

Mini Project 2

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For the second mini-project, we chose to look at migration inflows amongst European countries. Our primary focus is on which European countries admit the most migrants of European origin. Secondly, we are interested in the origin of these migrants. We first aggregated the data from 2000-2017. Following this, we removed any countries with total inflows lower than 500,000 and any individual tie of less than 5,000 people. An analysis of centrality revealed some interesting relationships. First the centrality measures are as follows:

Degree Centrality: (1) Germany (2) Poland (3) Italy (4) France (5) UK

Closeness: (1) Ireland (2) Luxembourg (3) Portugal (4) Iceland (5) Norway

Betweenness: (1) Slovenia (2) Iceland (3) Estonia (4) Luxembourg (5) Latvia

Eigenvector: (1) Germany (2) Poland (3) UK (4) Italy (5) Spain

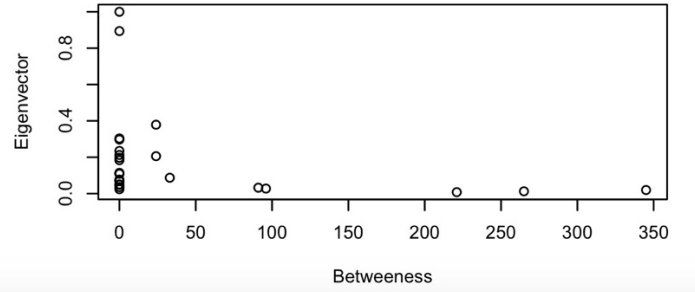
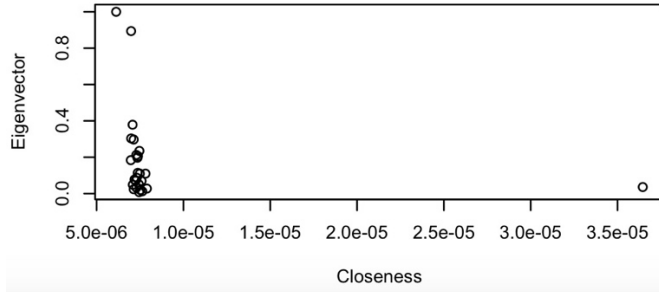
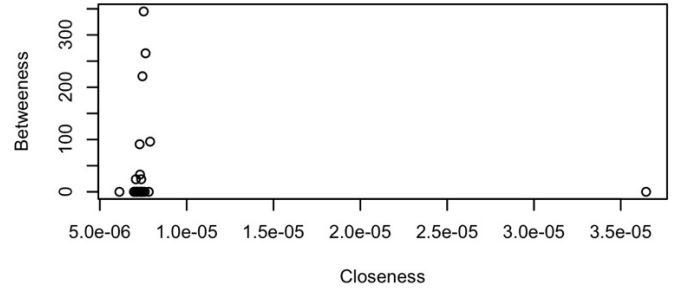
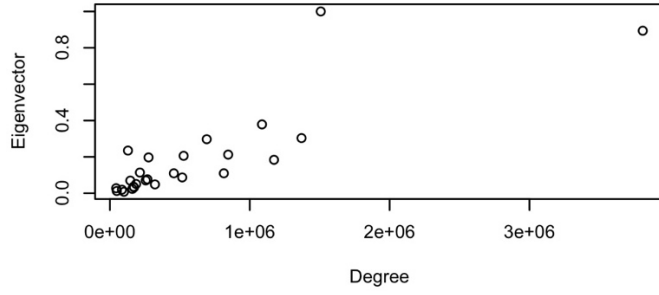
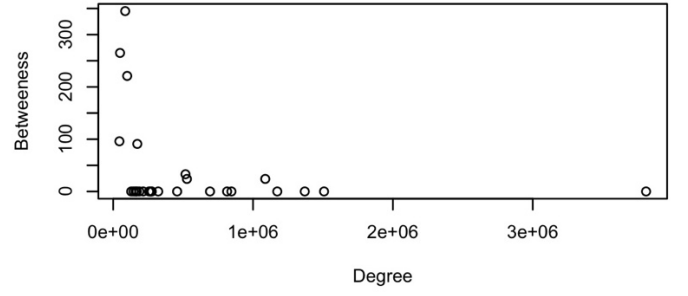
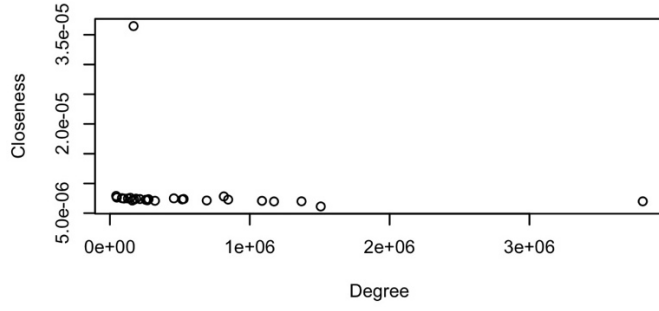
As the scores above show, the larger countries of Europe have the highest degree scores. This proves intuitive as these countries are most likely to receive the highest number of incoming people due to their size and large populations.

The closeness score shows that some of the smaller countries have the highest values for closeness however these rankings can be somewhat misleading as the closeness scores in general are all very similar. Therefore, while these countries have the highest closeness values, there is very little difference in closeness between these nodes.

The betweenness values show that some countries serve as a bridge to other countries. These states are largely smaller states that are on the edges geographically of our data. Due to this, these countries serve as bridges to other countries.

Eigenvector takes into account the number of ties a country has but also the ties of those ties. This measure again shows many of the larger countries being the most central. This makes sense as these countries are connected to many other countries that are also well connected.

We believe that the degree centrality is the best measure of centrality for this specific network. Degree centrality takes into account all of the different countries sending migrants to a given state, which addresses our main question. Closeness would be the least appropriate measure as it is most useful in describing the structure of the graph as a whole. Betweenness is also not an appropriate measure, as it puts the focus on the countries with high outflows of migrants rather than inflows. Finally, eigenvector centrality would be a reasonable alternative measure to use, but we have no theoretical reason to be especially interested in the ties between the central nodes. Therefore, degree centrality makes more sense to use for our question.

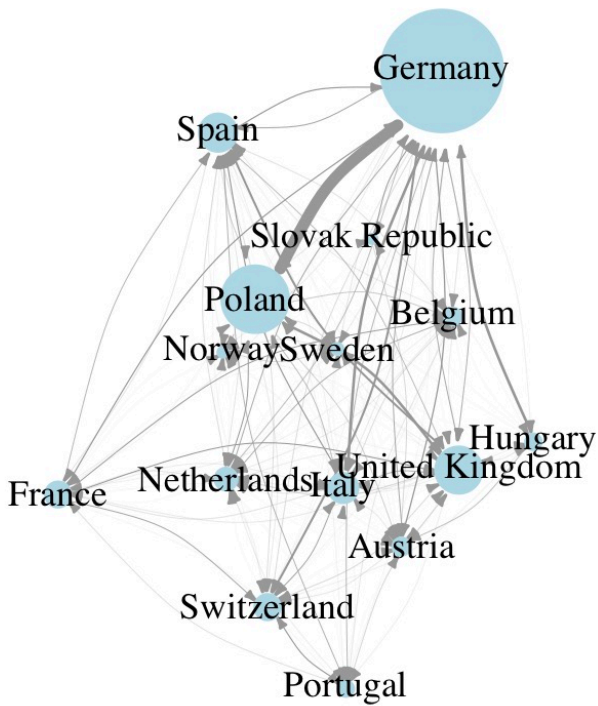


	Degree	Closeness	Betweenness	Eigenvector
Degree	1.00	-0.14	-0.28	0.83
Closeness	-0.14	1.00	-0.07	-0.17
Betweenness	-0.28	-0.07	1.00	-0.30
Eigenvector	0.83	-0.17	-0.30	1.00

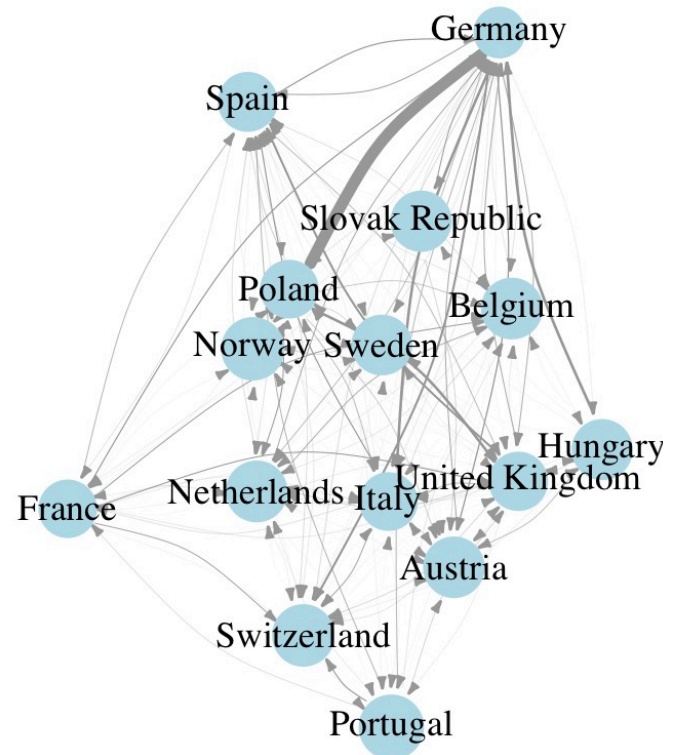
Table 1: Top 5 States by Centrality

Centrality Type	1st	2nd	3rd	4th	5th
Degree	Poland	Germany	Italy	France	UK
Closeness	Ireland	Luxemboug	Portugal	Iceland	Norway
Betweenness	Slovenia	Iceland	Estonia	Luxembourg	Latvia
Eigenvector	Germany	Poland	UK	Italy	Spain

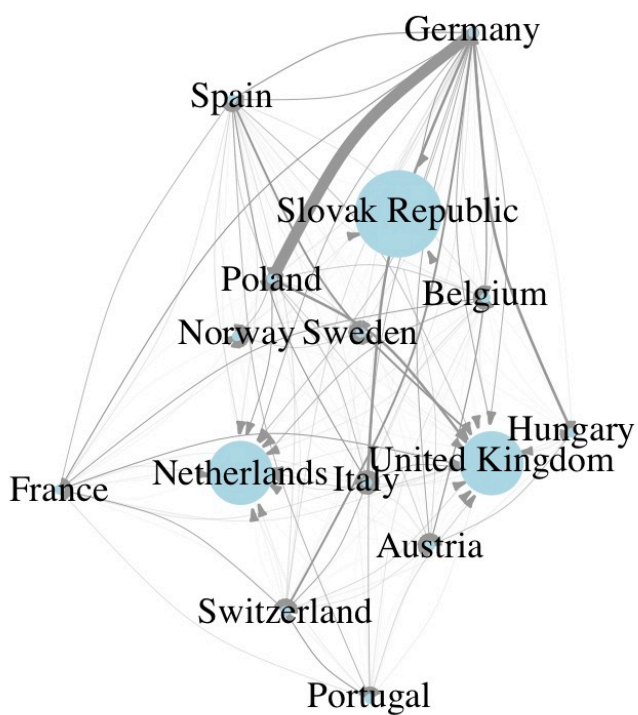
Degree



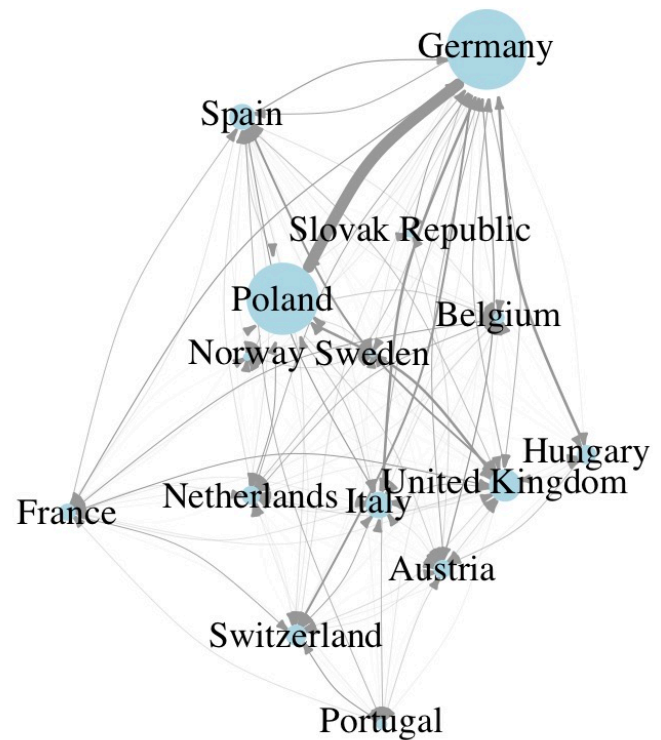
Closeness



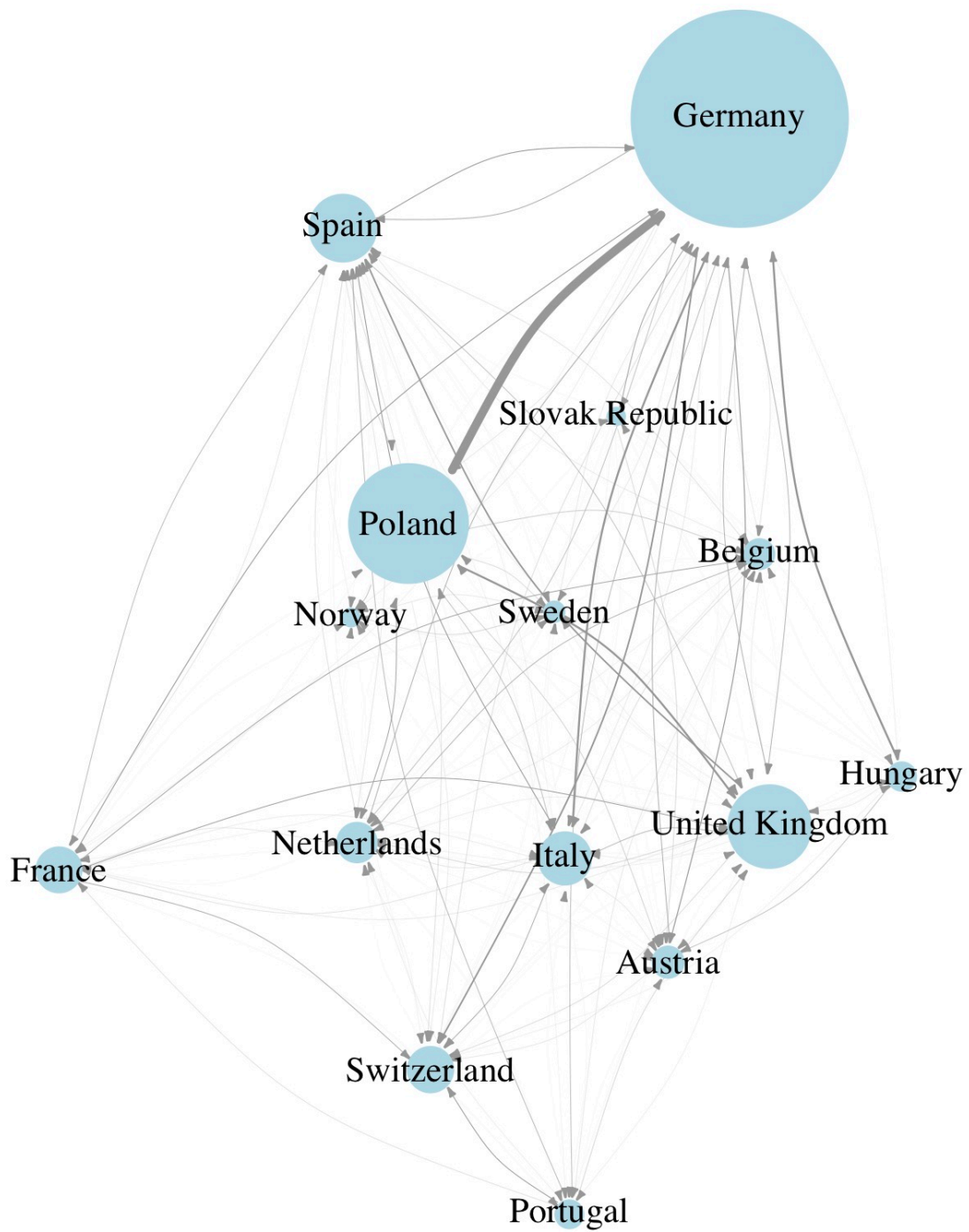
Betweenness



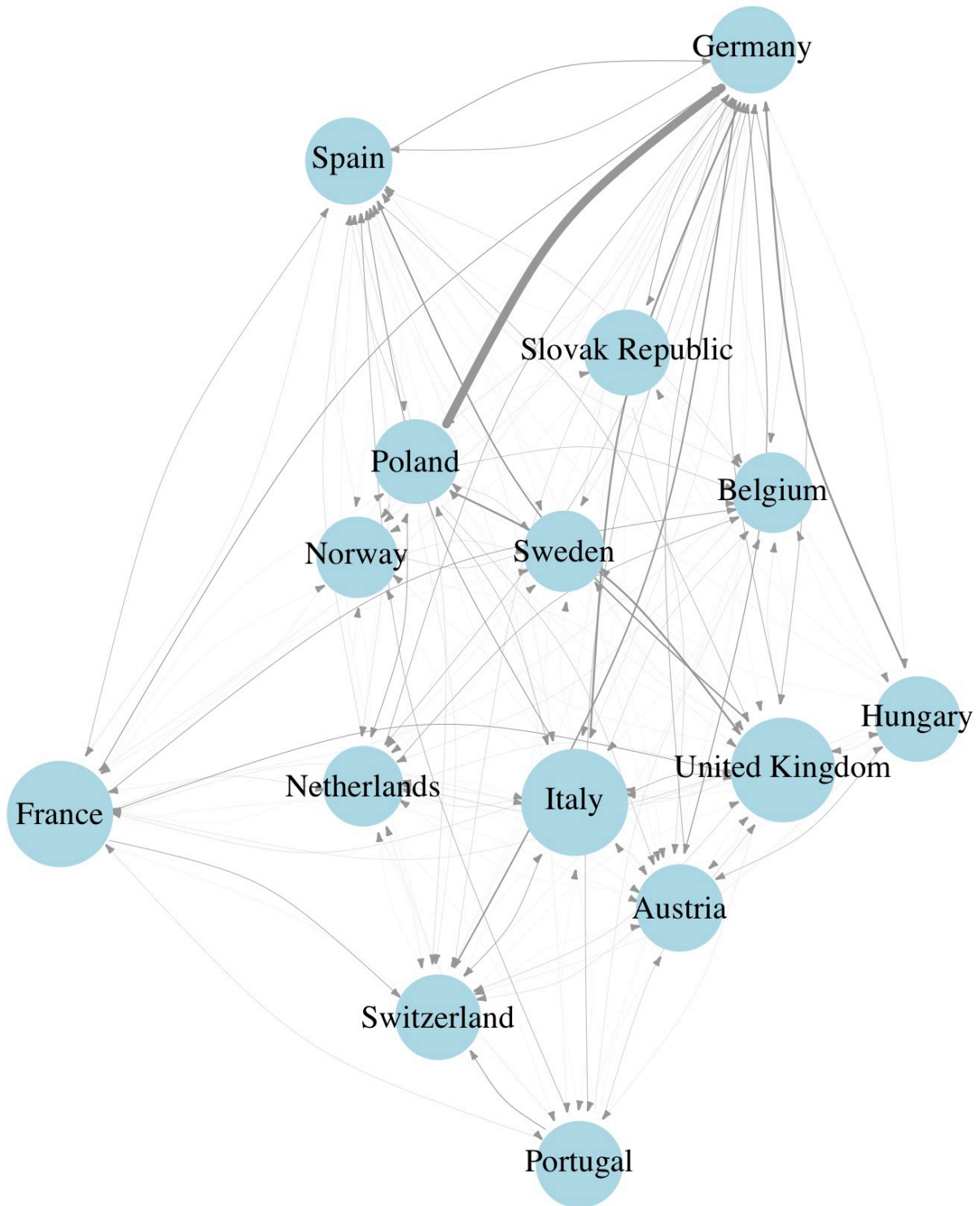
Eigenvector



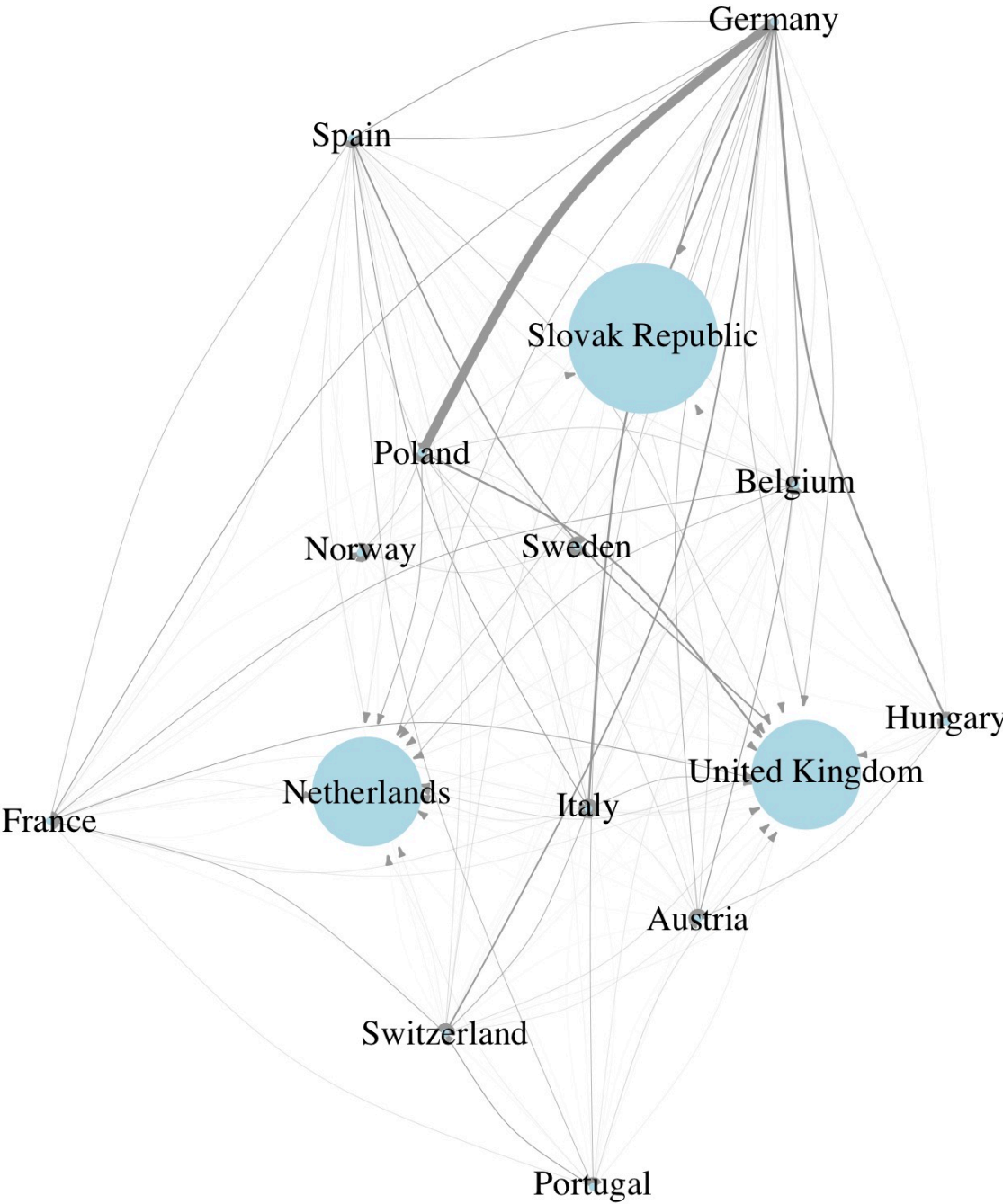
Degree



Closeness



Between



Eigenvector

