Motives behind the mobility of university graduates – A study of three German universities

Sidonia von Proff, Matthias Duschl and Thomas Brenner

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Sidonia von Proff[1], Matthias Duschl and Thomas Brenner

all from Section Economic Geography and Location Research, Philipps-University, Marburg, Germany.

Abstract:

The mobility of university graduates is influenced by economic factors and individual attitudes. The paper at hand focuses on individual characteristics influencing the spatial preferences of graduates from three universities in Hesse (Germany). Using survey data from prospective graduates in 2012 we find that the majority has preferred locations during the job search, which are on average farther away if the respondents focus on broad availability of job opportunities and leisure/cultural activities. Social ties and a focus on good infrastructure leads to a search dominantly at familiar places, i.e. the home or university region.

Keywords: graduate mobility, regional labor mobility, universities.

JEL Classifications: J61, I23.

1 Introduction

University graduates are known to be mobile above average (e.g. Abreu et al. 2014, Faggian et al. 2007, Haapanen and Tervo 2012, Venhorst et al. 2011). The reasons for migration can be found in the matching requirement of education and job profile, which is more difficult (specific) the higher the educational level is. In addition, university graduates may be better informed about job markets and be attracted by better economic prospects (Greenwood 1973, Venhorst et al. 2011) as well as the availability of amenities (Glaeser and Gottlieb 2006).

Research in the field of graduate mobility looks on performed moves and tries to investigate the reasons leading to the move, especially the economic ones. The most important factors influencing migration are income and employment opportunities in regions (see e.g. Greenwood 1973, Falk and Kratz 2009). Winners of this inter-regional competition for graduates are central, prospering regions while peripheral areas usually lose graduates (Venhorst 2013, Haapanen and Tervo 2012, Flöther and Kooij 2012). However, for the US, Winters (2011) found that even non-metropolitan university regions attract more students than they are losing after graduation - at the expense of non-university regions. In the existing studies, however, the decision of the individuals stays a black box.

The paper at hand takes a different approach and includes the job search process of the individuals. So far little is known about the motives of university graduates for taking jobs in specific locations. Therefore, we study the location preference that university graduates have while they search for jobs and especially the reasons for these location preferences. Understanding the motives behind location preferences of university graduates is interesting from a scientific as well as policy perspective. From a scientific perspective we open the black box of graduate mobility by examining the individual reasons for the observed mobility structure. From a policy perspective, knowledge about the motives behind the location preferences of university graduates help local policy makers and firms to increase the attractiveness of their location.

The focus is less on the decision whether a graduate wants to move or not but more on the role of the familiarity of places, particularly the university region and the home region in which the person grew up. In the case of moving we want to know if there are factors increasing the likelihood of moving very far away in contrast to moving to a neighboring region. Some graduates are very open in this regard while others have certain ideas of cities or regions where they want to find a job. Thus, our research questions are threefold. (1) Which characteristics lead to a job search restricted to certain places? (2) Which characteristics lead to a search for jobs in familiar places (in case of spatially restricted search)? (3) Which characteristics lead to a search at more distant locations (in case of spatially restricted search)? Examining the individual background and preferences in such a detailed manner is new to the literature. Interestingly, existing studies concentrate on a few countries, most likely due to data constraints: there is ample evidence for the Netherlands, the United Kingdom, Finland, and the US, while there are hardly any studies made for further countries. To the authors' knowledge, there are a few recent German studies in this area. Falk and Kratz (2009) analyzed Bavarian graduates and Busch and Weigert (2010) used data for whole Germany from the socio-

economic panel (SOEP). Both studies distinguished between Bundesländer, but did not include a distance measure and individual preferences. Krabel and Flöther (2012) as well as Buenstorf et al. (2014) investigated mobility between planning regions (dichotomous dependent variable, more fine-grained than Bundesländer). But none of the three papers included data on individual preferences.

By analyzing graduates from three universities located in two neighbored cities and at one point in time, we exclude factors related to economic cycles as well as regional characteristics like unemployment, because these factors are similar for all survey participants. The three universities are located in Middle Hesse, i.e. the center of Hesse (see Figure 1). Hesse has an economically very strong south while the center and the north are less wealthy and less densely populated. Furthermore, the transport infrastructure, especially the connection to other German regions, is only medium good in Middle Hesse. The Philipps University Marburg and the Justus Liebig University Giessen are hundreds of years older than the other universities of Hesse and the city of Marburg is a largely preserved historic town. This results in a lot of incoming students but at the same time many graduates leave the region.

The remainder of the paper is structured as follows. Section two reviews the literature in graduates' mobility research and states hypotheses, section three presents our data and method, section four contains the regression results and their discussion. Section five concludes.

2 Literature review and hypotheses

2.1 Attracting and retaining graduates

There is a strand of research investigating how regions can retain graduates. Regions want to keep highly qualified individuals, because there is widespread consensus that human capital fosters regional economic growth. However, graduates do not stay automatically in the region. Hansen et al. (2003), for instance, found for the Pittsburgh region that sufficient job opportunities, offers for further education, and low-cost housing are helping to keep graduates; few advancement opportunities, especially for women and minorities, push graduates away. In general, the attraction of graduates is stronger for more metropolitan regions (Haapanen and Tervo 2012), especially when their population is more diverse and tolerant (Florida 2002). Here, especially universities play a central role by helping to retain and attract highly educated individuals in a town or city (Winters 2011). In Bavaria (Germany), universities lead to a net inflow of graduates even in peripheral regions, especially the universities of applied sciences (Falk and Kratz 2009).

Another research strand consists of studies on the migration behavior of tertiary educated persons, which is a similar topic, but takes the view of the individuals instead of the regions and is not restricted to specific events in the educational career. Tertiary educated persons are more mobile than less skilled people and attracted by prospering regions (see e.g. Greenwood 1973, Venhorst et al. 2011). Haapanen and Tervo (2012) found, in addition, that migration rates decrease during the years after graduation. Put differently, if graduates stay directly after finishing university, they are likely to stay there for many further years. Similar findings were obtained for Germany by Busch and

Weigelt (2010): 70% of the graduates in their empirical study still lived in the Bundesland where they had graduated and one third of all moves took place in the first year after graduation. While some authors find that amenities play a role in attracting highly qualified individuals (Glaeser and Gottlieb 2006 with US data), others state that economic reasons outweigh such "soft" factors (Scott 2010 for engineers in the US, Liu et al. 2013 for China). However, "amenity-based approaches have highlighted the need to take into account a desire to live in certain regions" (Venhorst et al. 2011, p.62). Most likely, economic reasons play a dominant role and amenities are taken into account only if job seekers have several possibilities, e.g. due to qualifications in demand or outstanding grades. On average, changing job location increases career satisfaction (Abreu et al. 2014). Staying in a familiar environment and finding the optimal job is sometimes a trade-off and, depending on individual preferences, graduates accept either a second-best job or the costs of moving.

Most migration takes place within one country and, in general, individuals are rather settled in their location choice: most people move only a few times in life (see Liaw and Nagnur 1985 for Canada). Regarding migration of graduates in particular, Venhorst et al. (2011) found that 50% of Dutch students do not leave the NUTS2 region after graduation, and Haapanen and Tervo (2012) showed that Finnish graduates often return to the NUTS3 region where they have grown up or stay in the university region. The reason may be that family links as well as social ties reduce the willingness to move to an unknown city or region. If people decide to move, the probability of locating decreases with distance (e.g. Pellegrini and Fotheringham 2002) and locations where they have lived before are preferred (Venhorst 2013). Liaw and Bartels (1982) found that the spatial pattern of migration was rather stable in time. Recent studies find an increasing mobility (Mohr 2002).

2.2 Personal characteristics as determinants of mobility

Only few students have a prospective full-time job already when graduating. Most of them start to search before or after graduation. In case they have preferences for certain locations, they will initially limit their search to these places and only if the search is unsuccessful they will expand their geographical scope. Persons with family commitments move less often (Busch and Weigert 2010, Mincer 1978) or prefer to stay near to the recent place of living (Carree and Kronenberg 2012). Other household members may suffer from migration by being unable to continue current employment or (esp. children) by having to integrate into the new environment. Hence, Clark and Cosgrove (1991) found that singles migrate over longer distances than individuals with a partner.

Younger individuals as well as older ones are usually less mobile than those at the median age of labor force entry (Venhorst et al. 2011, Plane 1993). Regarding gender, findings are inconclusive. Venhorst et al. (2011) found female Dutch graduates to be more mobile, while Abreu et al. (2014) found female British graduates to move less often. Faggian et al. (2007) reported for the UK more differentiated results with females moving more often prior to studying as well as after graduation (most mobile group) and at the same time they are more often not moving at all. Males in turn move more often to the university region and stay afterwards or move back to the home region. For Germany, Busch and Weigert (2010) did not observe significant difference between sexes.

DaVanzo (1983) found that most moves in the US are repeated moves, meaning that individuals who moved in the past are likely to move again. Some recent studies tested this for students: Haapanen and Tervo (2012) for Finland, Busch and Weigert (2010) for Germany, as well as Faggian et al. (2007) for the UK found that individuals studying away from home are more likely to move after graduation. These persons made the experience to find a new social environment and know how to keep in contact with friends from earlier places of residence. In addition, they may also go back to the home region after graduation.

2.3 Hypotheses on individual attitudes during the job search

Although the individual decision process leading to job and, thus, location choices is little studied in the literature, we will use the theories and findings presented above to draw some hypotheses for our empirical study. In contrast to the existing studies, we questionnaire graduates before they finalise their study. Since only few graduates have a job offer already in the year before graduating, our focus is on how they tackle the job search and we examine their spatial preferences. While some are very flexible in spatial terms, other have clear preferences at which place they want to live or which characteristics this place should have. The literature reported above suggests that individuals with family obligations should be less flexible, while those having moved before should be more open. From the literature, the expectations for the relationship between age and openness are inconclusive. If there is an influence at all, we expect younger graduates to be more flexible, since they have more time left until the "rush hour" of the thirties and thus may try out more places.

Hypothesis 1: Graduates with family obligations should have clearer preferences for certain locations, while younger graduates and graduates who moved before should be more open with respect to the location of their job.

There is a debate in the literature whether job opportunities, leisure offers, or social ties are the most important factor for location preferences (see e.g. Dahl and Sorenson 2010, Gottlieb and Joseph 2006, Greenwood and Hunt 1989). Clearly, this depends on the preferences of the individuals. Since we know that economically prospering regions attract graduates over long distances, we expect those persons interested in good job opportunities to be willing to move over longer distances. This holds especially for graduates from Middle Hesse because this region does not provide very good job opportunities, so that it can be expected that graduates move towards the economic centers in Germany after finishing their study in Middle Hesse. Similar arguments hold for curious graduates who just want to go to a new place and those having a sophisticated leisure notion which can be satisfied only in a few large cities.

Hypothesis 2a: Graduates focusing on job opportunities, leisure possibilities, or who want to experience a new region prefer more often unfamiliar places.

Hypothesis 2b: Graduates focusing on job opportunities, leisure possibilities, or who want to experience a new region prefer places at large distances.

Details on the conditions of the infrastructure are usually more difficult to obtain, and hence they are known better for familiar and proximate places. Therefore, graduates looking at a rich infrastructure may prefer well-known locations. Further reasons for preferring a place are social ties and the costs of living. Friends and family members usually live at familiar places, especially the home or the university region, thus an attachment on them should have a positive influence on the preference for familiar places and a negative one on the distance toward a preferred place. High or low costs of living can be found at several places and should not depend on the distance from middle Hesse.

Hypothesis 3a: Graduates focusing on social ties prefer familiar places.

Hypothesis 3b: Graduates focusing on social ties prefer locations at shorter distances to their home or study region.

3 Data and method

3.1 Data

The data was collected in a survey among all graduates of three German universities located in the middle of Hesse (Justus-Liebig-Universität Giessen, Philipps-Universität Marburg, Technische Hochschule Mittelhessen) in 2012. The online survey was conducted in the year prior to graduation. Around 10,000 students graduate at the three universities in total every year and we received 1396 completed surveys, i.e. the response rate is approximately 14%. However, the questionnaire was focusing on the job search process of the graduates (which was also mentioned in the cover letter. For many graduates, especially Bachelor student and partly students of teaching certification, this is not relevant, so that many students did not answer. Hence, the response rate for those graduates that are relevant for the study is much higher but difficult to calculate. We estimate that it is around 30%. The response rate is significantly higher in Geography in the Philipps University Marburg (our own students) and for graduates from the Justus-Liebig University Giessen. Beside this, we did not identify any bias. Since for some questions there are missing answers, we were able to include 1178 individuals in the analyses.

The survey asked the prospective graduates about up to five places where they search for the first job after graduation[1], the reason for their spatial limitation or openness, their home domicile, whether they have made internships, and person-related information. We calculated the distances between their home and the city of the university and the distances to the preferred locations (if specified). Table 1 shows the variables in detail including their descriptive statistics for the 1396 respondents, whereas Table 3 gives an overview of the dataset where each preferred location is one data point.

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[1] The graduates were asked „In your choice of your job location are / have you been open or are there preferred places" with the possible answer options: A) „I am totally open", B) "I have preferred places" and C) "There are places that I avoid". In the cases of answer B the graduates have been asked to name up to five preferred places. These locations could be specified freely, i.e. a country, a region, a city, or a German Bundesland.

Variable	Description	Frequency of dummy = 1
age24	Dummy for persons 24 years old or younger	542
age25_27	Dummy for persons 25-27 years old	559
age28_30	Dummy for persons 28-30 years old	158
age31	Dummy for persons 31 years old or older	121 (age NA: 16)
female	Dummy for female individuals	920
sexnotspec	Dummy for persons who did not specify their sex	16
male	Dummy for male individuals	460
married	Dummy for being married	104
partner	Dummy for having a partner, but not being married	772
single	Dummy for being single or not specified	520
children	Dummy for having child(ren)	90 (NA: 126)
pum	Dummy for graduating at Philipps-Universität Marburg	350
jlu	Dummy for graduating at Justus-Liebig-Universität Giessen	894
thm	Dummy for graduating at Technische Hochschule Mittelhessen	152
limited	Dummy for being spatially limited during the job search	723 (NA: 81)
priormove	Dummy for home locations at more than 1 hour distance from the university city	649 (NA: 122)
field1-13	Dummies for 13 different fields of study	
internship	Dummy for having completed an internship during studying	942
Thesis ext	Dummy for having written the thesis in collaboration with an external firm	162 (NA: 173)

Table 1: Descriptive statistics for the respondents (n = 1396).

Table 2 shows that the majority of respondents has preferred places during the job search. Some respondents indicated to be spatially open as well as having preferred places, i.e. they primarily search at preferred places but are nevertheless open in case of other job opportunities.

	JLU	PUM	THM
respondents	894	350	152
respondents with preferred places	*60.4%*	*62.9%*	*63.8%*
respondents spatially open	*43.3%*	*39.4%*	*44.1%*

Table 2: Number of respondents and their spatial openness

Each specified location was coded with an eight-digit number according to the official list of German municipalities. The first two digits refer to the Bundesland, the third digits refines this to the NUTS2 level, the fourth and fifth goes down to administrative regions (NUTS3, i.e. counties or larger cities) and adding the last three digits indicates each municipality, i.e. the smallest administration unit. Non-German locations were coded as a "17th Bundesland". If a respondent specified a larger region than a

municipality as the preferred location, say, a NUTS2 region or a Bundesland, the last digits of the location code were set to zero.

Variable	Explanation	Decriptive statistics
dist	Maximum distance between home or university region and the preferred German place in minutes traveling time	mean = 133 min, sd = 96.7, min = 0, max = 464min
# pref loc	The number of preferred locations the respective respondent has indicated	1 2 3 4 5 143 300 537 480 900
	Reasons for preferring a certain place:	**frequency of dummy = 1**
jobopp	Dummy for focusing on job opportunities	1220
leisure	Dummy for focusing on the availability of leisure and cultural activities	1015
infrastr	Dummy for focusing on the existence of a good infrastructure	1113
currdom	Dummy for focusing on the fact that the place is a current domicile (some respondents do not have their main domicile at the location of the university or prefer the university region because they live there already)	501
fri&fam	Dummy for focusing on proximity to friends and family members	1278
newreg	Dummy for wishing to experience a new region	545
costs	Dummy for focusing on costs of living	381
oth reas	Dummy for focusing on other reasons	226

Table 3: Descriptive statistics for the dataset of preferred locations (n = 2360).

For calculating the distances we used the center of the locations. We have two familiar places for each graduate (home and university region, which may be identical) and one to five preferred locations (if not spatially open). We decided to use the largest distance between any familiar and each preferred place as dependent variable, i.e. the decision to experience a new region and the distance towards it. This approach is new in the research on graduate mobility: most studies use administrative units, often even rather large ones (like the German Bundesländer), and measure whether graduates move away from this region. Our measurement is much more detailed. Besides, the distance measure was refined by employing travel times from a route planning algorithm (for details, see Duschl et al. 2014) instead of mere geographical distances.

The distribution of observed distances shows two maxima at 50min and almost 5hrs travel time corresponding to the Frankfurt region and Berlin/Hamburg/Munich regions, i.e. the next large economic center and the three largest German cities.

Earlier studies found differences in migration behavior according to the field of study of graduates (Abreu et al. 2014, Falk and Kratz 2009). Investigating these differences is not the focus of the paper at hand. However, we will include dummies for field of study in the regression models.

3.2 Method

When estimating the distance to the preferred city or region, we are confronted probably with a sample selection bias. Respondents could indicate to be spatially open during the job search and most of these did not specify a preferred location, which excluded them in a model estimating the distance. Heckman developed the sample selection model, which is useful in such settings (Heckman 1979). The two step model first estimates the probability of being spatially open before estimating the variables influencing the distance to preferred places. The insignificant Mills ratio shows that being open and the distance are not interrelated. Therefore, we do the analyses separately. In total we conduct three analysis.

First, we use the dummy indicating spatial openness as dependent variable and apply a logit regression model. In the second analysis the dependent variable is a dummy indicating whether the preferred place is identical with the university region, the home region, or a region where the respondent did an internship (three regressions). Since the concurrence depends on which spatial level is looked at, the regressions are done once for administrative districts (*Kreise*, narrow concurrence) and once for the *Bundesländer* (rough concurrence).

Third, for investigating which factors lead to preferring locations at long distance, we estimate a OLS model with the maximum distance between the preferred place and any familiar place (i.e. domicile and university regions, since internship regions are not familiar to the same extent) as dependent variable. Each preferred place is one data point, such that each individual can have up to five entries. A variable was added counting the number of preferred locations of the respective individual ("# pref loc").

4 Results

Let us start with some descriptive statistics regarding the origin and destination of our survey participants. The three universities differ strongly in the origins of their students (see Figure 1, the values can be found in Table 8 in the appendix). At PUM (Philipps University Marburg), only 36% of the graduates have grown up in Hesse. The value for THM (Technische Hochschule Mittelhessen) is twice as high, while at JLU (Justus-Liebig University Giessen) about half of the students are from Hesse. The reason for the high value at THM is the application orientation of the university: the universities of applied sciences are better embedded into the regional economy than research universities. In addition, more individuals with non-academic parents study there and these individuals usually stay nearer to home than students of research-oriented universities, as was also pointed out for Bavaria by Falk and Kratz (2009).

Regarding the preferred locations, note that the shares are based on indicated places and thus, do not represent the whole of respondents, since around half of the respondents stated to be spatially open. The PUM attracts more students from outside Hesse, who in turn more often want to leave Hesse again after graduation. The two largest German cities, Berlin and Hamburg, attract disproportionally many graduates from all three universities, with the highest values for PUM. The

wish of graduates to stay in Hesse is lower than in Bavaria, where three quarters stay according to Falk and Kratz (2009). However, at the same time more of the students in Bavaria have finished school in Bavaria, too (78%).
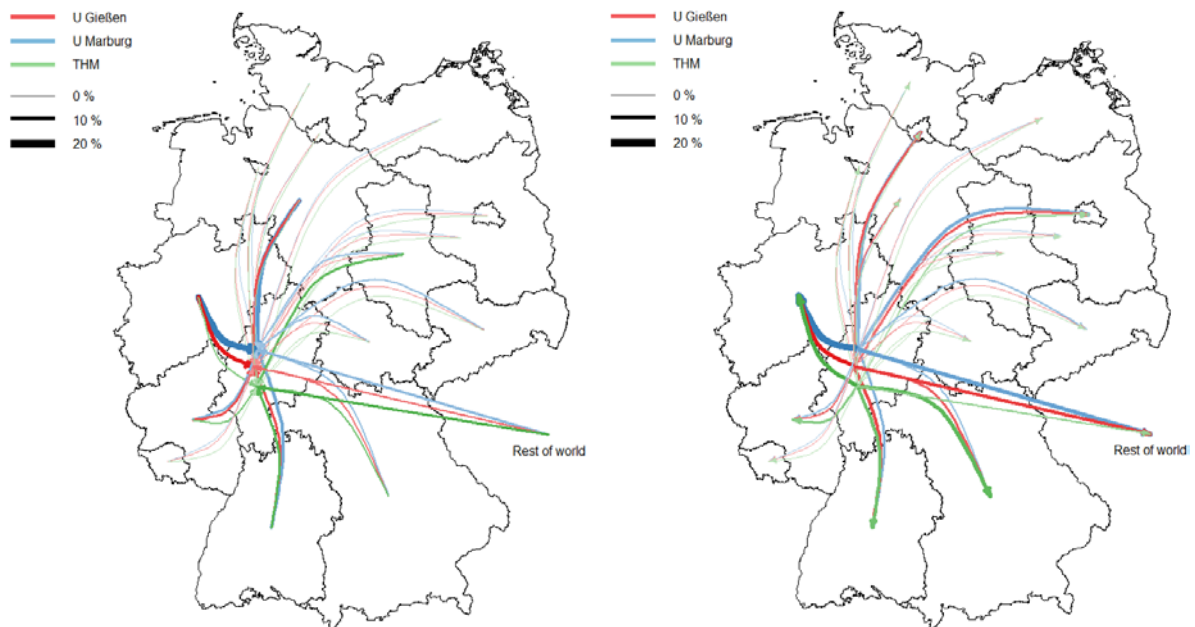
Figure 1: Inflow and outflow of graduates from the three universities.

4.1 Spatially open search vs. preferred places

First, we analyze which respondents indicated being spatially open. Some respondents did not give complete answers so that 1060 data points can be included in this regression (Table 4). As expected, respondents who moved before are more often spatially open during their search and married persons as well as those with a partner are less flexible. We do not find age differences except that the 25-27 year old respondents are less flexible than the youngest age group (reference category). Hence, Hypothesis 1 is confirmed, except for the decreasing openness with age. In contrast to Venhorst et al. (2011) and Faggian et al. (2007), females are less often spatially open than males.

Model 1: dependent var.: open			
	Estimate		Std. Error
(Intercept)	0.018		0.243
priormove	0.311	*	0.137
male	0.434	**	0.155
age25-27	-0.364	*	0.146
age28-30	-0.352		0.231
age>30	-0.139		0.312
THM	-0.077		0.405
PUM	-0.137		0.166
married	-0.781	*	0.338
partner	-0.706	***	0.138
children	-0.416		0.368
internship	-0.159		0.156
thesis ext	-0.117		0.240
n = 1060			
field of study dummies included			
Significance */**/***: 5/1/0.1%.			

Table 4: Factors influencing the spatial openness. Reference categories: age24 or undefined age, JLU, single or undefined family status, female or undefined sex.

4.2 Preferences for familiar places

Working near to the home or university region is an option for almost all graduates with preferred locations (and, by definition, also for the spatially open graduates). This shows that there is some potential to retain graduates in the university region or to entice them back to their home region. At the same time, only 14% specify only locations within one hour distance from home or university region. This shows the flexibility of the graduates in our survey. In the following, we present the findings from the second model, i.e. the concurrence of a preferred location and a familiar place. We did the regression twice, once for places where the first four digits concur, which is equivalent to the same Kreis (Table 5), and once for two-digit concurrence, which refers to the same Bundesland (Table 6).

Model 2a	university region			home region			internship region		
	Estimate		Std. Error	Estimate		Std. Error	Estimate		Std. Error
(Intercept)	-1.462	***	0.424	-1.806	***	0.369	-2.150		1.370
# pref loc	0.035		0.068	0.024		0.055	-0.117		0.085
priormove	-0.790	***	0.185	-0.450	**	0.149	-0.194		0.226
male	0.319		0.210	0.273		0.174	0.408		0.262
age25-27	-0.165		0.201	-0.041		0.166	-0.469	*	0.236
age28-30	0.347		0.269	0.218		0.235	-0.462		0.391
age>30	-0.615		0.390	-0.104		0.320	-1.039		0.587
THM	-1.617	**	0.576	-1.018	*	0.486	0.349		0.582
PUM	0.033		0.219	-0.223		0.185	0.371		0.254
married	0.201		0.375	0.618		0.318	-0.557		0.590
partner	0.035		0.198	-0.037		0.168	0.255		0.254
children	-0.066		0.361	-0.007		0.307	1.696	***	0.505
internship	-0.275		0.210	0.027		0.182	0.066		1.258
thesis ext	0.206		0.309	0.120		0.262	-0.249		0.381
job opp	-0.442	*	0.189	-0.574	***	0.158	0.295		0.230
infrastr	-0.110		0.198	-0.134		0.166	0.031		0.245
leisure	-0.424	*	0.209	-0.015		0.166	-0.080		0.243
fri&fam	-0.535	**	0.198	0.877	***	0.178	-0.168		0.241
currdom	1.869	***	0.192	0.360	*	0.155	1.063	***	0.230
newreg	-1.812	***	0.440	-3.079	***	0.592	-1.309	**	0.424
costs	0.556	**	0.202	0.354	*	0.174	0.583	*	0.252
oth reas	0.779	**	0.265	-0.525		0.301	-0.728		0.450
	n = 1984	AIC = 1083		n = 1962	AIC = 1436		n = 1472	AIC = 796	
	field of study dummies included				Significance */**/***: 5/1/0.1%.				

Table 5: Logit models investigating the factors influencing graduates to prefer a familiar place (four-digit concurrence). Reference variables: female or undefined gender, age24, JLU, single or undefined family status.

As expected, we find that those who have moved before, who would like to experience a new region, or who focus on job opportunities prefer the university and home region less often. Thus, Hypothesis 2a is supported in this respect. However, the focus on leisure possibilities does not have a negative impact on preferring the home region. This part of Hypothesis 2a holds only for the preference of the university region. In contrast to our expectations, those focusing on costs of living prefer familiar places, most likely because they know the height of these costs better for familiar places than for unknown ones or because the places they know are not as expensive as the big cities (which seem to be the other attracting destinations). This holds for all three types of familiar places. Friends and family are often the reason to go back to the home region and for not staying in the university regions. New friends found at the university seem to be either less important or will leave the university region as well. Thus, Hypothesis 3a is supported only for the home region, but not the university region. The findings for the internship regions are less conclusive than those for the university and home region, most likely because of the low number of people who made an internship at a place which was not in the university or home region (157 cases or 10.7% of those having done an internship at all).

Model 2b	university region			home region			internship region		
	Estimate		Std. Error	Estimate		Std. Error	Estimate		Std. Error
(Intercept)	0.922	**	0.302	1.222	***	0.276	1.576	*	0.625
# pref loc	0.161	***	0.049	0.045		0.045	0.005		0.052
priormove	-1.620	***	0.125	-1.270	***	0.114	-1.093	***	0.130
male	-0.083		0.147	0.145		0.134	0.184		0.162
age25-27	-0.273	*	0.134	-0.345	**	0.125	-0.544	***	0.140
age28-30	-0.192		0.205	-0.128		0.190	-0.238		0.238
age>30	-0.390		0.270	-0.637	*	0.248	-0.570		0.300
THM	-0.698	*	0.346	-0.344		0.322	-0.489		0.364
PUM	-0.409	**	0.144	-0.260	*	0.133	-0.293		0.149
married	1.279	***	0.323	0.748	**	0.283	0.653		0.335
partner	0.033		0.132	-0.008		0.122	0.439	**	0.147
children	-0.173		0.294	0.088		0.270	0.498		0.362
internship	-0.179		0.152	-0.037		0.138	-1.132	*	0.563
thesis ext	0.219		0.212	0.514	**	0.194	0.234		0.225
job opp	0.152		0.126	-0.361	**	0.116	0.146		0.135
infrastr	0.454	***	0.136	0.352	**	0.124	0.281		0.147
leisure	-0.979	***	0.132	-0.368	**	0.120	-0.493	***	0.142
fri&fam	0.307	*	0.129	0.720	***	0.119	0.023		0.139
currdom	1.949	***	0.182	0.126		0.144	0.686	***	0.159
newreg	-1.555	***	0.157	-1.427	***	0.143	-1.214	***	0.179
costs	-0.087		0.166	0.138		0.150	0.106		0.169
oth reas	0.007		0.200	-0.475	*	0.186	-0.140		0.209
	n = 1984	AIC = 1970		n = 1962	AIC = 2252		n = 1472	AIC = 1732	
	field of study dummies included				Significance */**/***: 5/1/0.1%.				

Table 6: Logit models investigating the factors influencing graduates to prefer a familiar place (same Bundesland). Reference variables: female or undefined gender, age24, JLU, single or undefined family status.

The results on the lower level of concurrence are similar but show a larger number of significant factors. In contrast to our expectations, the focus on job opportunities does not have a significant impact on the wish to leave Hesse (the *Bundesland* of the university). Most likely, the reason for this result are good job opportunities in Hesse, which do not require a move to another *Bundesland*. Since these good job opportunities prevail rather in the south of Hesse than in Middle Hesse, in the results depend on the level of concurrence (cf. Table 5). Hence, Hypothesis 2a is partly supported. Being married increases the probability to stay in Hesse or go back to the home *Bundesland*. Those aged 25-27 years more often prefer unfamiliar places than younger graduates (insignificant estimates for the other age groups). A focus on leisure activities leads to a preference for an unfamiliar *Bundesland* (in line with Hypothesis 3a), while a focus on infrastructure leads to a preference for university and home region. PUM graduates more often prefer to leave university and home *Bundesland* compared to JLU graduates (as seen in the descriptive statistics already).

4.2 Multivariate Model

The third model estimates the maximum distance from home and university region to the preferred location (Table 7). The dummy for prior moves is significant again: the respective persons c.p. are

expected to prefer locations which are eighty minutes farther away. This is the largest influence any variable has. In contrast to the decision of being spatially open, age and gender do not show an influence on the distance towards the farthest preferred location. Being married is again a barrier to move far away. Since there are only very few graduates with children, this dummy does not have significant results. The main finding concerns the reasons why graduates prefer certain locations. Five of the eight possible reasons show significant influence on the distance. Graduates who are interested in places with many leisure possibilities or are just interested in living at a new place indicate preferred locations at long distances. This shows that amenities play an important role for German graduates. The findings are in line with Hypothesis 2b. However, the job opportunities dummy is insignificant. As argued in the last section, the ambitious graduates may know about the good job opportunities at medium distance (e.g. South Hesse) and thus do not want to move farther. Those graduates who like certain places because they are/were already living there, want to stay near to friends and family, or attach great importance to a good infrastructure prefer locations at shorter distances. This is in line with Hypothesis 3b. Costs of living and other reasons remain insignificant.

Model 3: dependent var.: dist			
	Estimate		Std. Error
(Intercept)	77.12	***	8.98
# pref loc	-3.18	*	1.44
priormove	79.77	***	3.63
male	-3.22		4.35
age25-27	5.16		3.99
age28-30	0.52		6.17
age>30	9.80		7.99
THM	15.35		10.38
PUM	17.07	***	4.34
married	-21.79	*	8.64
partner	0.27		3.96
children	12.95		8.62
internship	11.54	**	4.41
thesis ext	-5.11		6.25
job opp	6.03		3.76
infrastr	-14.27	***	3.95
leisure	33.07	***	3.96
fri&fam	-19.37	***	3.91
currdom	-27.25	***	4.58
newreg	50.39	***	4.57
costs	6.90		4.73
oth reas	9.27		5.96
n = 1989, Adj. R2: 0.3915			
field of study dummies included			
Significance */**/***: 5/1/0.1%.			

Table 7: Results from the OLS model. Reference variables: female or undefined gender, age24, JLU, single or undefined family status.

5 Conclusion

The paper at hand provides new evidence on interregional mobility of graduates from three German universities. By using data from one region and one point in time, we have the same regional push/pull factors for all survey respondents and can focus on individual characteristics. In contrast to earlier studies on graduate mobility, our data was collected prior to graduation and includes personal characteristics and spatial preferences. We apply three models estimating (1) the decision of being spatially open, (2) the concurrence of preferred and familiar places, and (3) the distance between preferred and familiar locations. In line with earlier findings for other countries, family status and prior moves have significant impacts on migration decisions. Women are less often searching spatially open but if they are flexible, they do not differ from males in the choice of places. Furthermore, we find that spatially curious graduates and those with a sophisticated leisure notion prefer more often unfamiliar and far-away locations. Respondents with a focus on job opportunities are willing to go to places far away. For staying in Hesse (the *Bundesland* of the universities), the variable is insignificant, hinting at sufficient job opportunities in the region. Not surprisingly, those who do not want to move indicate a job search at rather proximate places. Graduates focusing on being near to friends and family are less likely to stay in the university region and more likely to go back to the home region, implying that their social ties predominantly stem from pre-study times. Caring for the height of the costs of living as well as a good infrastructure leads to staying at familiar places.

From the perspective of regional employers and the regional government, there is broad potential of retaining graduates in the region: even though people often indicate preferences for locations far away, there is a majority either spatially open or explicitly searching (not exclusively) in the university region. Asked for ways how employers could retain them in the university region, more than 30% of the respondents recommended internships or vacancies information at notice boards in the universities, half of all respondents proposed entries in online job vacancies databases. Regional governments could provide local job vacancies platforms. In addition, people like going back to their home region, most often because of social ties there.

Some limitation apply to the paper at hand. Certainly, wishes are not identical with actual migration after having found a job. It would be interesting to do further analyses to check whether at the end amenities still play the role as indicated in the survey prior to graduation. Even though the restriction on graduates from three neighbored universities provides advantages, it limits at the same time the validity of our findings. A conduction of similar studies for other universities would help to validate our findings.

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Appendix

Bundesland	JLU		PUM		THM	
(federal state)	preference	home	preference	home	preference	home
Baden-Württemberg	6.7%	6.30%	6.3%	8.00%	7.1%	5.20%
Bayern	5.3%	3.70%	4.2%	3.80%	8.9%	3.90%
Berlin	5.0%	1.20%	6.9%	1.20%	2.5%	0.00%
Brandenburg	0.5%	0.80%	1.0%	0.90%	0.0%	0.00%
Bremen	0.9%	0.30%	0.7%	0.30%	1.1%	0.00%
Hamburg	5.3%	0.70%	7.1%	0.60%	1.8%	0.70%
Hessen	**47.20%**	**52.50%**	**32.40%**	**35.70%**	**56.90%**	**71.20%**
Mecklenburg-Vorp.	0.2%	0.30%	0.3%	0.90%	0.0%	0.00%
Niedersachsen	3.2%	6.30%	4.3%	11.20%	1.4%	0.70%
NRW	10.3%	10.00%	17.5%	16.80%	11.0%	2.60%
Rheinland-Pfalz	3.8%	5.90%	2.5%	5.90%	4.6%	3.30%
Saarland	0.3%	1.40%	0.8%	0.90%	0.0%	0.00%
Sachsen	2.0%	2.10%	3.3%	2.70%	0.0%	0.00%
Sachsen-Anhalt	0.4%	1.70%	0.3%	2.40%	0.0%	4.60%
Schleswig-Holstein	0.7%	1.10%	1.7%	1.20%	0.7%	1.30%
Thüringen	0.3%	1.40%	1.1%	2.90%	0.4%	0.70%
International	7.7%	4.20%	9.7%	4.70%	3.6%	5.90%

Table 8: Origin and destination wishes of students with preferred places.