Brain Flows at Lower Rhine Region

Prof. Dr. Rüdiger Hamm
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Rüdiger Hamm, Angelika Jaeger, Johannes Kopper, Fabian Kreutzer
1. Introduction

2. Graduate Migration Patterns and Determinants

3. Reasons for Migration

4. Discussion and Conclusion
**Introduction**

*Academic literature tells us:*

- Human capital is a key indicator of regional economic and innovation performance
  - Patterns of regional “brain flows” are key determinants for the development of the human capital level

- Migration is a well-analyzed research topic on a macro level
  - Additional information can be gained with graduate migration analysis on a small-scale regional level
Introduction

Study Region: Central Lower Rhine Area (CLRA)
Introduction

What are central characteristics of the Central Lower Rhine Area (CLRA)?

- Old Industrial region, with a focus on textile and engineering (in the past)
- Adjustment problems due to structural changes
- On the rim of a congested urban area with several prospering metropolises → pull factor!

The CLRA faces diverse challenges

- Economic problems, above-average unemployment
- High municipal debts
- Below-average percentage of university graduates employed
- 38% of regional companies claim a shortage of skilled labour

→ A university is a vital chance for the region!
Skill shortage?

Betriebe mit jeweils aktuellem Fachkräftemangel
Anteile in Prozent

Durchschnitt

Quelle: IHK-Konjunkturumfragen.

10. Regionalökonomisches Forum | 08. Mai 2012 | Fachkräftemangel am Niederrhein?!
Quelle: IHK 2012, S.1
Skill shortage?
Skill shortage?

Interferences for firms, because of …

• … production process are encumbered,
• … staff costs will rise,
• … productivity will decrease and/or
• … innovation processes could be restrained.
Graduates’ Migration and its Determinants

1. Introduction

2. Graduate Migration Patterns and Determinants

3. Reasons for the Migration

4. Discussion and Conclusion
1. **Survey with Graduates, 2012**
   
   © Evaluationsstelle HSNR, N = 1.769

2. **Survey with Alumni, 2011**

   Online-survey, 3000 members of our alumni-network, N = 475

3. **Survey with students (plans), 2011**

   last semesters of study, N = 250
Hypotheses

Expectations

1. Many students stem from the region.
2. Especially regional students stay here after graduation.
3. Region is not very attractive for graduates from elsewhere to stay here after graduation.
## Types of mobility

<table>
<thead>
<tr>
<th>Origin (HZB)</th>
<th>Destination: Niederrhein</th>
<th>Destination: Rest of the world</th>
</tr>
</thead>
<tbody>
<tr>
<td>Niederrhein</td>
<td>“Non Migrants”</td>
<td>“Late Migrants”</td>
</tr>
<tr>
<td></td>
<td><img src="image" alt="Niederrhein" /></td>
<td><img src="image" alt="Niederrhein" /></td>
</tr>
<tr>
<td></td>
<td><img src="image" alt="Sonstige" /></td>
<td><img src="image" alt="Sonstige" /></td>
</tr>
<tr>
<td>Rest of the world</td>
<td>“University Stayers”</td>
<td>“Repeat Migrants”</td>
</tr>
<tr>
<td>(HZB)</td>
<td><img src="image" alt="Niederrhein" /></td>
<td><img src="image" alt="Niederrhein" /></td>
</tr>
<tr>
<td></td>
<td><img src="image" alt="Sonstige" /></td>
<td><img src="image" alt="Sonstige" /></td>
</tr>
</tbody>
</table>

© NIERS nach Wanderungsschema von Faggian / McCann, 2008
### Alumni 2011

<table>
<thead>
<tr>
<th>Origin</th>
<th>Stay</th>
<th>Migration</th>
<th>Summation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Niederrhein</strong></td>
<td>Non Migrants 12,4 vH</td>
<td>Late Migrants 30,5 vH</td>
<td>42,9 vH</td>
</tr>
<tr>
<td><strong>Other Regions</strong></td>
<td>University Stayers 6,2 vH</td>
<td>Repeat Migrants 50,9 vH</td>
<td>57,1 vH</td>
</tr>
<tr>
<td><strong>Summation</strong></td>
<td>18,6 vH</td>
<td>81,4 vH</td>
<td>100</td>
</tr>
</tbody>
</table>

→ Brainflow-Bilanz: - 24,3 vH
Graduates 2012

<table>
<thead>
<tr>
<th>Origin</th>
<th>Stay</th>
<th>Migration</th>
<th>∑</th>
</tr>
</thead>
<tbody>
<tr>
<td>Niederrhein</td>
<td>Non Migrants</td>
<td>Late Migrants</td>
<td>30,5* vH</td>
</tr>
<tr>
<td></td>
<td>15,0 vH</td>
<td>15,5 vH</td>
<td></td>
</tr>
<tr>
<td>Other Regions</td>
<td>University Stayers</td>
<td>Repeat Migrants</td>
<td>69,5 vH</td>
</tr>
<tr>
<td></td>
<td>11,5 vH</td>
<td>58,0 vH</td>
<td></td>
</tr>
<tr>
<td>∑</td>
<td>26,4 vH</td>
<td>73,5 vH</td>
<td>100</td>
</tr>
</tbody>
</table>

→ Brainflow-Bilanz: - 4,0 vH

* Hochschulstatistik: Share of first year students from Niederrhein > 37 vH

© NIERS, Datenbasis: Absolventenbefragung 2012, N = 1769; Hochschulstatistik HSNR
Graduates 2012

<table>
<thead>
<tr>
<th>Origin</th>
<th>Stay</th>
<th>Migration</th>
<th>∑</th>
</tr>
</thead>
<tbody>
<tr>
<td>NRW</td>
<td>Non Migrants 68,0 vH</td>
<td>Late Migrants 14,6 vH</td>
<td>82,6 vH</td>
</tr>
<tr>
<td>Rest of the World</td>
<td>University Stayers 6,5 vH</td>
<td>Repeat Migrants 10,9 vH</td>
<td>17,4 vH</td>
</tr>
<tr>
<td>∑</td>
<td>74,5 vH</td>
<td>25,5 vH</td>
<td>100</td>
</tr>
</tbody>
</table>

→ Brainflow-Bilanz bezogen auf NRW: - 8,1 vH
### University – influence on migration

#### How did you find your first job

<table>
<thead>
<tr>
<th>Method</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nebentätigkeit im Studium</td>
<td>13.3%</td>
</tr>
<tr>
<td>Praktika/Projekte</td>
<td>11.6%</td>
</tr>
<tr>
<td>Durch Abschlussarbeit</td>
<td>10.4%</td>
</tr>
<tr>
<td>Durch Lehrende/n</td>
<td>3.6%</td>
</tr>
<tr>
<td>Bewerbung auf Stellenanzeige</td>
<td>34.5%</td>
</tr>
<tr>
<td>Persönliche Kontakte</td>
<td>18.0%</td>
</tr>
<tr>
<td>Initiativbewerbung</td>
<td>12.2%</td>
</tr>
<tr>
<td>Vermittlung durch A&amp;AI</td>
<td>1.7%</td>
</tr>
</tbody>
</table>

39%: Connected with studies/University
Migrationsverhalten nach Fachbereichen

<table>
<thead>
<tr>
<th></th>
<th>Chemie</th>
<th>Design</th>
<th>Electrotechnical engineering</th>
<th>Mechanical engineering</th>
<th>Oecotrophologie</th>
</tr>
</thead>
<tbody>
<tr>
<td>Origin Niederrhein (%)</td>
<td>22,8</td>
<td>25,4</td>
<td>39,7</td>
<td>34,1</td>
<td>24,5</td>
</tr>
<tr>
<td>Destination Niederrhein (%)</td>
<td>20,3</td>
<td>11,8</td>
<td>22,4</td>
<td>38,1</td>
<td>29,2</td>
</tr>
<tr>
<td>Brainflow-Bilanz (%)</td>
<td>-2,5</td>
<td>-13,6</td>
<td>-17,3</td>
<td>+4,0</td>
<td>+4,7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Social Sciences</th>
<th>Textil-/ Clothing</th>
<th>Economics</th>
<th>Engineering and Economics</th>
<th>Health</th>
</tr>
</thead>
<tbody>
<tr>
<td>Origin Niederrhein (%)</td>
<td>30,3</td>
<td>9,2</td>
<td>42,2</td>
<td>42,4</td>
<td>24,0</td>
</tr>
<tr>
<td>Destination Niederrhein (%)</td>
<td>42,1</td>
<td>9,9</td>
<td>26,5</td>
<td>27,7</td>
<td>32,2</td>
</tr>
<tr>
<td>Brainflow-Bilanz (%)</td>
<td>+11,8</td>
<td>+0,7</td>
<td>-15,7</td>
<td>-14,7</td>
<td>+8,2</td>
</tr>
</tbody>
</table>

→ Differences by faculties
Graduate Migration Patterns and Determinants

Descriptive Analysis: Interesting results concerning migration determinants:

- Migration propensity differs considering different fields of study
- A temporary stay abroad: does not alter frequency of graduate migration, but generally raises the migration distance
- Duration of Job Seeking: Graduates, who stay in the region, find jobs faster
- Starting salary: A high starting salary seems to act as pull factor to other regions
2. Graduate Migration Determinants and Motives

Results of Empirical Analysis:

1. The university catchment area is very regionally oriented
2. NR UAS exhibits a negative brainflow-balance
3. The propensity of migration is much higher for external students
4. Two important migration motives: job-related and family-related/personal reasons
2. Graduate Migration Motives

Only two important migration motives:

- Starting first job in Central Lower Rhine Area (CLRA)
- Migration to other Areas

<table>
<thead>
<tr>
<th>Motives</th>
<th>Starting CLRA</th>
<th>Migration to other Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Job-related motives</td>
<td>62%</td>
<td>46%</td>
</tr>
<tr>
<td>Personal/family-related</td>
<td>66%</td>
<td>42%</td>
</tr>
<tr>
<td>Further studies/PHD program</td>
<td>14%</td>
<td>7%</td>
</tr>
<tr>
<td>CLRA Cost of living</td>
<td>5%</td>
<td>1%</td>
</tr>
<tr>
<td>CLRA Recreation Facilities/Amenities</td>
<td>5%</td>
<td>8%</td>
</tr>
<tr>
<td>CLRA Image</td>
<td>12%</td>
<td>4%</td>
</tr>
<tr>
<td>CLRA Accessibility/Infrastructure</td>
<td>16%</td>
<td>6%</td>
</tr>
<tr>
<td>Other reasons</td>
<td>9%</td>
<td>26%</td>
</tr>
</tbody>
</table>
Graduates’ Migration and its Determinants

1. Introduction

2. Graduate Migration Patterns and Determinants

3. Reasons for Migration

4. Conclusion
Possible Reasons for the Brain Drain

1. Region is not attractive enough

2. The regional economy cannot absorb the graduates
   a) They need more skilled workers rather than highly skilled
   b) The regional firms need other graduates

3. Missing Information about one another
1. **Hypothesis**: The Niederrhein area is not attractive for younger people.

   - **False, because…**
     - … only few graduates assess the soft site-related factors as an important reason for leaving the region/ for staying in the area
     - … nearly two-thirds of all graduates who left the region would have stayed if they had received a better working opportunity,
Reasons for the Brain Drain

2. Hypothesis: The absorption capacity of the regional economy is not sufficient

   a) The Niederrhein does not need high-skilled, the region needs skilled workers (qualification Mismatch).
# Reasons for the Brain Drain

<table>
<thead>
<tr>
<th>Employee</th>
<th>Ratio of university graduates</th>
<th>Expectancy Value</th>
<th>Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Graduates</td>
<td>Total</td>
<td>regional in vH</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>8.250</td>
<td>84.202</td>
<td>9,8</td>
</tr>
<tr>
<td>Water supply; sewerage; waste managment and remediation activities</td>
<td>284</td>
<td>4.486</td>
<td>6,3</td>
</tr>
<tr>
<td>Construction</td>
<td>414</td>
<td>18.599</td>
<td>2,2</td>
</tr>
<tr>
<td>Wholesale and retail trade; repair of motor vehicles and motorcycles</td>
<td>3.757</td>
<td>74.810</td>
<td>5,0</td>
</tr>
<tr>
<td>Transporting and storage</td>
<td>271</td>
<td>21.335</td>
<td>1,3</td>
</tr>
<tr>
<td>Information and communication</td>
<td>838</td>
<td>7.373</td>
<td>11,4</td>
</tr>
<tr>
<td>Financial and insurance activities</td>
<td>906</td>
<td>11.506</td>
<td>7,9</td>
</tr>
<tr>
<td>Real estate activities</td>
<td>147</td>
<td>2.213</td>
<td>6,6</td>
</tr>
<tr>
<td>Professional, scientific and technical activities</td>
<td>2.971</td>
<td>18.916</td>
<td>15,7</td>
</tr>
<tr>
<td>Administrative and support service activities</td>
<td>868</td>
<td>26.074</td>
<td>3,3</td>
</tr>
<tr>
<td>Public administration and defence; compulsory social security</td>
<td>2.797</td>
<td>17.564</td>
<td>15,9</td>
</tr>
<tr>
<td>Education</td>
<td>3.504</td>
<td>9.228</td>
<td>38,0</td>
</tr>
<tr>
<td>Human health and social work activities</td>
<td>5.543</td>
<td>48.841</td>
<td>11,3</td>
</tr>
<tr>
<td>Arts, entertainment and recreation</td>
<td>251</td>
<td>3.150</td>
<td>8,0</td>
</tr>
<tr>
<td>Other services activities</td>
<td>619</td>
<td>9.421</td>
<td>6,6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>31.420</td>
<td>357.718</td>
<td>8,8</td>
</tr>
</tbody>
</table>

**Regionalfactor** 0,83  
**Strukturfaktor** 0,91  
**Locationfaktor** 0,92
Reasons for the Brain Drain

2. Hypothesis: The absorption capacity of the regional economy is not sufficient

Shift-Analysis:
- Compared to the federal average the Niederrhein has fewer university graduates.
- Partly this has structural reasons: industrial sectors with few academics are overbalanced.
- Partly this has other reasons: Business orientated services have less academic quotas compared to other regions in the state.
Reasons for the Brain Drain

2. Hypothesis: The absorption capacity of the regional economy is not sufficient

b) The regional economy needs other graduates than those the university educates (occupational Mismatch).
   • A comparison of the regional economic structures and the structure of the faculties shows:
     ➢ This fits!
     ➢ The development is positive (e.g. health care).
     ➢ On the one hand the NR UAS can not offer everything the region needs (e.g. civil engineering); but most of it!
     ➢ On the other hand NR UAS offers programs with national performance (flagships).
Reasons for the Brain Drain

3. Hypothesis: Regional firms do not know enough about the NR UAS and the students do not know enough about the regional economy

How well are you informed about the regional economy in the compass of the NR UAS

- Completely: 3.1%
- 2: 22.8%
- 3: 33.5%
- 4: 26.4%
- Not at all: 14.1%
Reasons for the Brain Drain

• The NR UAS graduates do not know the regional economy very well.

• Activities have to be introduced to improve the alternately information flow.
Graduates’ Migration and its Determinants

1. Introduction

2. Graduate Migration Patterns and Determinants

3. Reasons for Migration

4. Conclusion
Conclusion

• The share of academics is under average at the CLRA that's especially relevant for business orientated services.

• Actually we need a Brain Grain but the NR UAS can fulfill this mission only particularly,

• Because the BrainFlow- Balance is negative.

• The regional standard of living and the regional image can not explain the emigration of the graduates.

• Job opportunities and social relations are the most important migration determinants.
Conclusion

• Many graduates want to stay in the region but leave them because they do not find an adequate job.

• Insufficient information of the graduates and the regional economy are one of the main barriers for a stay in the region.
Thank you for your attention!
3. Discussion

The three roles of HEI:

1. HEI as source of academic knowledge

2. HEI as provider of academic education

3. HEI as regional system builder

→ Especially important in old industrial regions facing economic challenges

→ Concerning graduation migration policy, how can NR UAS act as regional system builder?
3. Discussion

1. The university can embrace and support a role as „employment broker“:

How did you find your first job after graduation?

- 39%: Connection via university / studies
- 34.5%
- 18.0%
- 12.2%
- 13.3%
- 11.6%
- 10.4%
- 3.6%
- 1.7%
- 0%

Part-time Employment during studies, Internship, Final Thesis, Contact by lecturing tutors, Personal Contacts, Speculative Application, Jobcenter (Agentur für Arbeit)
2. The university can improve graduates’ knowledge about possible local employers

<table>
<thead>
<tr>
<th>Knowledge of local economy and possible future employers</th>
<th>Complete knowledge</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>No knowledge</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>I would have stayed in the CLRA given a better job offer</td>
<td>Yes</td>
<td>14</td>
<td>128</td>
<td>159</td>
<td>138</td>
<td>501</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>10</td>
<td>37</td>
<td>89</td>
<td>85</td>
<td>281</td>
</tr>
<tr>
<td>Migrating graduates</td>
<td></td>
<td>24</td>
<td>165</td>
<td>248</td>
<td>223</td>
<td>782</td>
</tr>
</tbody>
</table>
3. Discussion

3. The university needs to underline its importance for local companies

Local companies evaluate NR UAS as good, but unimportant location factor concerning „labour and qualification“

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Source: Survey of Chamber of Commerce and Industry, 2012; scale from 1 (highest value) to 5 (lowest)
3. Conclusion

**For old industrial regions facing economic problems...**

... a HEI is a vital chance for the development of human capital

... high importance of graduates who can be attracted to the region in the long run

... pull-factor of well-performing regions has to be faced
  → additional advantages have to be offered
  → regionally originated students are easier „to keep“ in the region

To improve the level of regional human capital, a HEI can...

... embrace and support a role as „employment broker“.

... improve graduates' knowledge about possible local employers

... needs to underline its importance for local companies


Appendix – Additional Information

Analysis based on three graduate surveys in 2012

1. Official university graduate survey
   Online, Conducted in a biannual interval rhythm, N=1700

2. Survey of Alumni networks
   Online questionnaire, N=475

3. Survey of students in final semester
   → Possibility to compare migration plans with actual migration patterns, N = 225
### 2. Graduate Migration Patterns and Determinants

**Online Survey of Alumni Network, N = 475 (no time limit after grad.)**

<table>
<thead>
<tr>
<th>Origin in CLRA</th>
<th>No Migration after graduation</th>
<th>Migration after graduation</th>
<th>Σ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non Migrants</td>
<td>12.4 %</td>
<td>Late Migrants</td>
<td>42.9 %</td>
</tr>
<tr>
<td>Late Migrants</td>
<td>30.5 %</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Origin in any other region</th>
<th>University Stayers 6.2 %</th>
<th>Repeat Migrants 50.9 %</th>
<th>57.1 %</th>
</tr>
</thead>
</table>

| Σ | 18.6 % | 81.4 % | 100    |

→ **Brainflow Balance – 24.3 %**
Appendix – Additional Information

International Experience…

- has no influence on migration probability
- but raises the distance range of migrating graduates

Migration probability after a temporary stay abroad during the studies

<table>
<thead>
<tr>
<th>Temporary Stay Abroad during studies (&gt;4Months)</th>
<th>No Temporary Stay Abroad</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central Lower Rhine Area</td>
<td>Other parts of NRW</td>
</tr>
<tr>
<td>Other parts of Germany</td>
<td>Europe</td>
</tr>
<tr>
<td>20.7%</td>
<td>20.9%</td>
</tr>
<tr>
<td>36.21%</td>
<td>46.36%</td>
</tr>
<tr>
<td>36.21%</td>
<td>27.88%</td>
</tr>
<tr>
<td>6.90%</td>
<td>4.85%</td>
</tr>
</tbody>
</table>

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Appendix – Additional Information

Graduates accept contracts of lower attractiveness to remain in the region

Migration probability considering characteristics of the job contract

- Central Lower Rhine Area
- Within rest of NRW
- Within rest of Europe
- Worldwide

Total: 26.4%
Permanent employment contract: 24.9%
Fixed-term employment contract: 32.5%
Full-time job: 24.5%
Part-time job: 43.0%
Appendix – Additional Information

High Starting Salaries are a Pull Factor

Migration Probability considering the starting salary of graduates

0-1000 €  1001-2000 €  2001-3000 €  3001-4000 €  4001-5000 €  5001-6000 €

Central Lower Rhine Area  Within rest of NRW  Within rest of NRW  Within rest of Europe  Worldwide
Appendix – Additional Information

Attractiveness of economic regions in North-Rhine-Westphalia based on a survey of MINT graduates

![Bar chart showing attractiveness of economic regions in North-Rhine-Westphalia. The chart compares various regions including Aachen, Köln/Bonn, Niederrhein, Düsseldorf, Bergisches Städtedreieck, Südwestfalen, Metropole Ruhr, Ostwestfalen-Lippe, and Münsterland. The values range from -0.35 to 0.35.](image)

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1. Introduction

Universities induce expenditure effects, knowledge spillovers, produce human capital

**To support the University Region → Importance of local focus**

- **Socio-Cultural Impacts**
- **Human Capital**
  - Spin Offs
  - R&D Transfer
- **Quality of Location**
- **Expenditure Effects**
  - Higher Education Institution
  - Students
  - Staff

*Higher Education Institution* → *Region*