

ERASMUS MOBILITY ON THE INSTITUTIONAL LEVEL

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Abstract:

There are various reasons that study abroad has become increasingly more popular and prominent, some of them can be associated with the human capital. For instance, studying abroad can directly or indirectly influence students' career paths and potentially offers additional job opportunities. In Europe, a very important opportunity for study abroad is well known Erasmus student mobility programme. In the paper we defined a network of Erasmus student exchanges on the institutional level. Firstly, more important universities with the highest number of Erasmus student exchanges were identified. Majority of them are coming from four the most represented countries in the programme: Spain, Italy, France and Germany. With the help of an advanced network analytic method – the island approach – we were actually able to determine the groups of institutions in the network which collaborate most extensively inside of Erasmus student exchange programme. Moreover, important islands were identified and analysed. We also confirmed findings of other authors on the same topic although our research was conducted over longer period of time.

Keywords: network analysis, student mobility, Erasmus, island approach

1. INTRODUCTION

Study abroad has become increasingly more popular and prominent. There are various reasons for such outburst. The growth of globalisation and particularly the enlargement of the mobility programmes to the eastern countries are among major reasons (Gonzales et al, 2011; Parey & Waldiner, 2007). On the other hand some of them are associated with the human capital. For instance, studying abroad can directly or indirectly influence students' career paths and potentially offers additional job opportunities. Also in the home country, additional education and training can increase student's worth in the job market (Bracht et al, 2006). On the other hand, some subtle benefits of studying abroad as communication skills and cultural knowledge with a widespread of social life can raise the value of any future employee (Huisman, 2004).

The Erasmus programme is a well known European Union student exchange programme established already in 1987. It offers a great opportunity for European students and academic staff to study abroad. Almost 3 million students and 300,000 academic staff were mobile in this programme within 33 European countries (27 European Union countries, Iceland, Liechtenstein, Norway, Turkey, Croatia and Switzerland). Breznik et al. (2013) studied student Erasmus mobility on the country level (from 2007/08 to 2010/11). They revealed 3 groups of countries: good importers and exporters, good importers only and good exporters only. First group is dominated by Mediterranean countries (except for Germany), which are good importers as well as good exporters of Erasmus students. In the second group we can find countries of the Northern Europe, which can be classified as good importers of Erasmus students. Denmark, United Kingdom and Ireland are also first participating countries in the programme (the long runners), whereas Finland and Sweden joined the Erasmus at the first enlargement in 1992/93. Third group consists of countries of the Continental Europe, which are good exporters of Erasmus students. In this group we find Belgium and the Netherlands, which are the 'long runners', Austria which joined in 1992/93 and two additional West European countries Czech Republic and Poland, which joined the Erasmus only in 1998/99 and can be therefore labelled 'short runners' (Breznik et al, 2013).

Derszi et al (2011) analyzed very similar kind of network of collaboration generated by the Erasmus student mobilities but only in the year 2011. The focus of their research was mainly on the topological properties of the network rather on the Erasmus issue itself. They confirmed an exponential degree distribution and a relatively high clustering coefficient with a small radius. In the paper we focus on the network of collaboration between European universities and/or institutions included in the Erasmus programme. As in the work of Derszi et al (2011) nodes of the bipartite network in this paper are European universities/institutions and links are the Erasmus student mobilities between these universities/institutions from 2007/08 until 2011/12. The most important nodes in the network will be identified using advanced network analytic methods and approaches.

2. ERASMUS MOBILITY NETWORK

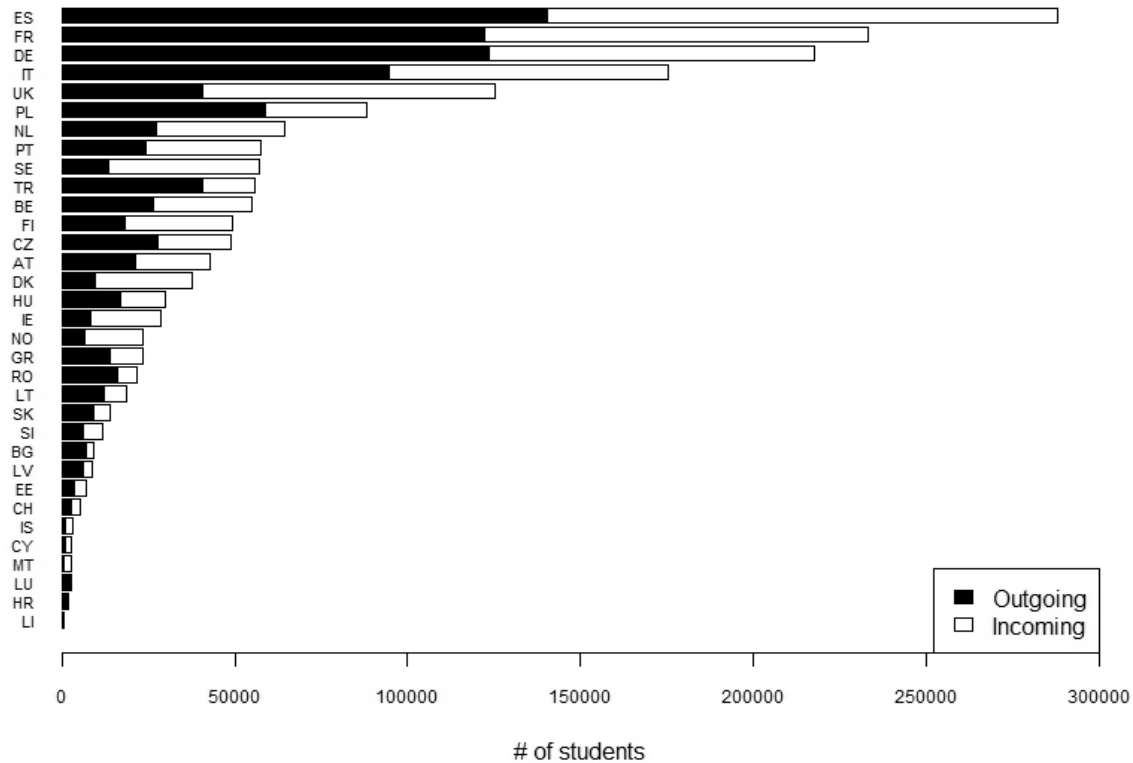
A network is usually determined with the set of actors and the set of links between them (Wasserman & Faust, 1994). Actors are represented by nodes and links are represented by edges and/or arcs. In the Erasmus mobility network on the institutional level actors are institutions (universities or a group of universities). Links between organisations are defined as Erasmus mobilities between these institutions from 2007/08 until 2011/12. As links are directed from the institutions from which students are coming from (home institution) to the hosting institution. Therefore, the Erasmus mobility network on the institutional level can be treated as directed network.

2.1. Country level

Almost one million Erasmus student mobilities (903831 student exchanges exactly) were conducted between 3049 institutions from 2007/08 until 2011/12. In the Picture 1 the number of outgoing/incoming students is presented with a bar plot. At the top we can find Spain with the highest number of outgoing and incoming students. In analyzed five years, the number of exchanged students involving Spain is approaching number 300,000. Spain is closely followed by France, Germany and Italy. Breznik et al. (2013) classified these four countries as both good exporters and good importers of Erasmus mobility students.

The ratio between outgoing and incoming students for Spain is approximately 0.95 and therefore Spain is considered as a country with no specific trend neither to export nor import Erasmus students although it is slightly in favour of importing. Ratios of all other countries with exact numbers of incoming and outgoing students can be found in Table 1.

Picture 1: Outgoing/incoming Erasmus students from 2007/08 until 2011/12 per country



Countries in Table 1 are listed by the outgoing/incoming ratio from the lowest to the highest ratio. Malta has had the lowest ratio and therefore it is very incoming orientated country in terms of Erasmus student exchange. Similarly, countries from northern Europe, Sweden, Denmark and Norway, can be found in that category as well. Other extremely incoming orientated countries are Ireland, United Kingdom, Island, Cyprus and Finland. All of them has had the ratio under 0.6 (e.g. under six outgoing Erasmus students per 10 incoming Erasmus students). At the bottom of Table 1 we can find countries as Luxembourg, Croatia, Bulgaria, Romania, Turkey, Latvia, Slovakia and Poland with ratio over 2. In these countries they have at least two outgoing students per each incoming student.

Table 1: The number of outgoing/incoming Erasmus students and their ratio by country

Country	Outgoing	Incoming	Outgoing/Incoming
MT	465	2051	0.2267187
SE	13539	43387	0.3120520
DK	9329	28106	0.3319220
NO	6674	16718	0.3992104
IE	8356	20274	0.4121535
UK	40676	84391	0.4819945
IS	1090	1945	0.5604113
CY	954	1621	0.5885256
FI	18245	30870	0.5910269
PT	24282	33284	0.7295397
NL	27354	36977	0.7397571
LI	137	181	0.7569061
BE	26551	28331	0.9371713
ES	140484	147407	0.9530348

CH	2514	2606	0.9646969
AT	21210	21527	0.9852743
EE	3428	3453	0.9927599
SI	5878	5757	1.0210179
FR	122255	110932	1.1020715
IT	94611	80594	1.1739211
DE	123760	93786	1.3195999
CZ	27761	20948	1.3252339
HU	17050	12742	1.3380945
GR	13722	9614	1.4272935
LT	12311	6233	1.9751324
PL	58954	29307	2.0116013
SK	9174	4486	2.0450290
LV	6171	2436	2.5332512
TR	40471	15399	2.6281577
RO	16029	5630	2.8470693
BG	6894	2210	3.1194570
HR	1379	300	4.5966667
LU	2123	328	6.4725610

2.2. Institutional level

The main focus of presented paper is on the Erasmus exchange between institutions. The Erasmus student mobility between universities determines a large network. From 2007/08 until 2011/12 at least 3049 institutions exchanged at least one student in the Erasmus student mobility programme. Following two criteria, the number of exchanged students and the number of institutions with which the students were exchanged, we determined the top twenty Erasmus student exchange institutions. All of them are listed in Table 2 with the above mentioned criteria.

Table 2: Top twenty institutions per number of exchanged students

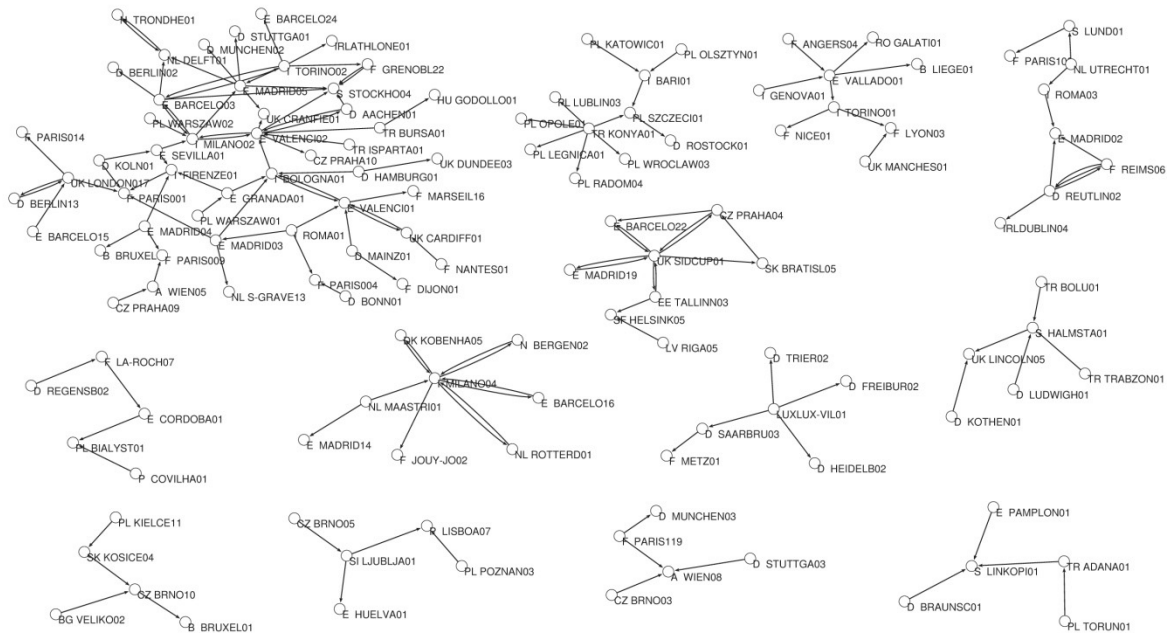
Institution	Student exchanges	
	# students	# different organisations
E GRANADA01	18147	2237
E MADRID03	16253	1952
I BOLOGNA01	15116	1888
E VALENCI01	14286	1635
E VALENCI02	13488	1801
E SEVILLA01	13457	1663
I ROMA01	11092	1452
CZ PRAHA07	10411	1562
E BARCELO01	9024	1502
E BARCELO02	8933	1543
A WIEN01	8879	1151
E SALAMAN02	8775	1343
E MADRID 04	8168	1111
I FIRENZE01	8081	1200
SI LJUBLJA01	7992	1571
E BARCELO03	7850	1015
PL WARSZAV01	7775	1010
E ZARAGOZ01	7756	1277
I PADOVA01	7740	1268
E VALLADO01	7733	1093

A first insight in Table 2 reveals that twelve institutions are coming from Spain. Moreover, seven of them are among first ten institutions. The most active is Spanish institution named GRANADA01 exchanging over 18,000 students with 2,237 institutions. Institution MADRID03 is on the second place (over 16,000 exchanged students with 1,952 institutions), followed by Italian BOLOGNA01 (over 15,000 exchanged students with 1,888 institutions). Beside Spanish and Italian institutions in Table 2 we can find one institution from Czech Republic (PRAHA07), one institution from Austria (WIEN01), one institution from Slovenia (LJUBLJANA01) in one institution from Poland (WARSZAV01).

Our main interest of the study is to determine the institutions which are collaborating more closely in sense of exchanging Erasmus students. For this aim we use specific network analytic approach called an island approach (Batagelj & Zaversnik, 2011). A node island of size $[k;K]$ is a weakly connected subnetwork with number of nodes in the interval $[k;K]$; such that the nodes inside the island have larger values of selected property p (in our case property p is number of exchanged students) than their neighbours outside the island. Similarly, a line island of size $[k;K]$ is a weakly connected subnetwork with number of nodes in the interval $[k;K]$; such that the links linking nodes of the island to their neighbours outside the island have weights w lower than the values of links of a maximal spanning tree inside the island.

We additionally limited the size of islands between 5 and 50 institutions per island. In the resulting split we obtained 13 islands which comply with the required property. Islands of institutions are displayed in Picture 2. Each institution is represented with a single node and original code, for example SI LJUBLJA01 is code for University of Ljubljana.

Picture 2: Islands of size between 5 and 50 institution in the Erasmus mobility network



In Picture 2 one very large island (top left in the Picture 2) with 50 institutions and 12 smaller islands with number of institutions varying between 5 and 11 institutions are displayed. On the largest island we can find several institutions which are listed in Table 2: E GRANADA01, E MADRID03, I BOLOGNA01, E VALENCI01 etc. It seems that institutions which exchange the largest number of students are also collaborating very well (in terms of Erasmus student exchange) among themselves. 10 institutions from the largest island are coming from Spain, 9 from Germany, 8 from France, 5 from Italy and 4 from United Kingdom. Other countries have up to 2 institutions (Poland, Turkey, the Netherlands and Czech Republic) or only one institution (Austria, Belgium, Hungary, Ireland, Norway and Sweden).

Beside the largest island, some smaller islands are also very interesting. Next to the largest island, there is an island with majority of Polish universities. These universities are exchanging students with Turkish university (Picture 2 suggests that Selcuk University obviously sends a lot of Erasmus students to Poland) and Italian university in Bari. We can find a German island and conclude that university from Luxembourg is sending their students to Germany. Very interesting is also an island with a business university from Milano as the main representative. This university is exchanging a lot of students with Copenhagen University, Bergen University, one university from Barcelona and university from Rotterdam.

Other islands are much more diverse in terms of nationality. Interestingly, we can even observe four islands on which every institution is coming from a different country. These islands can be found in the bottom left side of Picture 2 (three islands) and one similar island is in the bottom right side of Picture 2.

3. CONCLUSION

In the paper we defined a network of Erasmus student exchanges on the institutional level. First we listed the institutions with the highest number of exchanging Erasmus students and the highest number of institutions with which they are collaborating. Secondly, with the help of the island approach, we determined the groups of institutions which collaborate extensively in terms of the Erasmus student exchanges. Very interesting islands inside the network were identified and analysed.

Beside the institutional level, we confirmed results from Breznik et al. (2013) although our study was conducted on the country level and over longer period of time. Future work should include the analysis of other components of Erasmus mobility, staff mobility for teaching or staff mobility for training.

The programs for data editing and producing networks were written in R (R Development Core Team, 2014). Likewise, program R was used for statistical analysis. For analysis of networks we used the Pajek program (Batagelj & Mrvar, 1996-2014).

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