Regional Labor Mobility of German University Graduates

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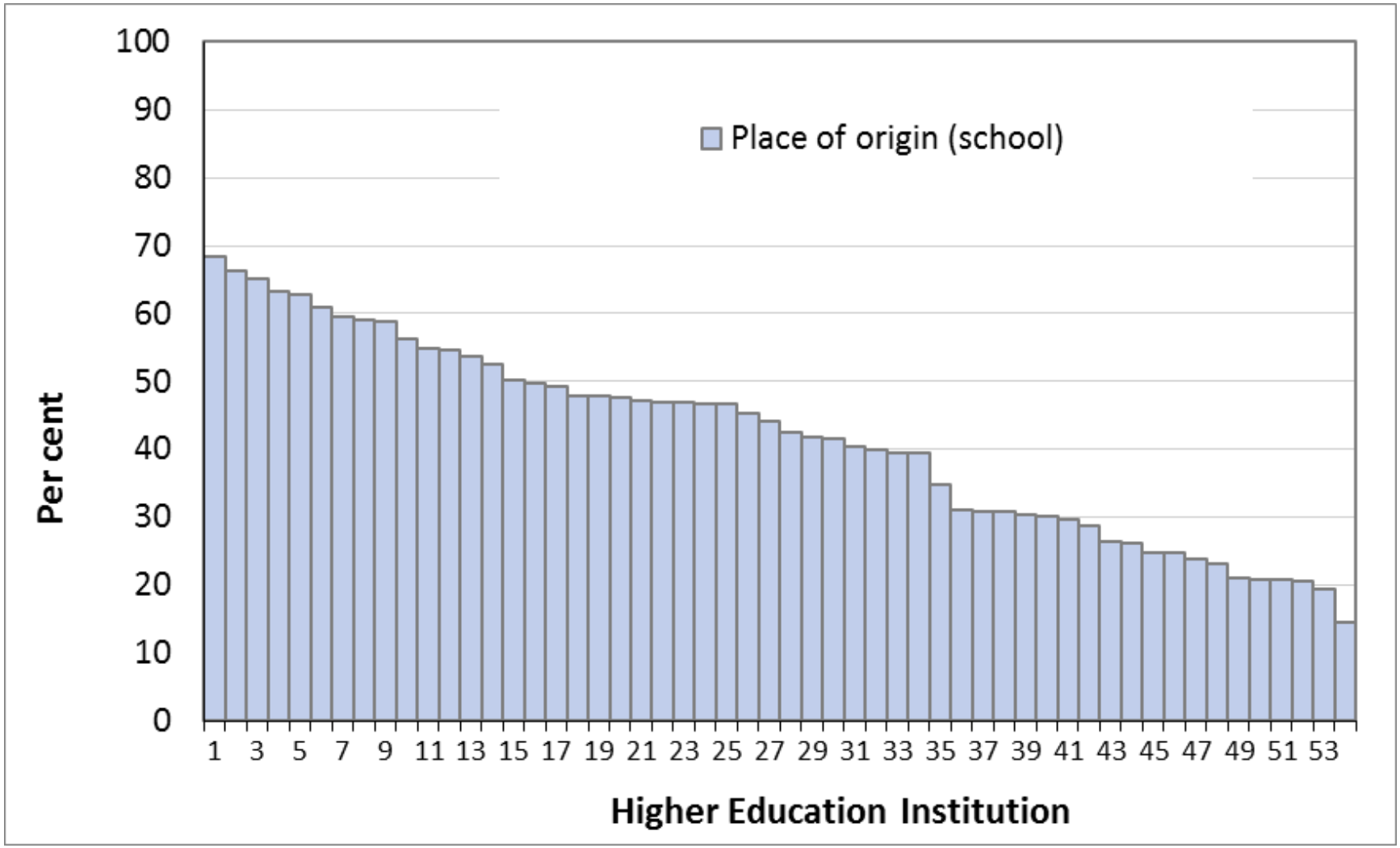
Outline

- Why studying regional labor mobility of graduates?
- Extend of graduates' labor mobility in Germany
- Determinants of graduates' labor mobility
- Data: Graduate surveys and regional data
- Empirical approach
- Results & Conclusions

Why studying regional labor mobility of graduates?

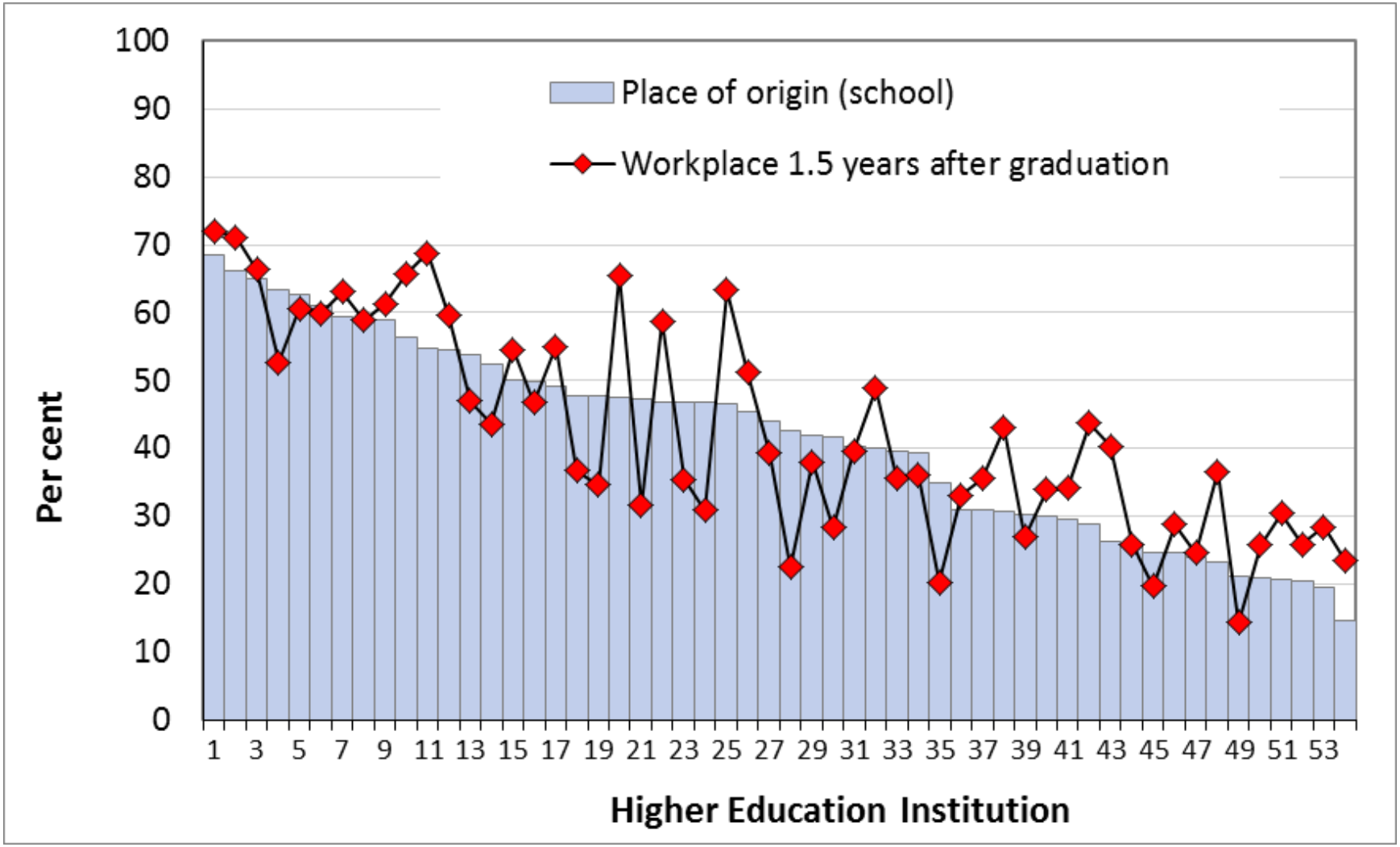
- Local demand created directly by HEI
- Today: Universities are increasingly seen as economic actors
  - Educating and qualifying graduates for the regional workforce
  - Knowledge transfer to the private sector
- Regions are thought to benefit from local higher education institutions
  - Absorption of human capital, Externalities from knowledge flows
- Perspectives for graduates: extend of supply on local labor market
- However, regions only benefit from educating highly qualified employers, if graduates stay in the region!
  - Thus, it is crucial to understand what determinants let alumni remain in university region -- > measurement by graduate surveys
  - Absorptive capacity of region

Absorptive capacity: migration balance?



Source: KOAB Graduate Survey 2007, 2008, 2009, INCHER-Kassel

Differences in migration balances



Source: KOAB Graduate Survey 2007, 2008, 2009, INCHER-Kassel

Determinants of graduates‘ labour mobility

Determinants of graduates‘ labor mobility

Labor mobility may partly depend on

1. Regional attributes of university region
2. Study characteristics
3. Sociodemographic characteristics
4. Attitude towards mobility
5. Social networks

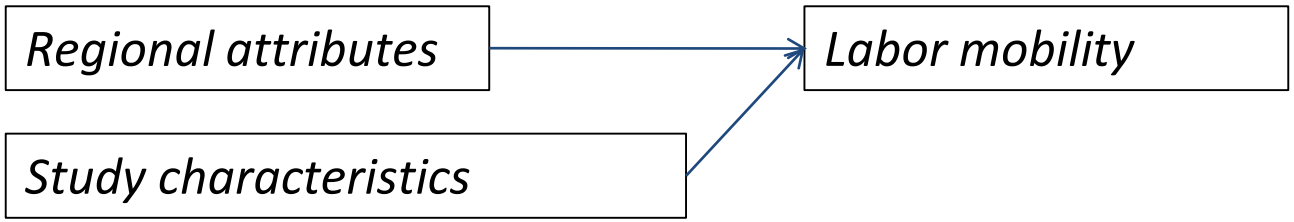
→ although there is previous analysis on determinants 1. – 4. these have hardly been tested jointly in a full model

Regional attributes of the university region

- Net flows of graduates varies across regions
  - Metropolitan areas attract greater share of graduates (e.g. Hoare and Corver, 2010)
  - Regional economic indicators may affect extent of outflow (e.g. Hansen et al. 2003)
  - Level of income and employment trend may affect extent of outflow (e.g. Buch et al. 2010)
- Mobility of graduates is hypothesized to depend on regional factors

Study characteristics

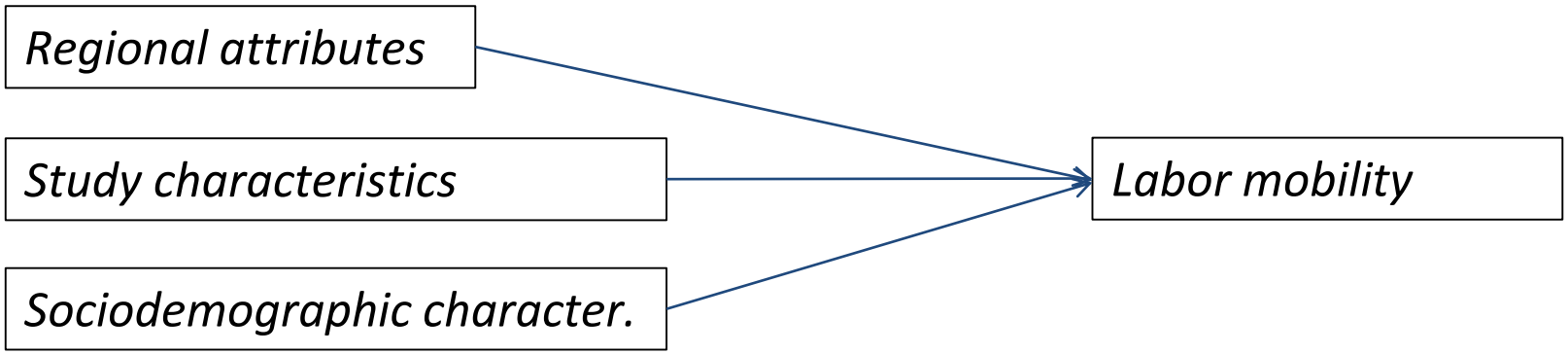
- Field of study
  - Graduates in some field need strong regional customer base or networks (i.e. medical graduates or lawyers that start an own firm)
  - High demand of graduates in certain fields (as engineering or computer scientists)
- Study success may indirectly affect mobility as “bad grades“ may be related to worse employment chances and the necessity to broaden the area of employment search
- Type of higher education institution – university of applied science with a stronger regional focus



Socio-demographic characteristics & Attitude towards mobility

Several socio-demographic characteristics may affect mobility

- Having children (→ social ties)
- Gender
- Previous mobility (attitude toward mobility)
- (Age)
- (Indiviual abilities (e.g. health))



Empirical approach: Heckman-selection

- Descriptive evidence
- Labor mobility: Is place of work in same planning region as the university? (Yes/No)
- Place of work → only employed graduates included → sample bias?

Heckman-selection technique (two-stage probit regressions)

First Stage:

- Probit regression analysis on determinants of employment
- Calculation of inverse Mills' ratio

Second Stage:

- Probit regression analysis on regional mobility of university graduates
- Inclusion of inverse Mills' ratio in regression analysis in order to account for bias in mobility (as mobility is only observed for those who are employed)

Data

Graduate surveys and regional data

Data source I: Graduate survey

Two data sources:

A. KOAB Graduate Survey

- Survey of graduates of 47 higher education institutions
- Harmonized survey is conducted by separate universities ca. 1.5 years after graduation
- Organization and data collection implemented by the International Center for Higher Education Research (INCHER)
- 'Core'-questionnaire plus 'optional' questions
- Representative sample within each university
- Sample of universities is not representatitve for whole of Germany (Bavaria and Saxony missing, East under-represented)
- Over 30.000 interviews completed with alumni of 2007

KOAB, regional distribution

Regional distribution of universities used for this analysis

36 universities, 11,085 oberservations

(Because of optional questions, missing answers, and exclusion of graduates who entered further studies or traineeship)

Data sources II: regional data

B. Second data source: regional characteristics

Regional data on economic development,

used here on level of planning regions/NUTS-2

(Federal Office of Regional Planning, Building and Urban Development)

- Information used includes:
  - Share of highly qualified employers in regional workforce
  - Local wage level
  - Unemployment rate
  - Settlement structure (Metropolis, agglomeration, urbanized area, rural area)

- Information on indicators of university region used for the year 2007 (graduation year of university graduates)

Results

Results (Step 2)

(Step 1: Likelihood to be employed after 1,5 years)

Step 2: Likelihood to be mobile after graduation (labor mobility) (R^2 = 0.133)

- 58 % of graduates are mobile on regional level

  (34 % leave state/*"Bundesland"*)

Regional labor mobility is more likely:

Regional variables:

- HEI in a rural or non-metropolitan area
- Low share of high qualified workforce at region of HEI
- Low wage level at region of HEI

Individual variables:

- No children
- Prior regional mobility (national or international)
- NO significant correlation with sex and age

Results (2)

Study characteristics:

- Field of study
- Bachelor dgree
- University of applied science

Signaling effect:

- Finished studies in time
- Better grades

Social networks → Mobility is less likely:

- Selfemployed
- Successfull job seaarch via internship
- Graduates who continue job they had before graduating

Conclusions

Conclusions

Large fraction of university graduates leave their university region

- 58 percent leave the university region when entering employment
- Regional characteristics of the university region have a significant impact, but study characteristics and socio-demographic characteristics as well.
- The more 'sucessful' graduates are more likely to leave the region
- Social networks linked with labor market reduce mobility
- Previous mobility strong indicator for further mobility.

→ Need to consider questions of regional mobility in questionnaire

→ Need of complex models

→ Combination of data from graduate surveys with regional data (and other data sources)

Thank you

Information on KOAB Graduate Survey:

http://koab.uni-kassel.de

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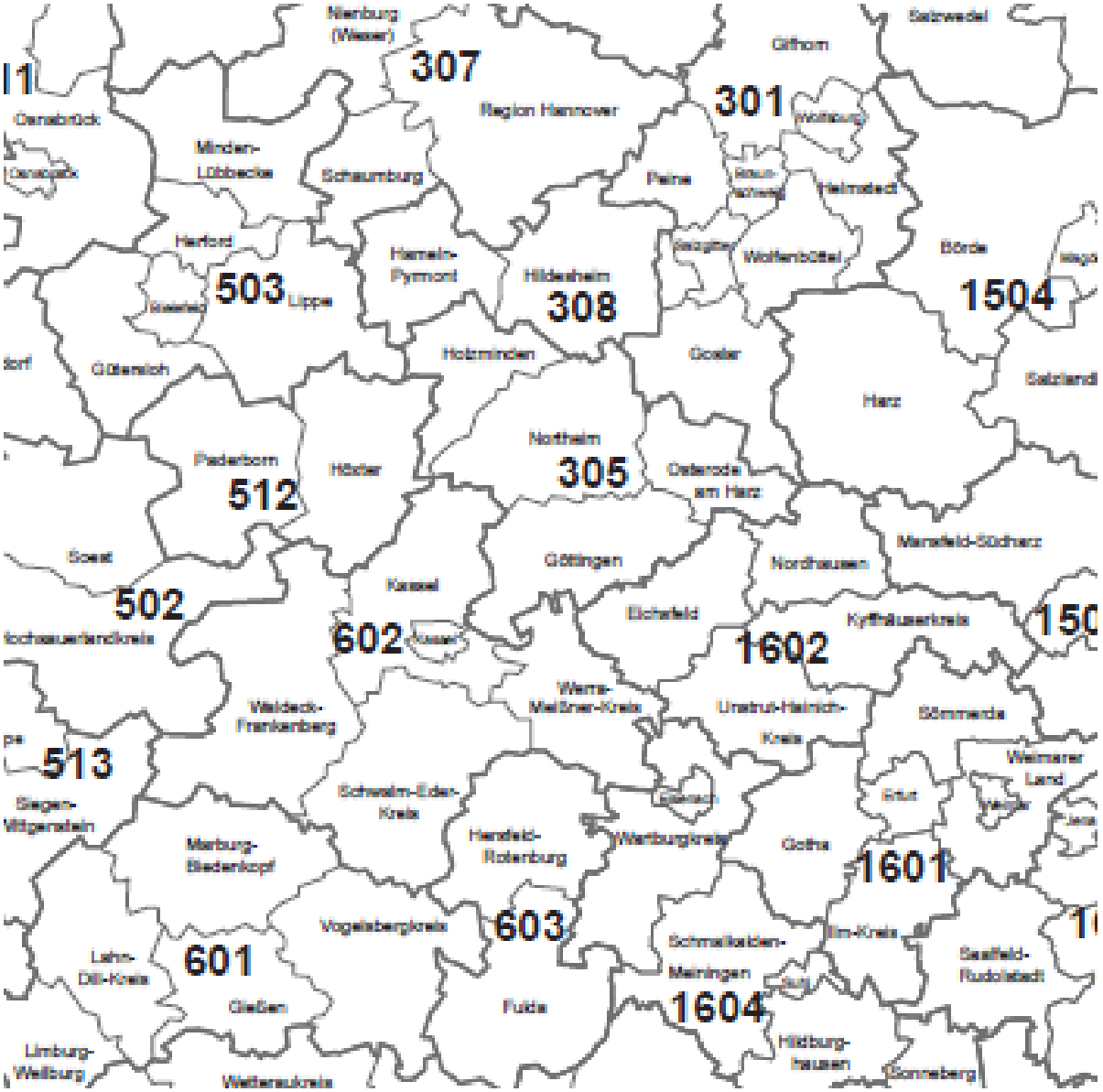
NUTS-2 Planning regions (number-lables/thick lines) and NUTS-3 administrative districts (name-lables/thin lines)



Appendix Table 4: Regional labor mobility of university graduates

Models	(1)	(2)	(3)	(4)
Variables	Coeff.	Marg. Eff	Coeff.	Marg.Eff.
Regional characteristics of university region				
University in rural region	0.661***	0.228***	0.561***	0.198***
University in urbanized region	0.317***	0.123***	0.250***	0.097***
University in agglomeration region	0.243***	0.094***	0.161**	0.062**
University in metropolis	(Reference)	(Reference)	(Reference)	(Reference)
Regional wage level of employers	-0.001***	-0.001***	-0.001***	-0.001***
Share of highly qualified in regional workforce	-0.101***	-0.040***	-0.094***	-0.037***
Share of R&D employees	0.012***	0.005***	0.010***	0.004***
Individual characteristics and study specificities				
Female			0.061**	0.024**
Children			-0.133**	-0.052**
Self-employed			-0.258***	-0.102***
Degree (1=bachelor)r			0.313***	0.117***
Length of study			-0.015***	-0.006***
Final grade of university degree			0.062***	0.024***
University of applied sciences			-0.002	-0.001
Mobility from school to university			0.545***	0.213***
International mobility during studies			0.191***	0.074***
Inverse Mill's Ratio	-0.557***	-0.217***	-0.831***	-0.324***
Constant	1.206***		0.880**	
Field of Study Controls	YES	YES	YES	YES
Observations	10333		10333	
Cragg-Uhler R2	0.108		0.174	
Log likelihhood	-6602.2593		-6315.5611	
Wald Test	X2(18)		X2(27)	
	861.54***		1434.93***	

Appendix Table 3: Employability of university graduates

Variables	1 (Coefficients)	2 (Marginal effects)
Regional attributes and ind. mobility		
University in metropolis	-0.695***	-0.099***
University in rural region area	0.156	0.014
University in agglomeration or urbanized region	(Reference)	(Reference)
Share of highly qual. employers in region	0.004	0.000
Employers in R&D in region	-0.008**	-0.001**
Regional wage level of employers	0.000	0.000
Unemployment rate	-0.001	-0.000
Regional gross value	0.025***	0.002***
Individual Characteristics		
Gender (1=female)	-0.185***	-0.018***
Age	0.005	0.001
Children	-0.525***	-0.072***
With vocational training prior to study	0.012	0.001
Mobility from school to university	0.052	0.005
International mobility during studies	-0.025	-0.002
Study specifities		
Degree (1=bachelor)	-0.683***	-0.108***
Final grade of university degree	-0.076**	-0.007**
Length of study	0.004	0.000
University of applied science	0.296***	0.024***
Constant	-0.021	
Field of study controls	YES	YES
Observations	11085	
Mac Fadden's R2	0.165	
Log-likelihood	-2380.6373	
Wald test	X2(28) 737.20***	

Notes: Standard errors in given in parentheses. The asterisks denote to following significance-levels: *** significant at 1%, **significant at 5%, * significant at 10%

Appendix Table 2 Regional mobility by (some) covariates and by measurement level of mobility

	Mobility to employment (mean)	
	by planning district	by state
Covariates: Former mobility experience		
Mobile prior to study (n=6992)	0.65	0.39
International mobile during study (n=3946)	0.63	0.55
Covariates: Study characteristics		
Languages and cultural studies (n=2029)	0.54	0.31
Social science (n=994)	0.52	0.33
Law (n=180)	0.39	0.24
Economics (n=2118)	0.68	0.38
Mathematics and computer science (n=1058)	0.54	0.32
Natural science (n=768)	0.42	0.29
Medicine (n=864)	0.65	0.35
Agriculture, forestry, nutrition science (n=226)	0.77	0.56
Engineering (n=1232)	0.56	0.34
Architecture (n=287)	0.66	0.37
Arts, music (n=158)	0.52	0.39
Other field of study (n=419)	0.64	0.34
Bachelor degree (n=547)	0.68	0.33
Diploma or master degree (n=9769)	0.57	0.34
University of applied science *(Fachhochschule) (n=1259)*	0.67	0.41
Covariates: Demographics		
Female (n=5263)	0.59	0.35
Male (n=5070)	0.57	0.33
With Children (n=982)	0.48	0.27
With vocational training prior to study (n=2600)	0.58	0.32
Selfemployed (n=804)	0.45	0.26
Covariates: Regional attributes		
University in metropolis (n=1658)	0.36	0.27
University in urban agglomeration region (n=3810)	0.57	0.26
University in urbanized region (n=4850)	0.65	0.41
University in rural region (n=481)	0.77	0.54
TOTAL (n=10333)	*0.58*	*0.34*

Appendix Table 1 Overview on variables from KOAB graduate survey

Variable	Mean	Std.Dev.	Min	Max
Mobility (n = 10333)				
Regional mobility from university to employment (by planning district)	0.58	0.494	0	1
State Mobility from university to employment	0.34	0.474	0	1
Former mobility experience (n = 11085)				
Mobility from school to university (1=yes, 0=no)	0.68	0.468	0	1
International mobility during study (1=yes, 0=no)	0.38	0.486	0	1
Field of Study (n = 11085)				
Languages and cultural Studies	0.21	0.404	0	1
Social science	0.10	0.298	0	1
Law	0.02	0.143	0	1
Economics	0.20	0.398	0	1
Mathematics and computer science	0.10	0.298	0	1
Natural science	0.08	0.268	0	1
Medicine	0.08	0.274	0	1
Agriculture, forestry, nutrition science	0.02	0.148	0	1
Engineering	0.11	0.317	0	1
Architecture	0.03	0.165	0	1
Arts, music	0.02	0.126	0	1
Other field of study	0.04	0.196	0	1
Other study characteristics (n = 11085)				
Bachelor degree	0.06	0.237	0	1
Diploma or master degree	0.94	0.240	0	1
University of applied science *(Fachhochschule)*	0.11	0.317	0	1
Final grade of university degree	1.56	0.627	1	4
Length of study (number of semester)	10.83	3.598	0	80
Demographics (n = 11085)				
Gender (1=female)	0.52	0.499	0	1
Age (years)	27.98	3.833	20	64
Children (1=yes, 0=no)	0.10	0.303	0	1
Vocational training prior to study (1=yes, 0=no)	0.24	0.433	0	1
Self-employed (1=yes, 0=no)	0.07	0.262	0	1

Ergebnisse (1)

- 61 % der AbsolventInnen sind nach dem Studium mobil (Raumordnungsregion)
- 38 % verlassen das Bundesland

Stufe 1: Wahrscheinlichkeit der Beschäftigungsaufnahme

(a) Gesamt, b) Frauen, c) Männer) (Gesamt: $R^2 = 0.137$) :

Kein signifikanter Zusammenhang:

- Signaleffekte (internationale Mobilität, Abschlussnote, Regelstudienzeit)
- Soziale Netze 'privat': Jobsuche mittels Freunden/Verwandeten

Geringer Zusammenhang:

- Siedlungstyp (geringer in Metropolen (!))

Hoher Zusammenhang:

- Soziale Netze 'beruflich': Praktika während des Studiums
- Individuell: Geschlecht (geringer bei Frauen), Frauen mit Kind
- Studium: Abschlussart (geringer bei BA), Fach (höher bei Wiwi, Medizin) , Hochschultyp (geringer bei Universitäten)
- Region: Bruttowertschöpfung

Potential von Absolventenstudien

Wie misst man Wissenstransfer….?

→ Wissenstransfer durch HochschulabsolventInnen

- Methodische Vorteile von Absolventenstudien
- Vielzahl von Studien zur regionalen Mobilität von AbsolventInnen, u.a.:
  - Großbritannien: Bristow et al. 2011, Hoare/Corver 2010, Faggian/McCann 2009, Faggian et al. 2007;
  - USA: Kodrzycki 2001, Groen 2004 ;
  - Niederlande: Venhorst et al. 2010 ;
  - Österreich: Flöther 2011, Guggenberger 2008;
  - Deutschland: Flöther 2012, Fabian/Minks 2008, Mohr 2002;
  - Bayern: Falk/Kratz 2009; Sachsen: Lenz et al. 2010 .; Saarland: Hell et al. 2011
- Effekte von HochschulabsolventInnen auf regionalen Arbeitsmarkt (Schlump/Brunner 2010)