)		(0.0452)		(0.0478)		(0.0578)
rheinland_pfalz		0.707***	0.684***		0.687***		0.685***		0.664***
		(0.0419)	(0.0437)		(0.0407)		(0.0406)		(0.0425)
saarland		0.848	0.744**		0.814		0.786*		0.683***
		(0.115)	(0.105)		(0.110)		(0.107)		(0.0963)
baden_wuerttemberg		0.964	1.038		0.947		0.943*		1.023
		(0.0339)	(0.0420)		(0.0333)		(0.0333)		(0.0416)
Type 1 agglomeration			1.144***	1.193***					1.130***
			(0.0311)	(0.0260)					(0.0311)
Type 2 center			1.791***	1.770***					1.819***
			(0.0605)	(0.0423)					(0.0618)
Type 6 periphery 1			0.538***	0.566***					0.578***
			(0.0274)	(0.0273)					(0.0297)
Type 7 periphery 2			0.499***	0.643***					0.522***
			(0.0393)	(0.0461)					(0.0415)
Home dialect zone					1.707***	1.726***			1.697***
					(0.0363)	(0.0359)			(0.0359)
University dialect zone					0.986	1.008			1.035
					(0.0249)	(0.0252)			(0.0263)
Home settlement type							1.255***	1.249***	1.272***
							(0.0262)	(0.0258)	(0.0267)
University settlement type							1.159***	1.141***	1.140***
							(0.0254)	(0.0247)	(0.0256)
Observations	24722	24722	24722	24722	24722	24722	24722	24722	24722
Psuedo R2	0.4332	0.4365	0.4394	0.4370	0.4396	0.4367	0.4373	0.4434	0.4434
Log Lik	-63810	-63443	-63115	-63380	-63087	-63415	-63344	-63718	-62665

seEform in parentheses

*** p<0.01, ** p<0.05, * p<0.1

As expected, geographic distance (travel time) decreases the likelihood of moving to a destination region, yet squared distance is positively related to choosing a destination region suggesting that the marginal effect of the first hour of travel distance away from the university region is larger than that of the 6th hour. We also find the expected positive effects of employment opportunities and average wages on the likelihood to move to the respective region. Our analysis moreover confirms the pattern found in the descriptive information that substantial shares of graduates stay in the university region or return to their home region. The respective regional are several times as likely to be chosen as other regions with comparable characteristics. There is also a substantial spillover effect of universities on adjacent regions.

Controlling for prior locations and labor market conditions, regions with different settlement types differ dramatically in their capacity of attracting university graduates. In the full model, Type 2 agglomerations (including Berlin, Hamburg, and Munich) are twice as likely as destinations, whereas peripheral regions are half as likely, to be chosen when compared to regions of intermediate urbanization.

With respect to our main variables of interest, graduates are substantially more likely to move to regions located in the same dialect zone as their home region, whereas the dialect zone of the university region is not predictive. Compared to the role of cultural boundaries, our results suggest a smaller but nonetheless substantial importance of settlement types. and when the settlement structure is similar to the home region or, respectively the university region of a graduate. Interestingly, when the potential destination region resembles the home region the likelihood to move to that region is greater as in the case of the destination region resembling the university region. With respect to dialect zones we only find a significant effect in the case of the destination region resembling the home region while no significant effect is found regarding the dialect zone of the university region. Finally, metropolitan areas and urban agglomerations are more attractive regions for graduates relative to regions with intermediate degrees of urbanization providing while peripheral areas are less attractive for graduates even when controlling for jobs available in a region.

Overall, our results suggest that graduates are very likely to either stay in the university region or to return to their home region. Roughly one half of the graduates considered chose either one of those regions as the work region. This finding is in line with previous findings suggesting that individuals are likely to remain in regions close to relatives and friends. However, if individuals are mobile, they are significantly more likely to move to

regions resembling their home region while the similarity to the university region is less likely to be affective.

As noted above, the conditional logit model is based on the assumption that choices are independent of irrelevant alternatives. To check whether our results are biased, we excluded twenty destinations that are relatively less often chosen as employment regions. We then conducted a Hausman test whether coefficients are systematically different from the model comprising all graduates. No systematic differences of coefficients were detected (results are available from the authors upon request).

6. Discussion and conclusions

This study has investigated the regional mobility of university graduates in Germany. We conditioned graduates' decisions of where to enter the labor market on regional characteristics of the 96 German planning regions representing potential destinations. Based on data for 24,722 graduates our study reveals a variety of findings that corroborate and extend prior knowledge about individual mobility.

First, in line with economic migration models, individuals are attracted by regions with more favorable labor market conditions (jobs in potential target industries as well as general wage levels). They are also deterred by geographic distance, albeit with decreasing marginal effects for longer distances. This is consistent with moving costs being reflected by individual choices.

Second, we found that about half of the students remain in the university region or to return to their home region. This finding is in line with the conjecture of a substantial "social attachment to place" (Dahl and Sorenson, 2010a) reflecting ties to family and friends. We also found a deterring role of cultural boundaries proxied by moves across dialect zones, as suggested by Falck et al. (2012), and the pronounced role of settlement structure types is consistent with the arguments put forward by Florida (2003) about the relevance of amenities for location choices of high-skilled labor force participants.

Third, our findings suggest that the factors focused upon by the prior literature do not provide an exhaustive account of individual location choices. We found that that graduates are significantly more likely to move to regions resembling their home region in terms of their

degree of urbanization. *Ceteris paribus*, graduates are about 25% more likely to move to regions of the same type as their home region, and they are also significantly more likely to migrate to regions of the university type. .

Overall, our results indicate that a variety of monetary and non-monetary factors shape location choices of university graduates. From a regional policy perspectives, the high degree of inertia and regional “homophily” is notable. While metropolitan regions are in an advantageous position, there also seem to be implications for policy makers in more peripheral regions. First, university regions may benefit from the attachment of graduates to the university region. This is micro-level evidence supporting the original rationale underlying the establishment of universities out of regional development motives in the 1970s. Second, our results provide *prima facie* evidence suggesting targeted recruitment strategies for universities and employers. In addition to trying to retain (or lure back) “natives”, it seems to be advisable to try and attract individuals from other but comparable regions. This seems to be a more viable strategy and to try and outcompete metropolitan regions in terms of amenities and “buzz”.

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