



Student mobility analysis (ERASMUS)

László GADÁR¹, András TELCS^{1,2,3,4}, Vivien V. CSÁNYI^{1,2}, Marcell T. KURBUCZ², Zsolt T. KOSZTYÁN^{1,2}

¹MTA-PE Budapest Ranking Research Group ²University of Pannonia, Department of Quantitative Methods ³BME Department of Computer Science ⁴WIGNER CFP MTA, Department of Computational Sciences



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 staff using database of travels between 2008 - 2014 from EU Open Data Portal. The network nodes are the universities and three type 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.

2. Exchanges between regions

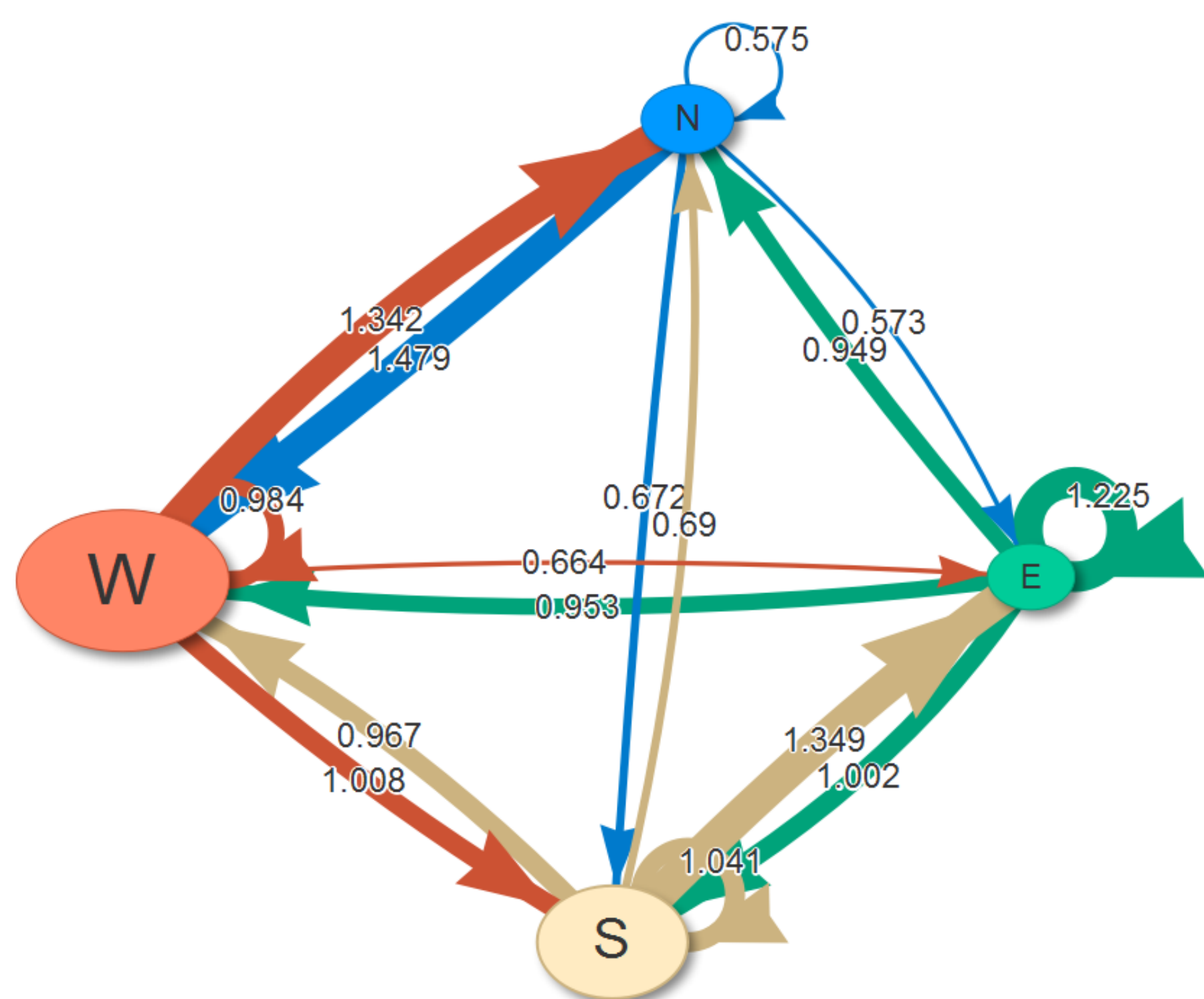


Figure 2: Values (associated to arrows) indicate observed-expected ratio of the number of travels.

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.

Acknowledgements

This research has been supported by the European Union and Hungary and co-financed by the European Social Fund through the project EFOP-3.6.2-16-2017-00017, entitled "Sustainable, intelligent and inclusive regional and city models" and

MTA-PE Budapest Ranking Research Group (grant no. 16208).

1. Study destinations

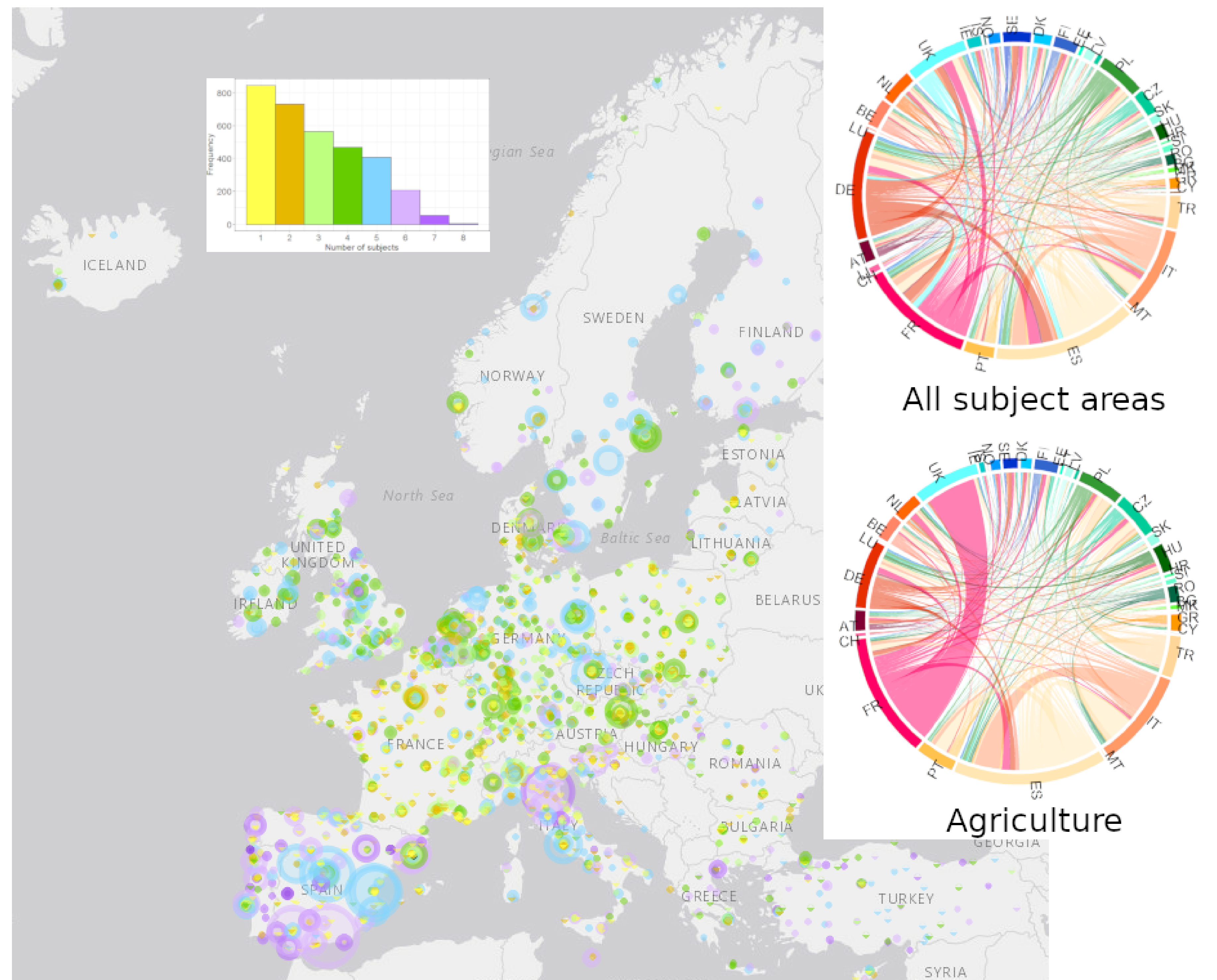


Figure 1: Institutes participating in Erasmus student exchange (size is proportional with hosting activity; colors mean the number of subject represented by institutes)

Hosting 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 edu-

cation 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.

3. Correlation of centralities of Erasmus network and Leiden ranks

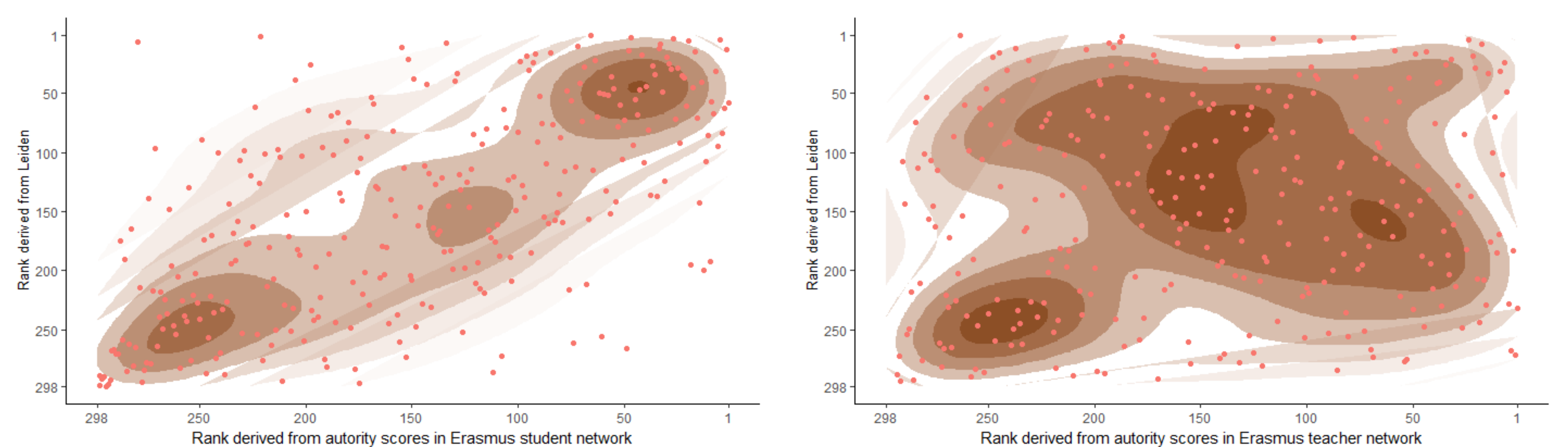


Figure 3: Correlation between Erasmus networks centrality based rank and the number of cross-border co-authorship publication based rank from Leiden ranking in Mathematics and computer science subject area (Kendall τ values highlighted with red in Table 1)

	Student	Teacher
Biomedical and health sciences	0.41	0.15
Life and earth sciences	0.31	0.12
Mathematics and computer science	0.63	0.12
Physical sciences and engineering	0.36	0.02
Social sciences and humanities	0.53	0.04

Table 1: Kendall τ values of Erasmus network and Leiden ranks by subjects

Ranks derived from Erasmus student and teacher networks based on the authority scores of institutes which is a centrality measure proportional with hosted students or teachers. Leiden ranking based on the number of publication that have been co-authored by two or more countries. There is slightly or no correlation neither subjects.