# Dormant skills
## as a result of regional and skill mismatch?

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**T.A.S.K.S.**

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# Motivation

- Skill shortages
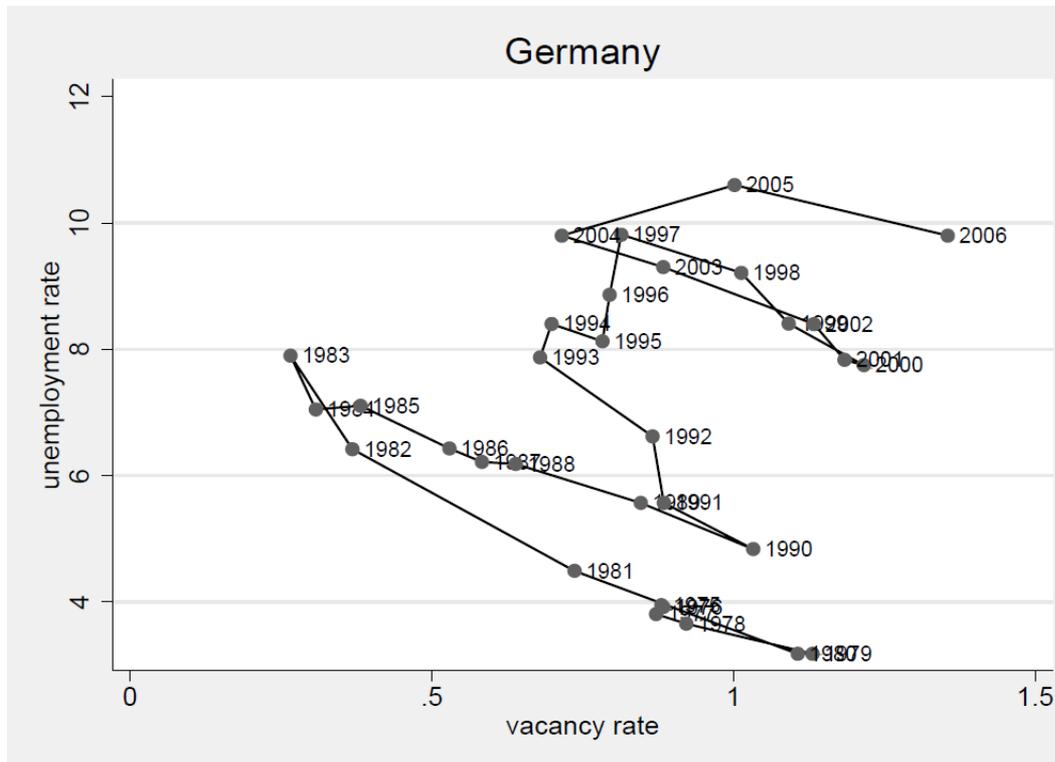- High unemployment



Figure 1. The Beveridge curve 1976-2006 (Source: Bouvet 2009)

# Why do shortages and unemployment coexist?

- Asymmetric information
- Coordination failures
- Institutional arrangements
- Restricted regional labour mobility (regional mismatch)
- Heterogeneity in the demand and supply of skills (skill mismatch)
  (Pissarides 2000, Petrongolo and Pissarides 2001)

- Political relevance
  - Skills mismatch→ requalifictaion policy
  - Regional mismatch→ labour mobility or other policy

# Regional mismatch

- Are the jobs where the unemployed skill-stocks are?
- Low/medium skilled unemployed/jobs: less regionally mobile than high-skilled (OECD 2008, Mauro and Spilimbergo 1998)
- Do unemployed migrate to regions where the jobs are?

H1: The geographical distance to the job openings has a negative effect on the exit from unemployment.

# Skill mismatch

- Demand side: changing skill demands due to:
  - Demographic changes (health-care jobs),
  - International division of labour (textile jobs),
  - Technological change (complementing creative and substituting routine skills).
- Supply side: inelastic supply for certain occupations due to the duration of training and retraining.
- Human capital is transferable across occupations (Poletaev and Robinson 2008, Gathmann and Schönberg 2010).
- Among the unemployed, those trained in *occupations skill-related* to those in demand should have an advantage in the reemployment.

# Skill mismatch

H3: The occupation-specific unemployment rate does not only depend on the demand for the own occupation, but also on the demand for *skill-related* occupations.

H4: The effect is more pronounced for the low-skilled.

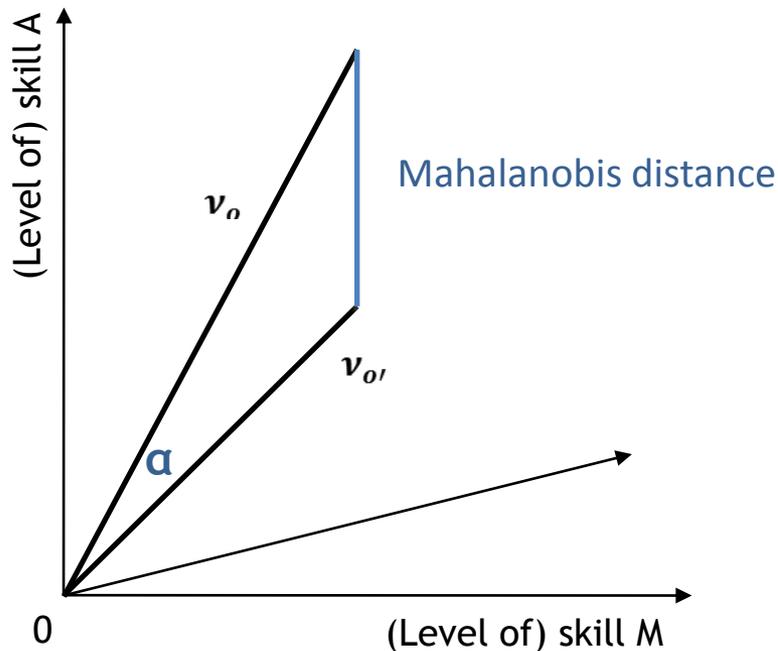H5: The effect is more pronounced for the young workers.

# Data

- Occupational and Career Survey (BauA and BIBB, 2005/2006)
  - 20,000 individuals
  - 52 questions on tasks and working conditions
  - Occupations, 3-digit KldB88
- IAB Employment samples (IAB, 1975-2004)
  - 2% sample of the German population subject to social security
  - Employment and unemployment history, occupational history, labour mobility, regional information
- Job openings and vacancy time (Federal Employment Agency, 2000-2009)
  - By 3-digit KldB88 and 16 German states
- Final sample: 120 occupations, 16 states, 2000-2004.

# Measurement: skill demand, skill shortages, skill stocks

- Demand: job announcements by occupation and state.
- Shortage: vacancy time.
  - Corr(vacancy time, unemployment)=0.71;
  - Corr(vacancy time, real wages)=0.33;
  - Corr(vacancy time, real wage growth)=0.15.
- Skill stocks: skills required at the last occupation before unemployment.
- Regional distance (same state, bordering state, non-bordering state)

# Measurement: skill-relatedness
# skill-distance of occupations

- Polataev and Robinson (2008), Gathmann and Schönberg (2010), Neffke (2009), Nedelkoska and Neffke (2010), Rocher (2010).



Orthogonal skills (Angular distance, Euclidean distance):
Factor analysis of the 52 tasks
6 skill dimensions:
-cognitive
-manual
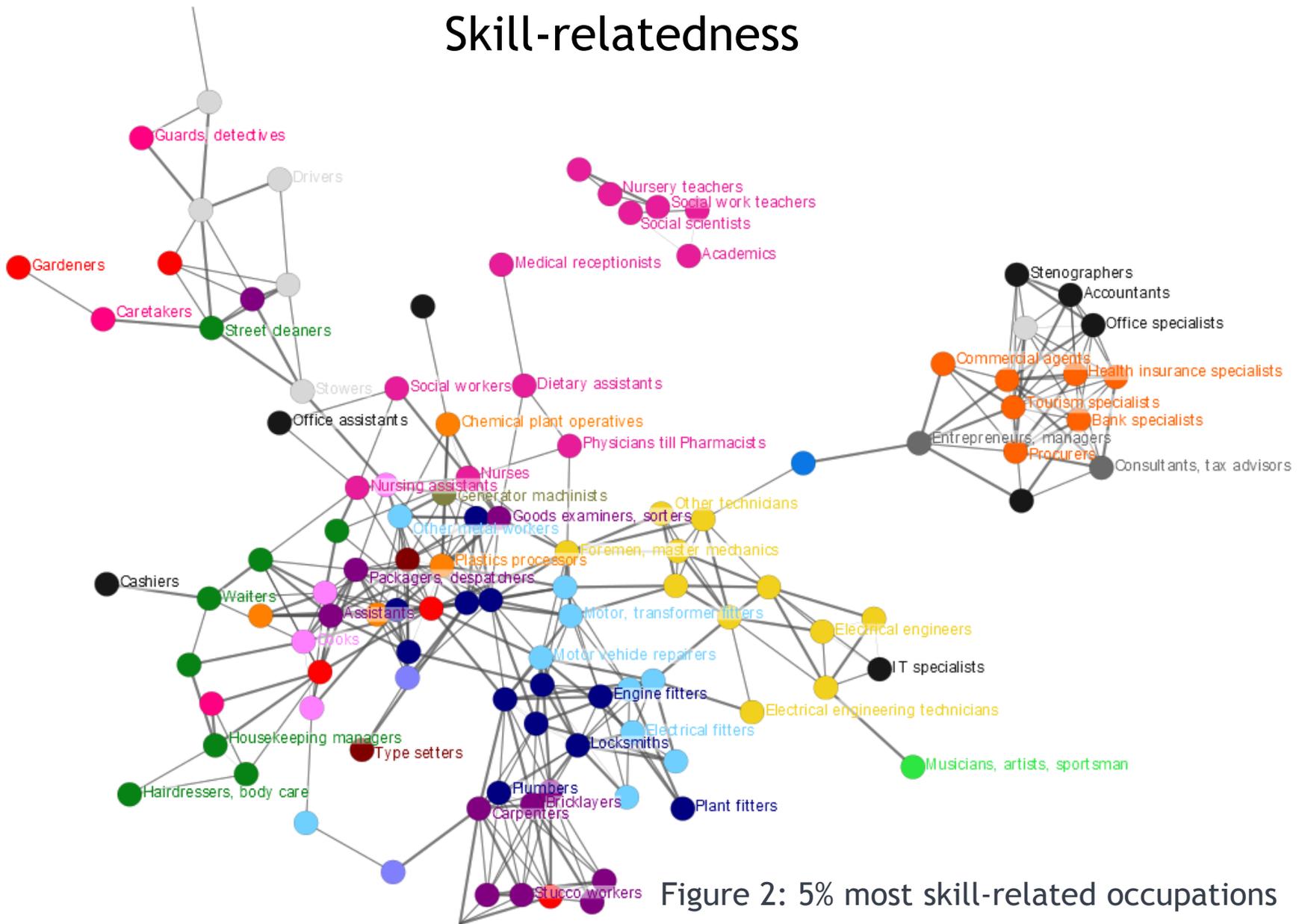-technical
-care
-service
-security

# Skill-relatedness



Figure 2: 5% most skill-related occupations

# Job openings which are difficult to fill

| Occupation | Average vacancy time (2000-2004) |
|---|---|
| Electrical engineers | 96.74 |
| Health insurance specialists | 95.38 |
| Bank specialists | 94.45 |
| Business dealers | 92.78 |
| Mechanical, motor engineers | 86.70 |
| Other wood and sports equipment makers | 84.54 |
| Toolmakers | 84.20 |
| Physicians till Pharmacists | 81.74 |
| Electrical engineering technicians | 81.68 |
| Postal deliverers | 81.44 |
| Conductors | 79.94 |
| Other engineers | 78.44 |
| Architects, civil engineers | 76.98 |
| Other mechanics | 75.76 |
| Drillers | 74.79 |
| Motor, transformer fitters | 72.72 |
| Telecommunications mechanics | 71.86 |
| Machinery repairers | 71.59 |
| Non-medical practitioners | 69.48 |
| Mechanical engineering technicians | 69.42 |
| Precision fitters | 69.20 |
| Nurses | 69.00 |
| Chemists, physicists, mathematicians | 66.33 |
| Other technicians | 66.04 |
| Nursing assistants | 65.82 |

Source: Federal Employment Agency, 2011

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Source: Federal Employment Agency, 2011

# Skills of the difficult-to-fill jobs

| Mechanics | |
|---|---|
| Handicraft knowledge | 0.77 |
| Technical knowledge | 0.76 |
| Measuring, checking, proving | 0.75 |
| Repair and maintenance of machines | 0.71 |
| Work with computers | 0.54 |
| Production of goods | 0.42 |
| Consult and inform | 0.41 |
| Controlling and operating machines/technological processes | 0.38 |
| PC software knowledge | 0.33 |

| Healthcare occupations | |
|---|---|
| Consult, inform | 0.86 |
| Information collection, research, inform | 0.75 |
| Work with computers | 0.74 |
| Medical knowledge | 0.73 |
| Care, assist, cure | 0.69 |
| Advanced knowledge of German | 0.46 |
| Measuring, checking, proving | 0.45 |
| Organizing, planing, and preparing | 0.42 |
| Knowledge in natural sciences | 0.37 |

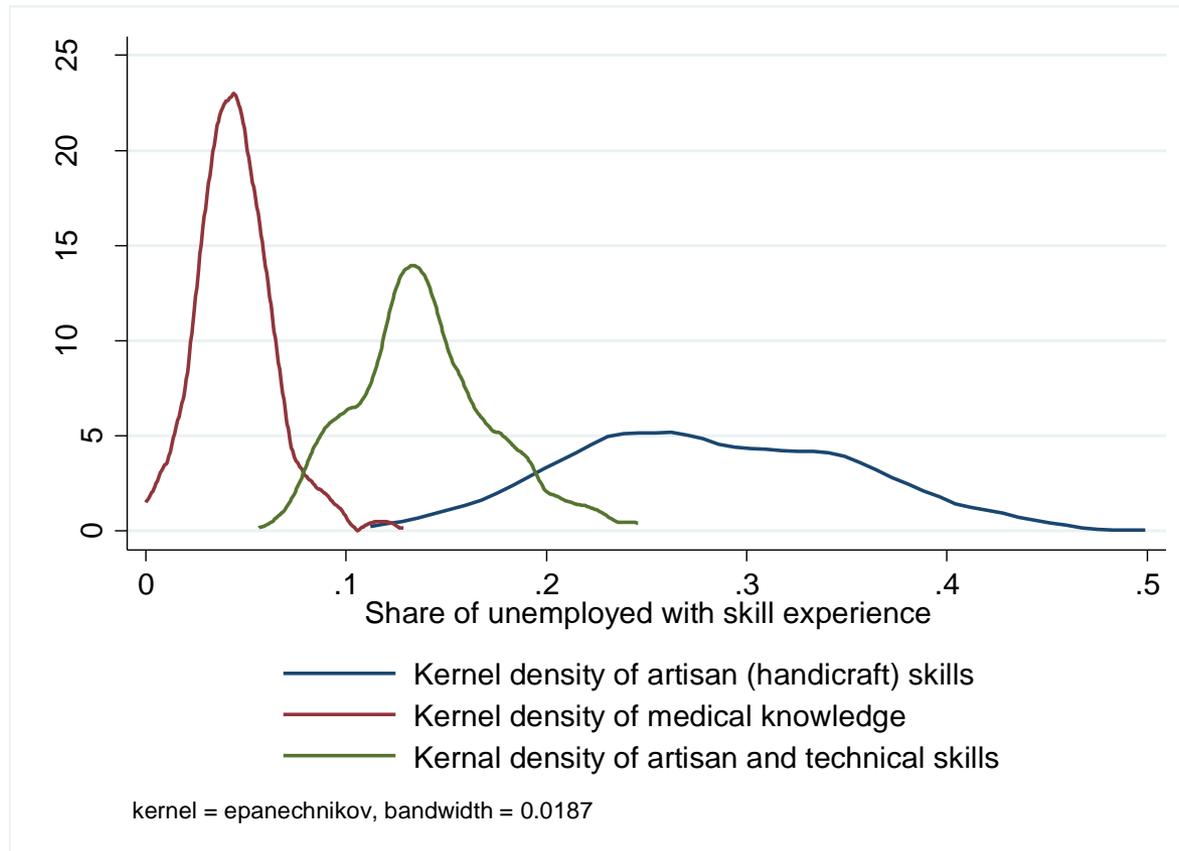# Regional mismatch: are there dormant skills?



Figure 3: Share of unemployed with experience in different skills
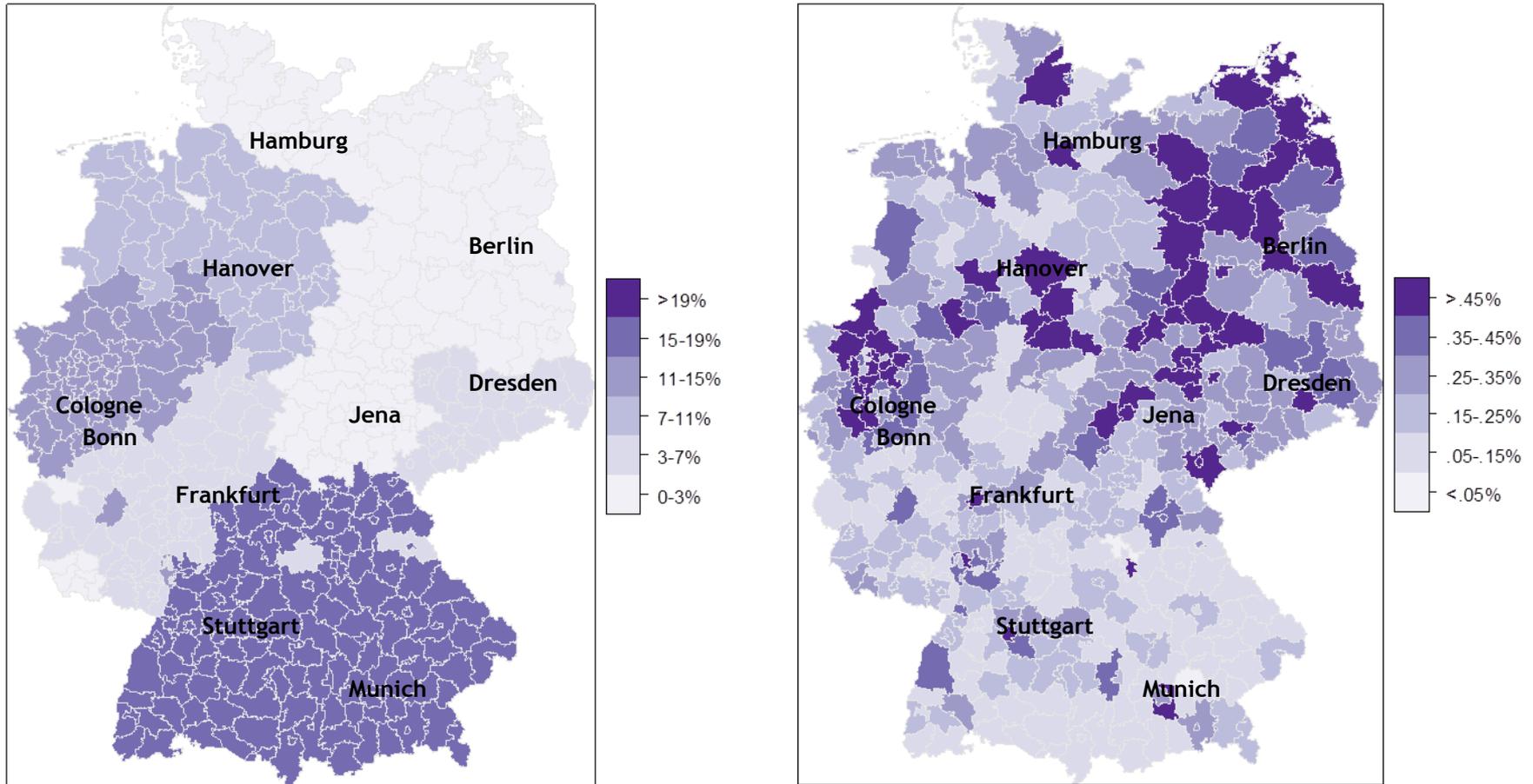
# Is there a regional mismatch?



Figure 4: Regional distribution of artisan skill experience (left)
Regional distribution of artisan+technical skill experince (right)

# Regional mismatch: does labour migrate to job creating regions?

$$move_{olo'l'} = \beta_0 + \beta_1 RD_{ll'} + \beta_2 openings_{o'l'} + \beta_3 RD * openings_{o'l'} + \beta_4 De_{oo'} + \beta_5 unempl_{ol} + \beta_6 w_{o'l'} + \beta_7 size_{o'l'} + \varepsilon_{olo'l'}$$
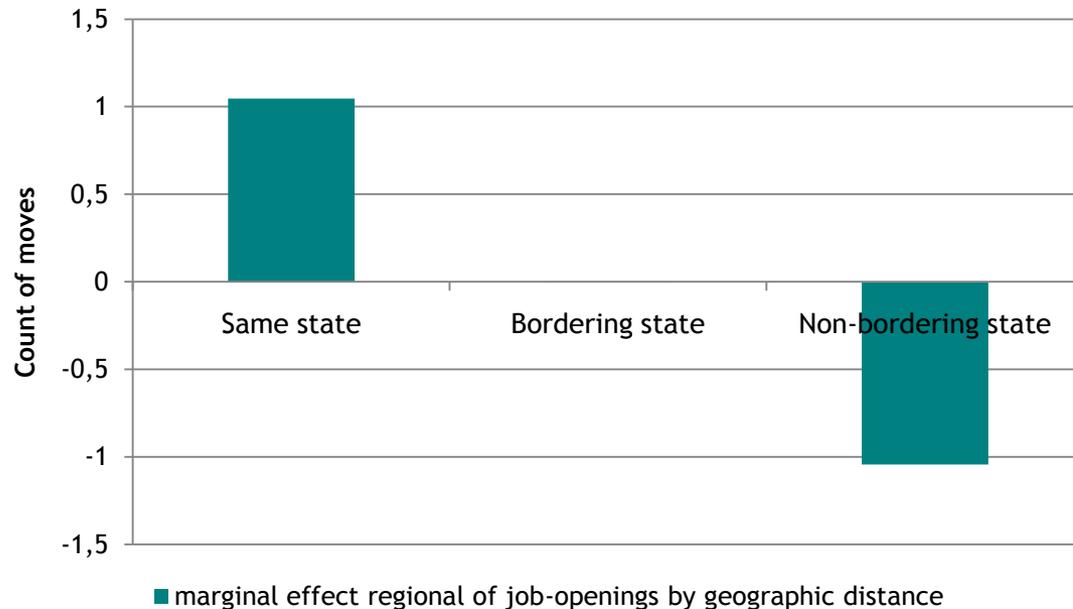


Figure 5: Interacion effects openings share*regional distance

# Skill mismatch: employing from related occupations?

$$\Delta unempl_{ol} = \beta_0 + \beta_1 openings_{ol} + \beta_2 openings_{rl} + \beta_3 \Delta w_{ol} + \varepsilon_{ol}$$

H1: The occupation-specific unemployment rate does not only depend on the demand for the own occupation, but also on the demand for *skill-related* occupations.

| Dependent variable--> Unemployment growth | All unemployed | | 35 or younger | | 14 edu years or less | |
|---|---|---|---|---|---|---|
| | Random effects | | | | | |
| **Related openings (Da)** | **-0.0424*** | | -0.0292*** | | -0.0518*** | |
| | **(0.00710)** | | (0.00707) | | (0.00986) | |
| **Related openings (Dm)** | | **-0.00052*** | | -0.000393*** | | -0.000564*** |
| | | **(6.61e-05)** | | (6.58e-05) | | (7.66e-05) |
| Own occupation openings | -0.103*** | -0.0508** | -0.0908*** | -0.0514** | -0.0945*** | -0.0412* |
| | (0.0277) | (0.0234) | (0.0258) | (0.0213) | (0.0287) | (0.0242) |
| Real wage growth | -0.000853* | -0.00115** | 0.00221 | 0.00214 | -0.0155 | -0.0150 |
| | (0.000487) | (0.000518) | (0.00821) | (0.00821) | (0.0163) | (0.0161) |
| Constant | 3.647*** | 3.790*** | 2.485*** | 2.609*** | 4.224*** | 4.342*** |
| | (0.257) | (0.267) | (0.242) | (0.255) | (0.334) | (0.341) |
| Observations | 1,933 | 1,933 | 1,914 | 1,914 | 1,437 | 1,437 |
| Random effects. Standard errors clustered by occupation. 121 occupations and 16 States | | | | | | |

# Skill mismatch: employing from related occupations?

H2: The effect of the demand for *skill-related* occupations is stronger for younger workers.

| Dependent variable--> Unemployment growth | All unemployed | | 35 or younger | | 14 edu years or less | |
|---|---|---|---|---|---|---|
| | Random effects | | | | | |
| **Related openings (Da)** | -0.0424*** | | **-0.0292*** | | -0.0518*** | |
| | (0.00710) | | **(0.00707)** | | (0.00986) | |
| **Related openings (Dm)** | | -0.000522*** | | **-0.00039*** | | -0.000564*** |
| | | (6.61e-05) | | **(6.58e-05)** | | (7.66e-05) |
| Own occupation openings | -0.103*** | -0.0508** | -0.0908*** | -0.0514** | -0.0945*** | -0.0412* |
| | (0.0277) | (0.0234) | (0.0258) | (0.0213) | (0.0287) | (0.0242) |
| Real wage growth | -0.000853* | -0.00115** | 0.00221 | 0.00214 | -0.0155 | -0.0150 |
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Random effects. Standard errors clustered by occupation. 121 occupations and 16 States

# Skill mismatch: employing from related occupations?

H3: The effect of the demand for *skill-related* occupations is stronger for less-educated workers.

| Dependent variable--> Unemployment growth | All unemployed | | 35 or younger | | 14 edu years or less | |
|---|---|---|---|---|---|---|
| | Random effects | | | | | |
| **Related openings (Da)** | -0.0424*** | | -0.0292*** | | **-0.0518*** | |
| | (0.00710) | | (0.00707) | | **(0.00986)** | |
| **Related openings (Dm)** | | -0.000522*** | | -0.000393*** | | **-0.00056*** |
| | | (6.61e-05) | | (6.58e-05) | | **(7.66e-05)** |
| Own occupation openings | -0.103*** | -0.0508** | -0.0908*** | -0.0514** | -0.0945*** | -0.0412* |
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# Conclusions

H1: Geographical distance between job openings and dormant skills reduces the job-finding frequency of the unemployed.
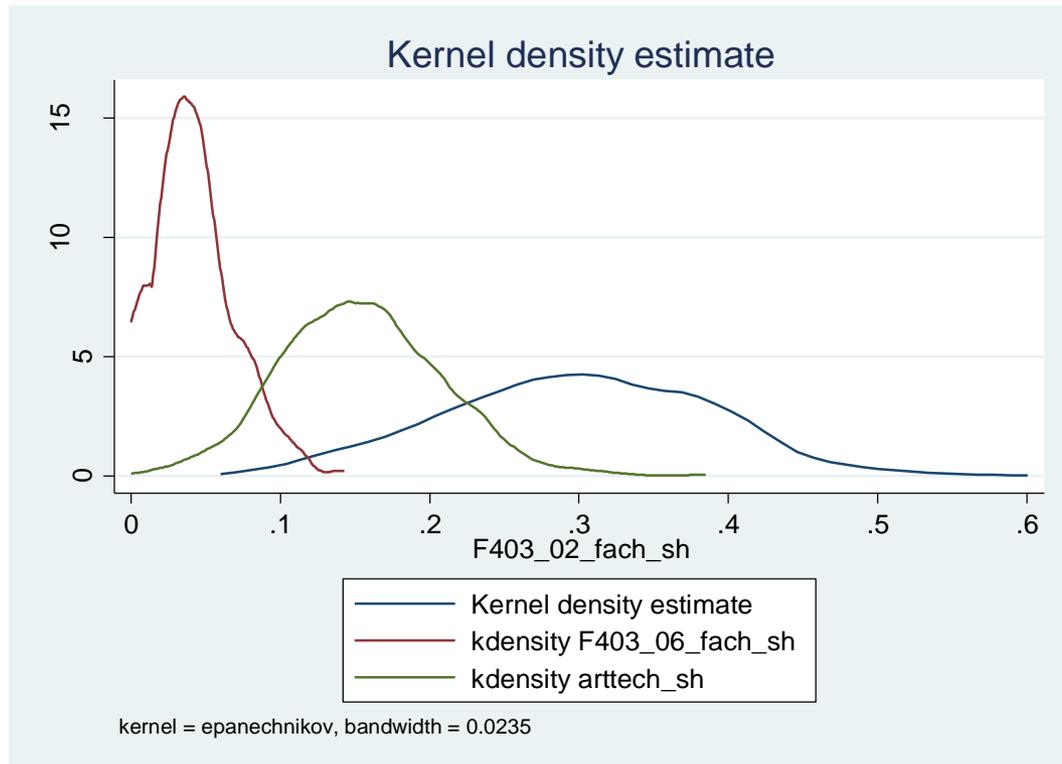
H2: Unemployed with past experinece in occupations which are skill-related to the occupations in demand are more likely to become reemployed.

H3: Younger unemployed are less likely to become reemployed in skill-related occupations.

H4: Lower-skilled unemployed are more likely to switch to skill-related occupations.

- Policy implications

# Appendix



Kernel density estimate

kernel = epanechnikov, bandwidth = 0.0235

# Motivation

- How to counteract skill shortages and unemployment?
  - **Requalify unemployed**
    - "Das vorhandene Potenzial im Land sollte erst einmal genutzt werden. Wir können nicht zulassen, dass Menschen in Arbeitslosigkeit sind, nur weil ihre Talente nicht genutzt werden" (Frank-Jürgen Weise for Financial Times Deutschland, 02.08.2010)
    - "Priorität bei der Sicherung der Fachkräftebasis in Deutschland hat der Abbau der Arbeitslosigkeit" (BMAS, 2011, p. 18)

| Dependent variable--> | Job-unemployment-job moves | All moves |
|---|---|---|
| **Bordering region** | -2.812*** | -2.832*** |
| | (0.0279) | (0.0204) |
| **Non-bordering region** | **-3.999*** | **-4.125*** |
| | **(0.0297)** | **(0.0212)** |
| Occupational distance | -5.716*** | -6.230*** |
| | (0.124) | (0.0838) |
| Share of job openings in arrival region | 0.0232*** | 0.0268*** |
| | (0.00174) | (0.00143) |
| Real wage level in arrival region | -0.0233*** | -0.00218*** |
| | (0.000642) | (0.000475) |
| Constant | 0.826*** | 1.874*** |
| | (0.0535) | (0.0473) |
| Inflated model (logit) | | |
| Labour force | -0.0436*** | -0.0702*** |
| | (0.00203) | (0.00100) |
| Constant | 2.436*** | 1.753*** |
| | (0.0294) | (0.0178) |
| ln(alpha) | 1.432*** | 2.012*** |
| | (0.0484) | (0.0157) |
| Observations | 3,600,091 | 3,600,091 |

Robust standard errors in parentheses. Significant at the ***1%, **5%, *10% level.
Zero-inflated negative binomial model.