Student mobility analysis (ERASMUS)
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Abstract
We investigate the ERASMUS mobility network of students and researchers. We found that preferences of the ERASMUS travel and general pattern of tourism match. This finding is also supported with the other one which shows that no or weak connection can be found between the choice of destination and scientific excellence.

About the network
We investigated the ERASMUS mobility of students, researchers and stuff using a database of travels between 2008 - 2014 from EU Open Data Portal. The network nodes are the universities and three types of edges we have: 1.2M student and 180k teacher travels between 3,200 institutes in 8 subject areas. Figure 1. shows on a map that 48% of institutes send or receive students on one or two subject areas. There the inset shows the country level travel directions. We studied the deviation of the inter-regional travel patterns from the one which would be expected based only on the aggregated in/out activity of the region regions (Fig. 2). Weak connection of scientific excellence and destination choice demonstrated on Figure 3.

1. Study destinations

![Figure 1: Institutes participating in Erasmus student exchange](size is proportional with hosting activity; colors mean the number of subject represented by institutes)

Hosted activity in ERASMUS program shows relationship with well visited tourist destinations. From a networks science point of view ERASMUS network should be analyzed by subjects because institutes represent different and various number of subject areas. Eg. higher education institutes in Spain and Turkey are generalists while in France and Poland are preferably specialists. Travels between countries shows different patterns by subjects illustrated by all fields combined and agricultural networks in chord diagrams in Figure 1.

2. Exchanges between regions

![Figure 2: Values (associated to arrows) indicate observed-expected ratio of the number of travels](values (associated to arrows) above one indicate excess the expected number of travels. Similarly below one indicates less the expected number of travels. The baselines values for the given direction are calculated as the product of the capacity of the nodes of the regions. Eastern Europe is less attractive for western and northern but more attractive for southern students than under random condition. The exchange between North and West is more but North and South is less than expected. These rates are different in case of subject areas.

3. Correlation of centralities of Erasmus network and Leiden ranks

![Figure 3: Correlation between Erasmus networks centrality based rank and the number of cross-border co-authorship publication based rank from Leiden ranking in Mathematics and computer science subject area (Kendall \(\tau\) values highlighted with red in Table 1)](Student Teacher

<table>
<thead>
<tr>
<th>Subject Area</th>
<th>Student</th>
<th>Teacher</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biomedical and health sciences</td>
<td>0.41</td>
<td>0.15</td>
</tr>
<tr>
<td>Life and earth sciences</td>
<td>0.31</td>
<td>0.12</td>
</tr>
<tr>
<td>Mathematics and computer science</td>
<td>0.63</td>
<td>0.12</td>
</tr>
<tr>
<td>Physical sciences and engineering</td>
<td>0.36</td>
<td>0.02</td>
</tr>
<tr>
<td>Social sciences and humanities</td>
<td>0.53</td>
<td>0.04</td>
</tr>
</tbody>
</table>

Table 1: Kendall \(\tau\) values of Erasmus network and Leiden ranks by subjects

Acknowledgements
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