



# The effect of Eurasian Economic Union on the trade volume of its member states in the dynamic social network



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# Motivation

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- An Overview of SN and Economic Applications (Jackson, 2010)
- Nodes attributes in SNA (Andrade et.al.,2018)
- EAEU`s goal of rapid integration (EDB, 2017)
- Full Integration of EAEU by 2020 (Wiśniewska, 2012)



# Research Question

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What is the effect of the Eurasian Economic Union on the trade volume between its member states and with the rest of the world?

- a. What are the dynamics within the trade unions?
- b. Who are the key drivers of the Economic Union?



# Hypothesis

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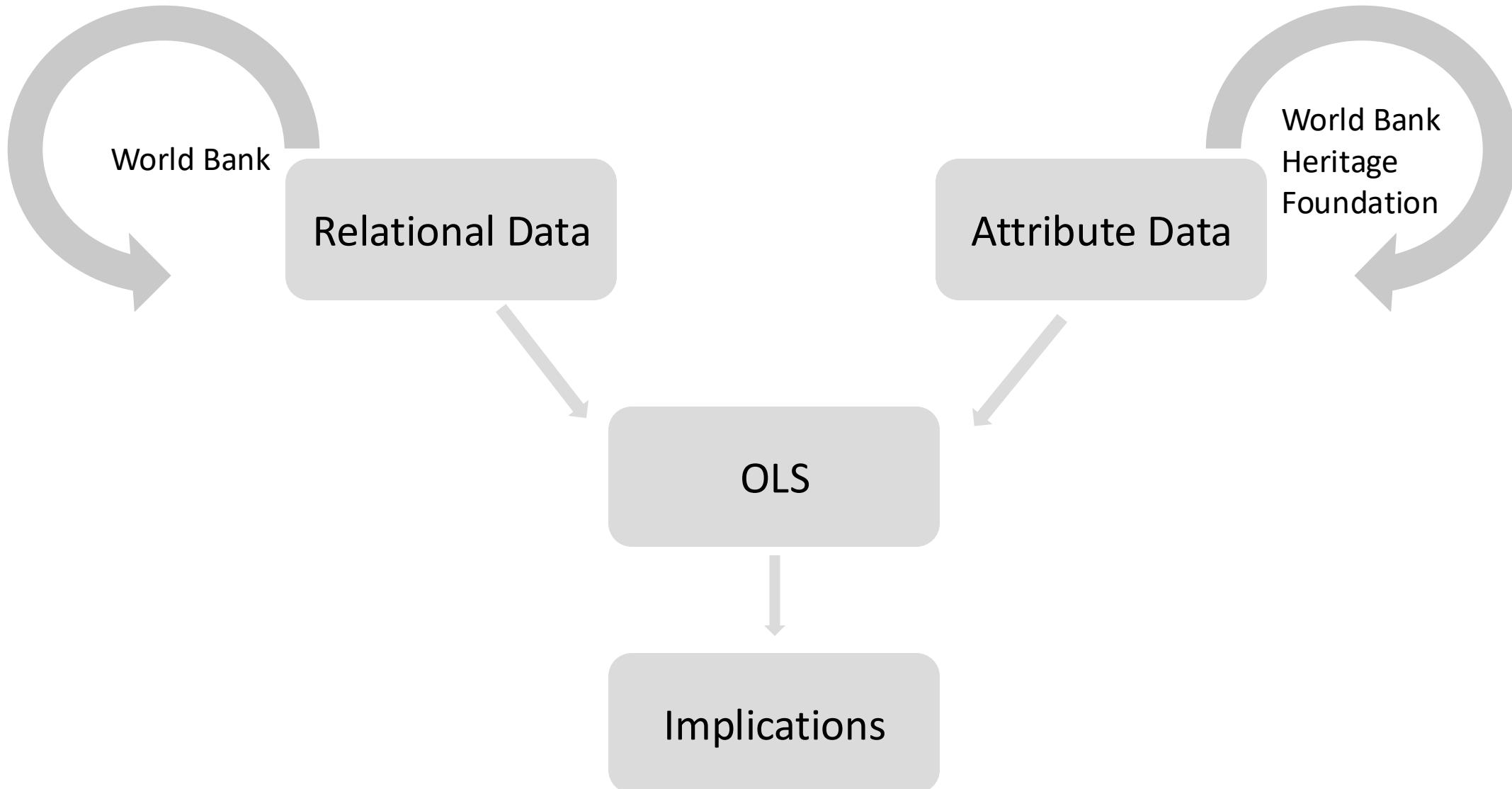
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- H1: Trade volume among the EAEU member states increased after joining the union
- H2: Russia is the central player in the union and its influence becomes even more pronounced



# Research Design

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# Variable description

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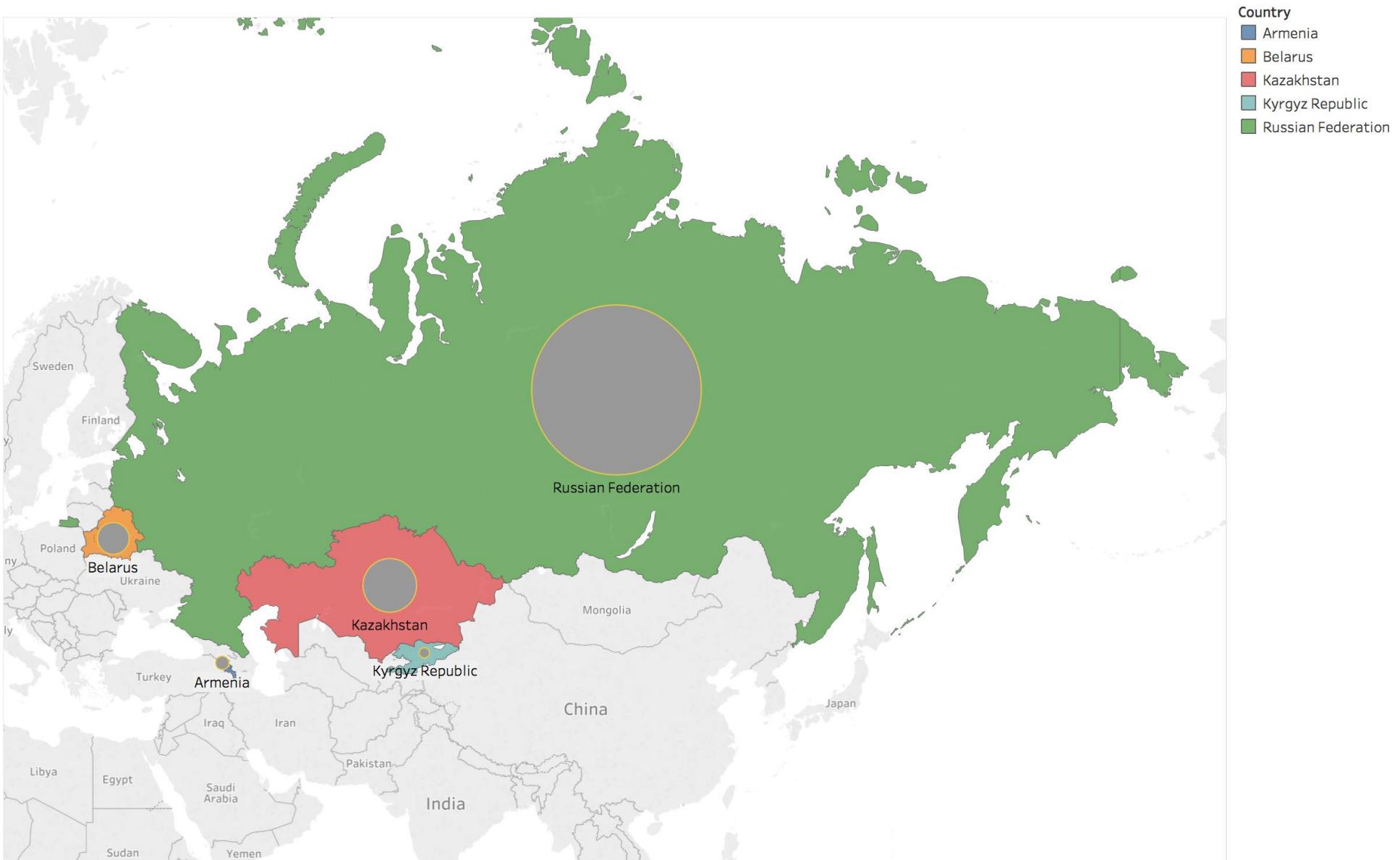
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Variable	Description	Source	Period
Trade as percentage from total	Ration between total trade within the union over the global trade volume	WITS World Bank	2008-2017 (excl 2014)
Import/Export as Partner share	Relational Data- Percentage Import/Export as a partner share	WITS World Bank	2008-2017 (excl 2014)
GDP	USD	World Bank	2008-2017 (excl 2014)
Total Population	Count	World Bank	2008-2017 (excl 2014)
Unemployment		World Bank	2008-2017 (excl 2014)
Economic Openness		The Heritage Foundation	2008-2017 (excl 2014)
Number of years in the union	The number of years a country has been a member of the union	Investopedia	2008-2017 (excl 2014)



# GDP by country, 2017

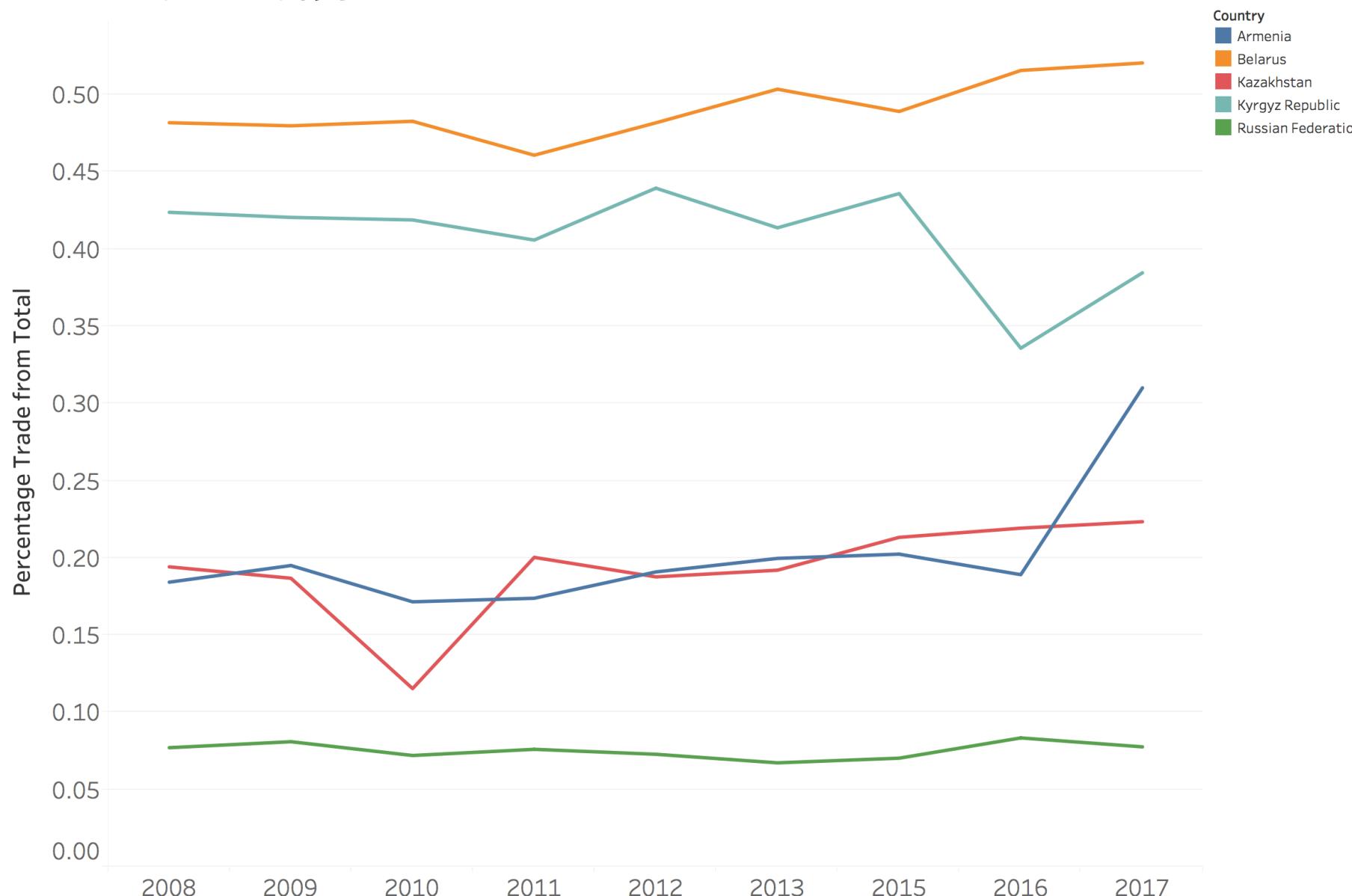
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# EAEU countries dependence on mutual trade

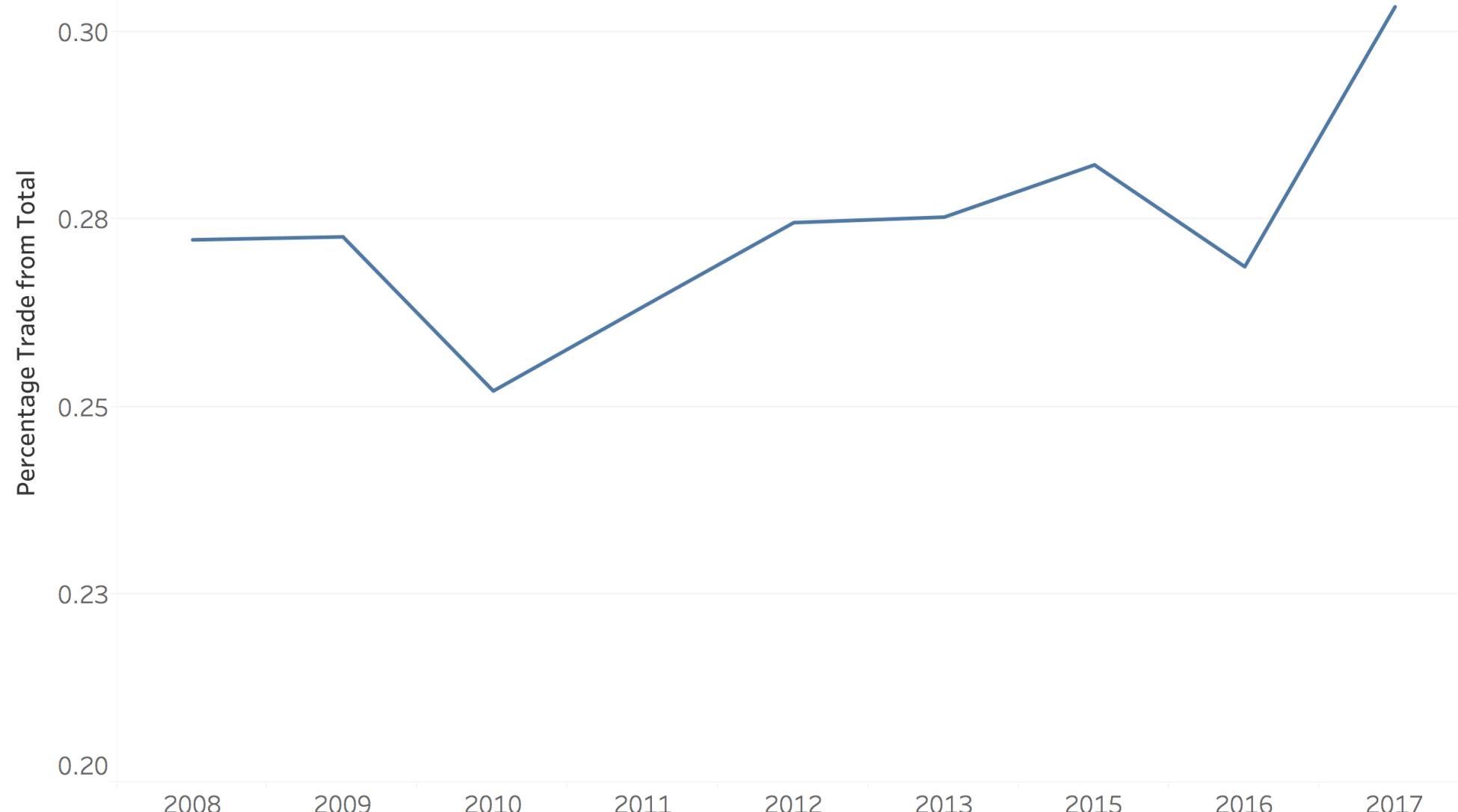
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# Average Trade between the members over time, % from Total Global Trade

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# Methodology

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- Social Network analysis using Gephi
- OLS, (R, Stata)
- Overall Network Density
- Centrality measures to determine the most influential SH
- Betweenness
- Dynamic changes over years

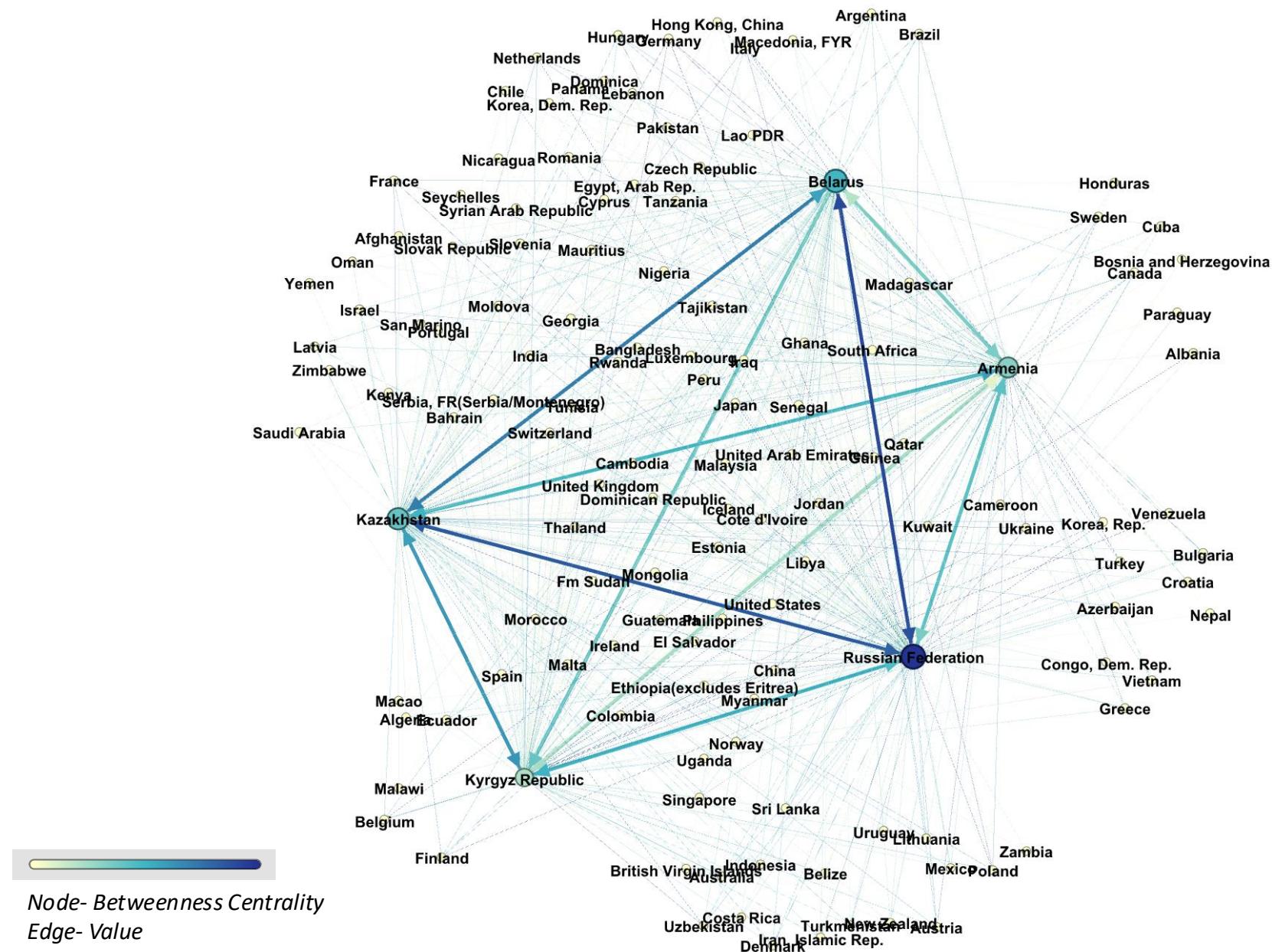


# SOCIAL NETWORK VISUALIZATIONS



# 2008 Social Network

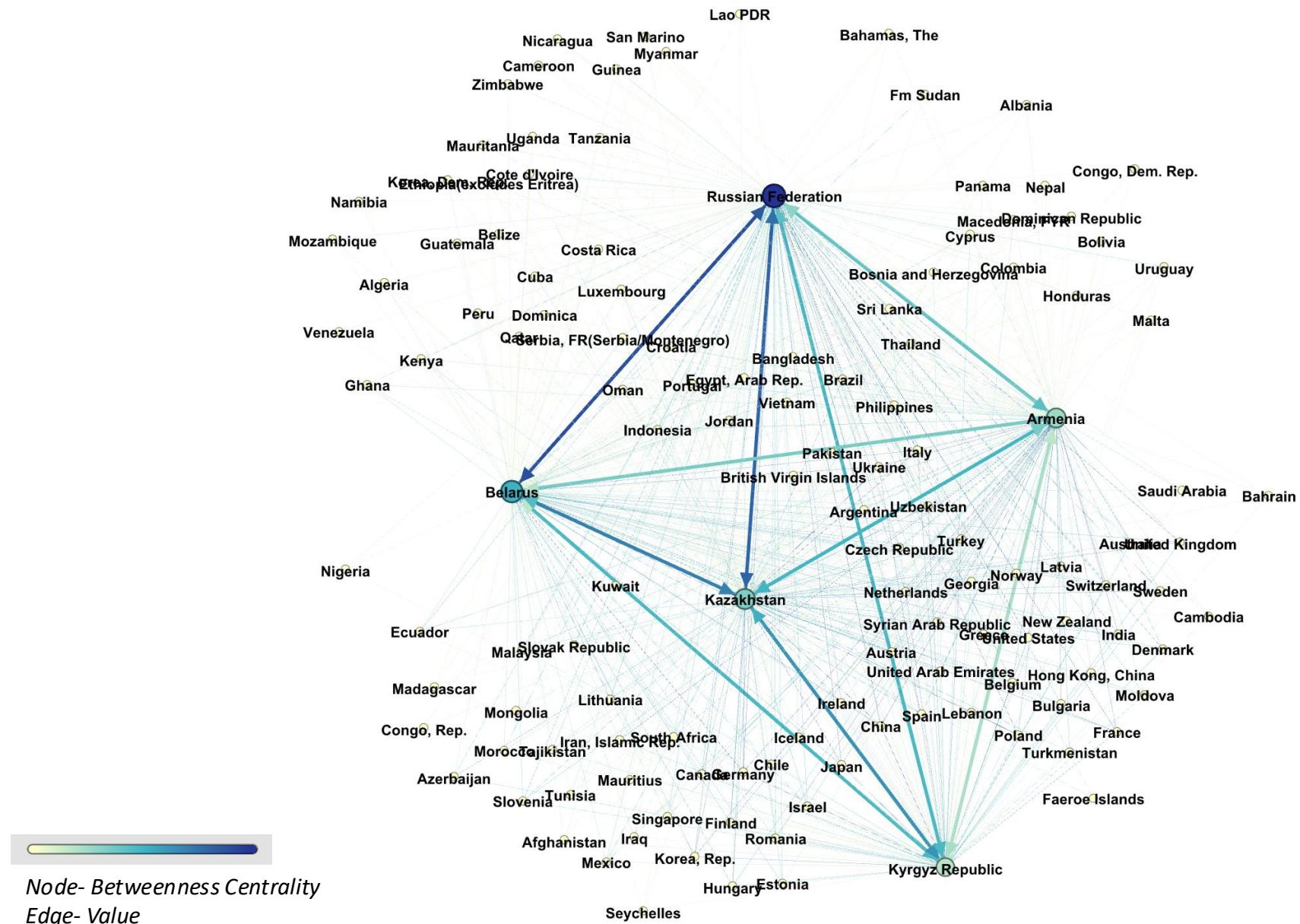
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# 2009 Social Network

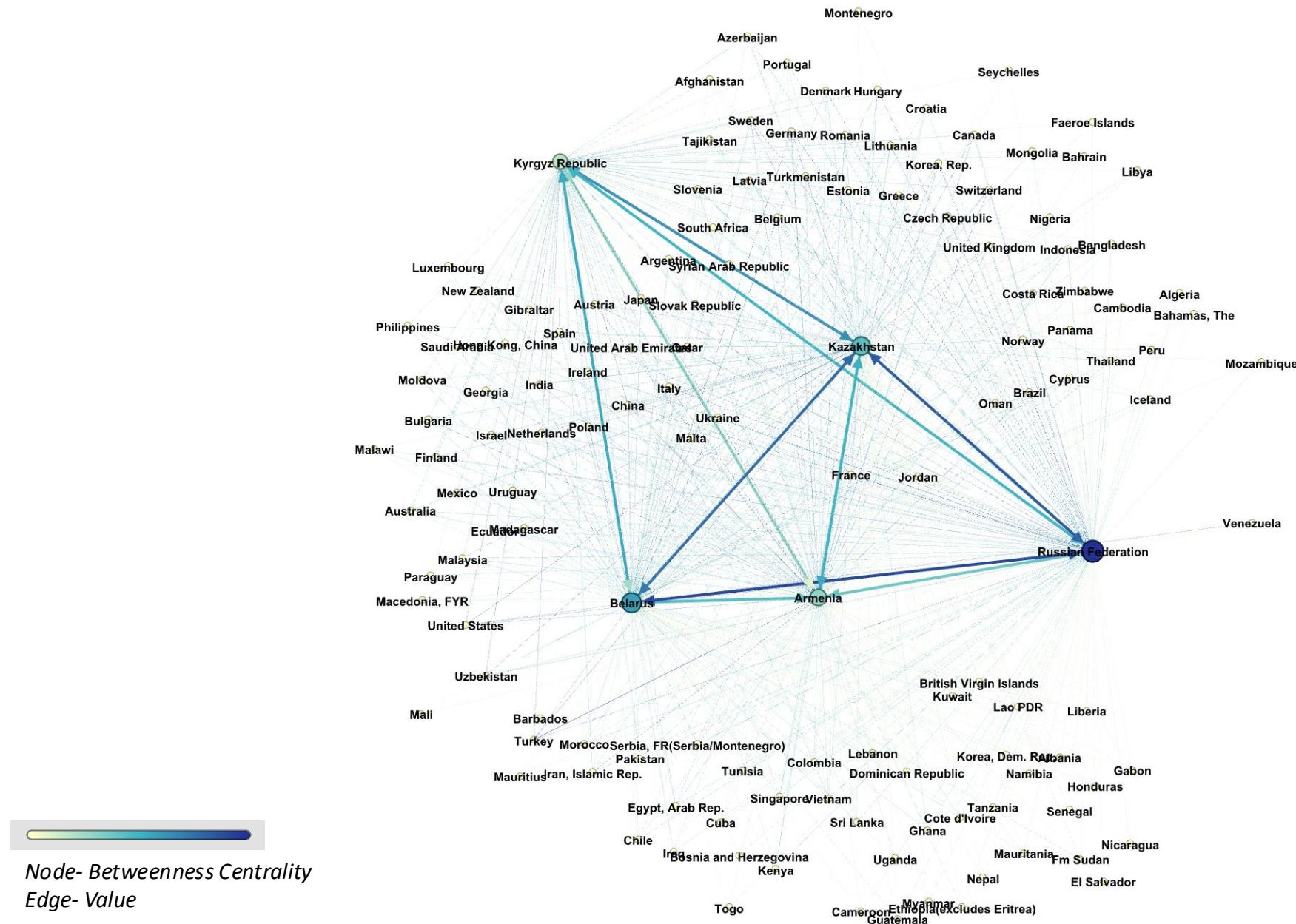
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# 2010 Social Network

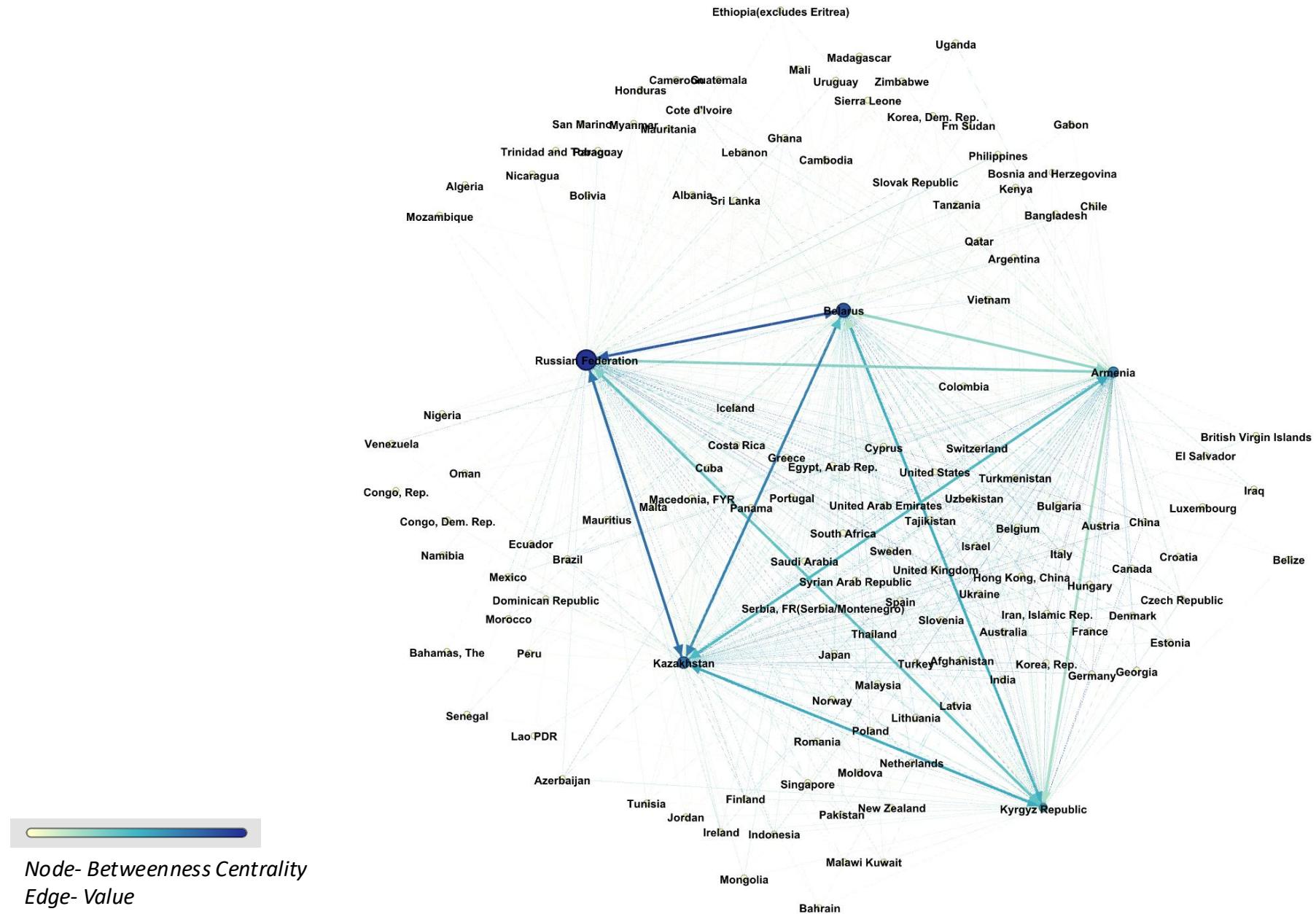
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# 2011 Social Network

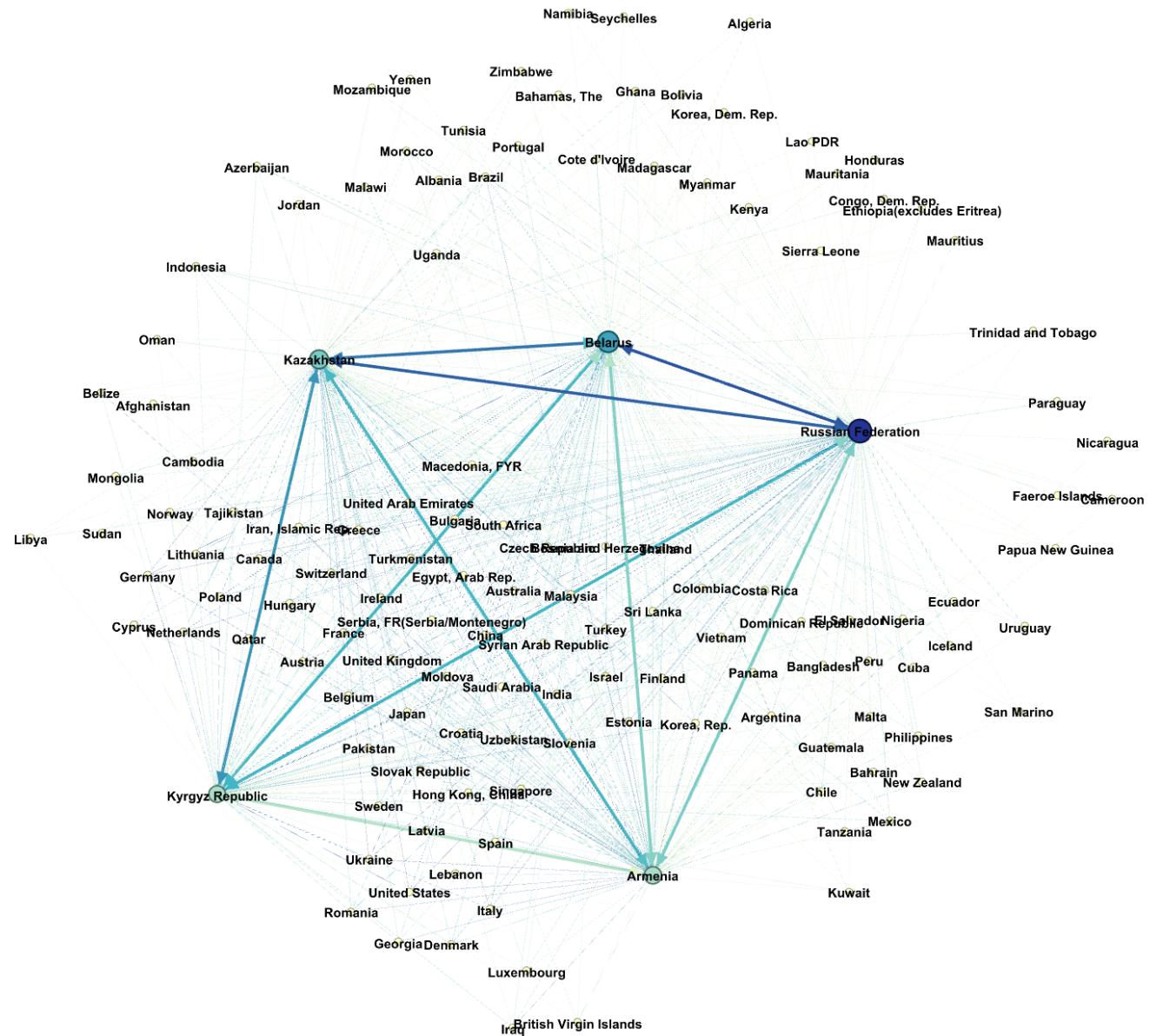
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# 2012 Social Network

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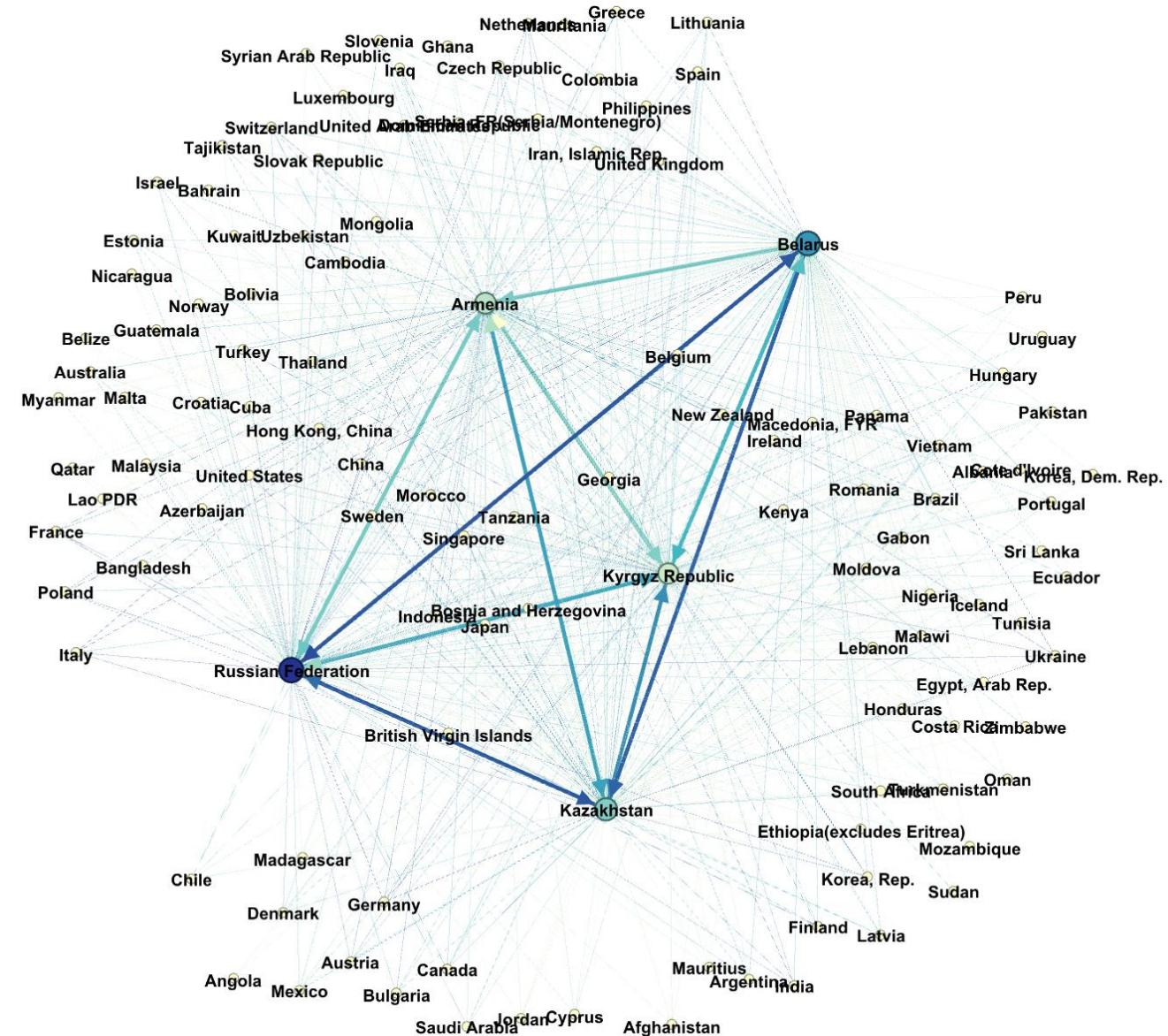


*Node- Betweenness Centrality  
Edge- Value*



# 2013 Social Network

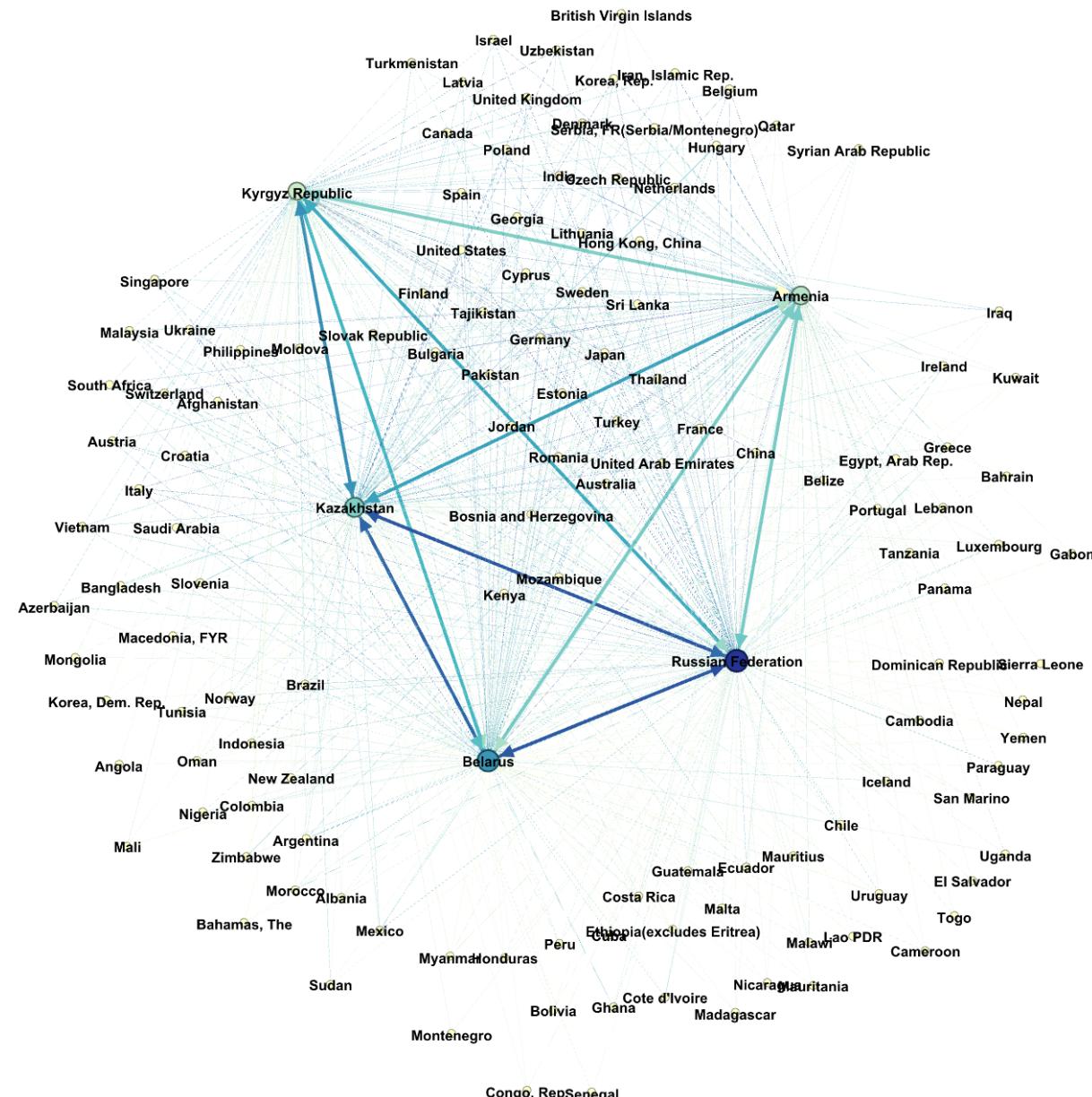
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# 2015 Social Network

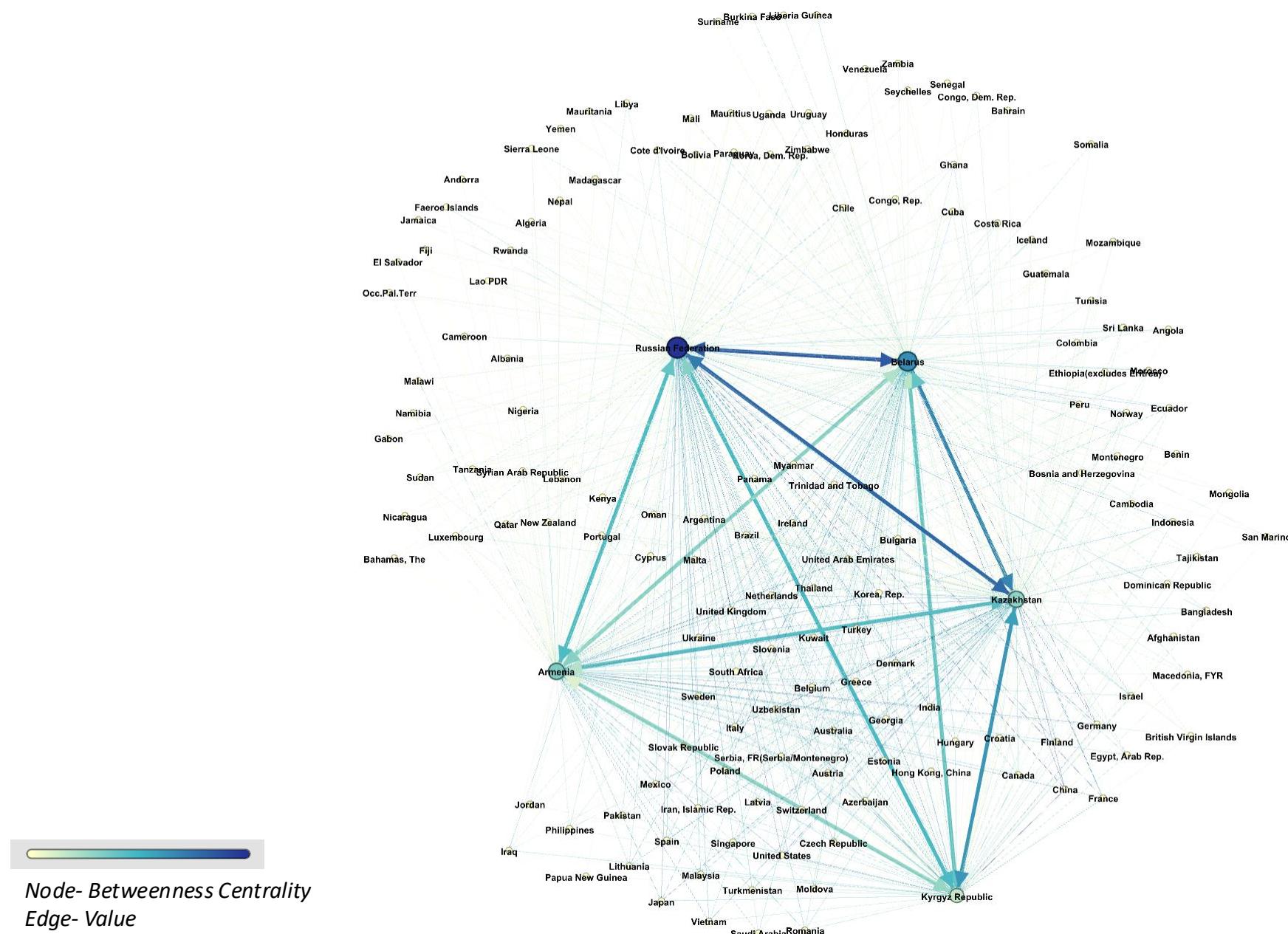
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# 2016 Social Network

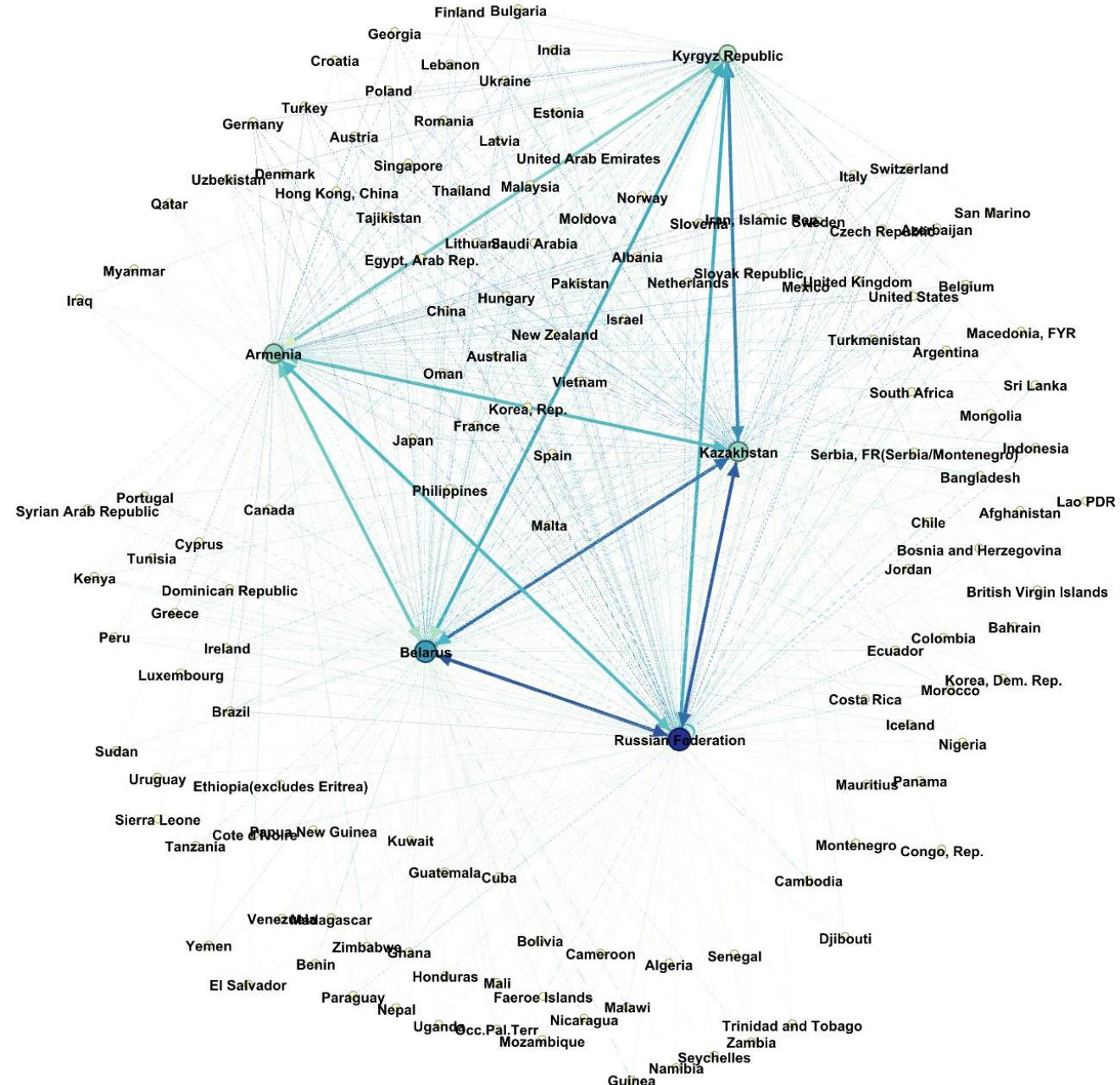
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# 2017 Social Network

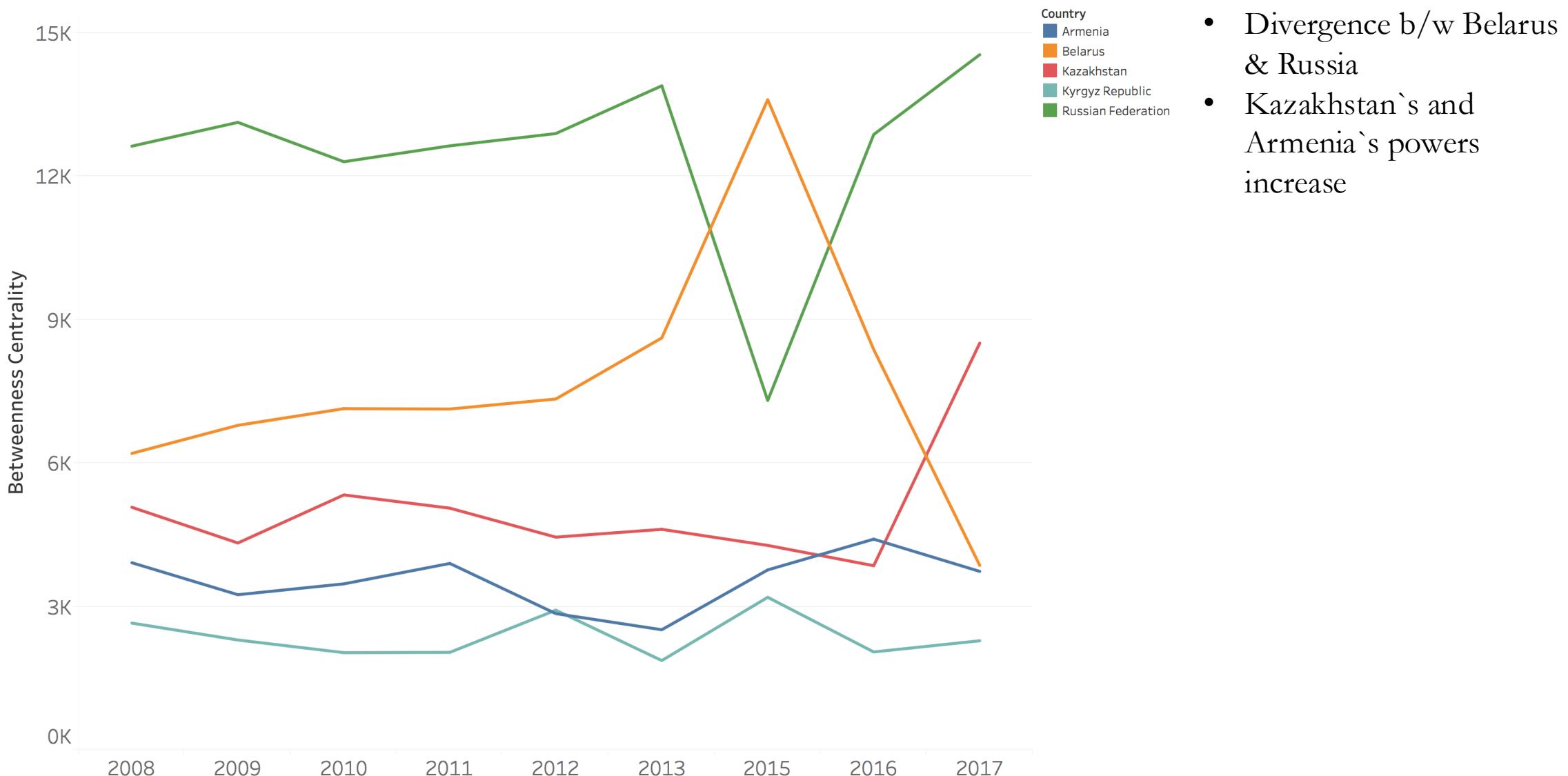
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# Betweenness Centrality by Country over Time

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# Inferences

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- No distinct variation in trade dynamics between actors
- No distinct variation in trade with the world
- Russia remains the most influential actor at a steady pace
- No significant effect in the Short Run

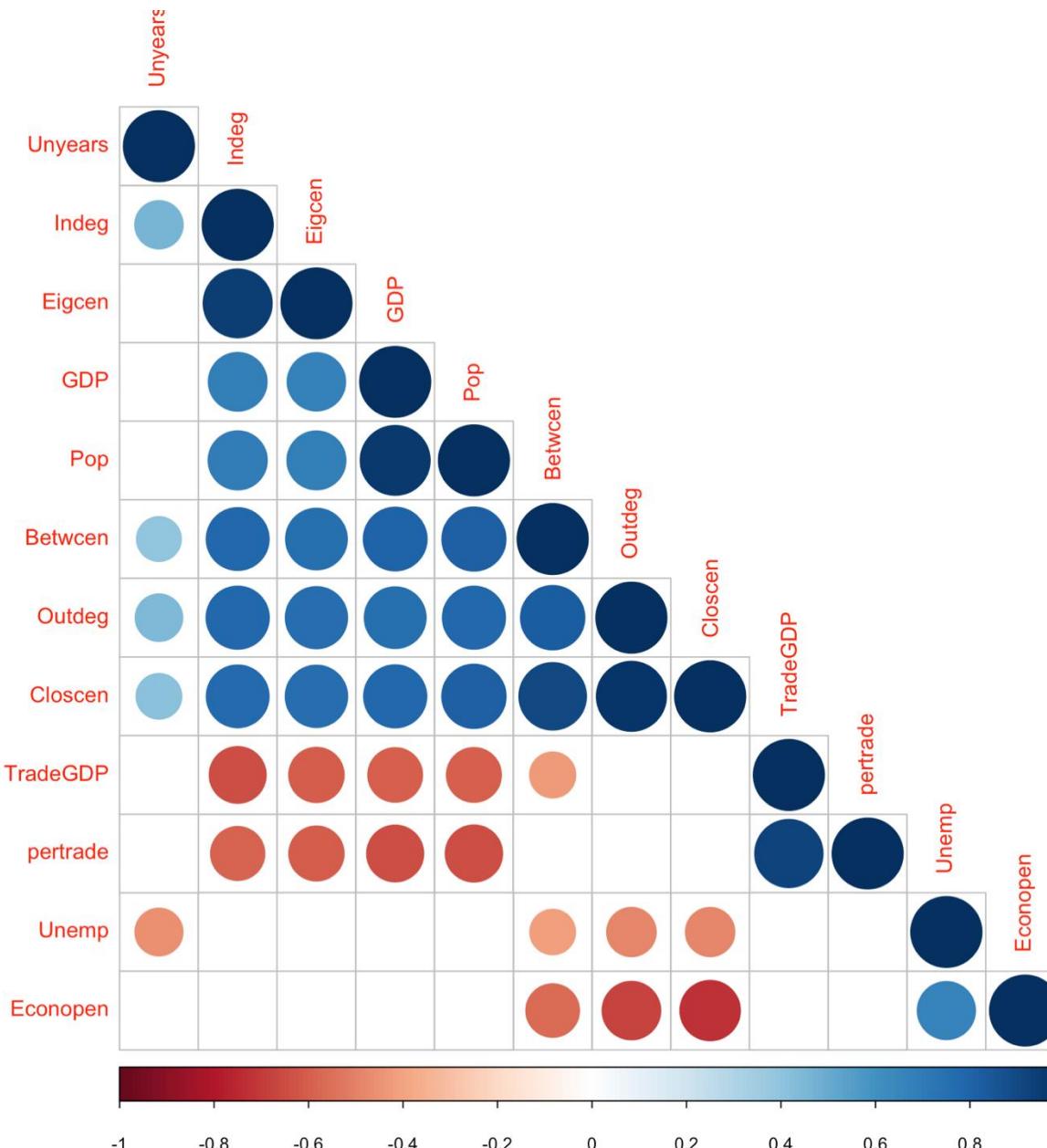


# ANALYSIS



# Correlation Matrix

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- In/Out degree
- Betweenness Centrality
- Eigenvector Centrality
- Closeness Centrality



# Ordinary Least Squares

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$$\text{Percentage Trade} = \frac{\text{Total Trade between 5 Countries}}{\text{Total Trade between 5 Countries & World}}$$

$$\text{Percentage Trade} = \hat{\beta}_0 + \hat{\beta}_1 \text{unyears} + \hat{\beta}_2 \text{unemp} + \hat{\beta}_3 \text{lngdp} + \hat{\beta}_4 \text{indeg} + \hat{\beta}_5 \text{betwcen} + \varepsilon$$



# Outputs

	(1) pertrade	(2) pertrade	(3) pertrade
unyears	<b>0.236</b> (0.119)	<b>0.290**</b> (0.0984)	<b>0.214</b> (0.107)
unemp	<b>-0.169</b> (0.223)		
econopen	<b>-0.714***</b> (0.131)	<b>-0.880***</b> (0.123)	<b>-0.904***</b> (0.117)
lngdp	<b>-0.135**</b> (0.0465)	<b>-0.102***</b> (0.0205)	<b>-0.0957***</b> (0.0216)
indeg	<b>-0.00714</b> (0.367)	<b>-0.0909</b> (0.221)	<b>0.307</b> (0.384)
betwcen		<b>-0.262</b> (0.228)	<b>-0.280</b> (0.225)
eigcen			<b>-0.411</b> (0.311)
_cons	<b>0.284</b> (0.354)	<b>0.584***</b> (0.158)	<b>0.696***</b> (0.178)
R-sq	<b>0.791</b>	<b>0.799</b>	<b>0.806</b>
AIC	-26.31	-28.08	-27.72
BIC	-15.60	-17.38	-15.23
F	29.44	29.84	27.87
N	44	44	44

Standard errors in parentheses

\* p<0.05, \*\* p<0.01, \*\*\* p<0.001



# Conclusions

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- Economic Openness, GDP, Indegree are significant drivers
- Years in the Union are less significant
- No visible Short-Term effect of the union
- Russia remains the most influential actor



# Policy Implications

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- More explicit effects as early as by 2020
- There is a potential role dynamics within the union
- The most economically dependent- Kyrgyzstan, Belarus
- Continued trade between countries is necessary to see results
- Russia's influence is pronounced and puts it into a beneficial position



# Research Limitations

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- Data
- Lack of Control Variables
- Short-Term vs. Long-Term Effects
- Partial Network Bias
- Complexity- Effect of other unions
- Software



# Further Study

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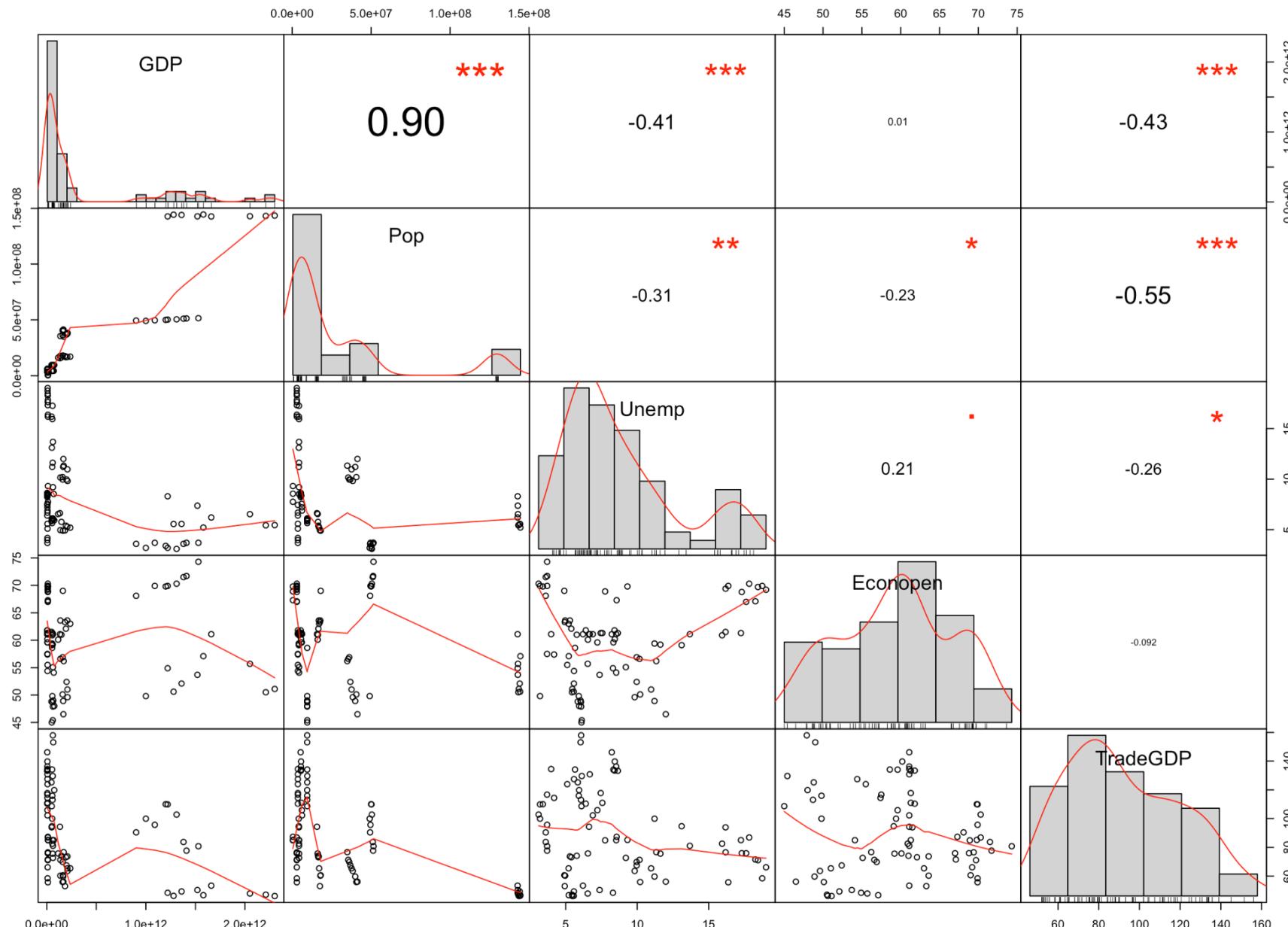
- Time Series
- Machine Learning- predictions
- Alliance Network
- New Attribute Data (e.g. corruption)



# Appendix



# Initial Data Distribution





# Variance Inflation Factor

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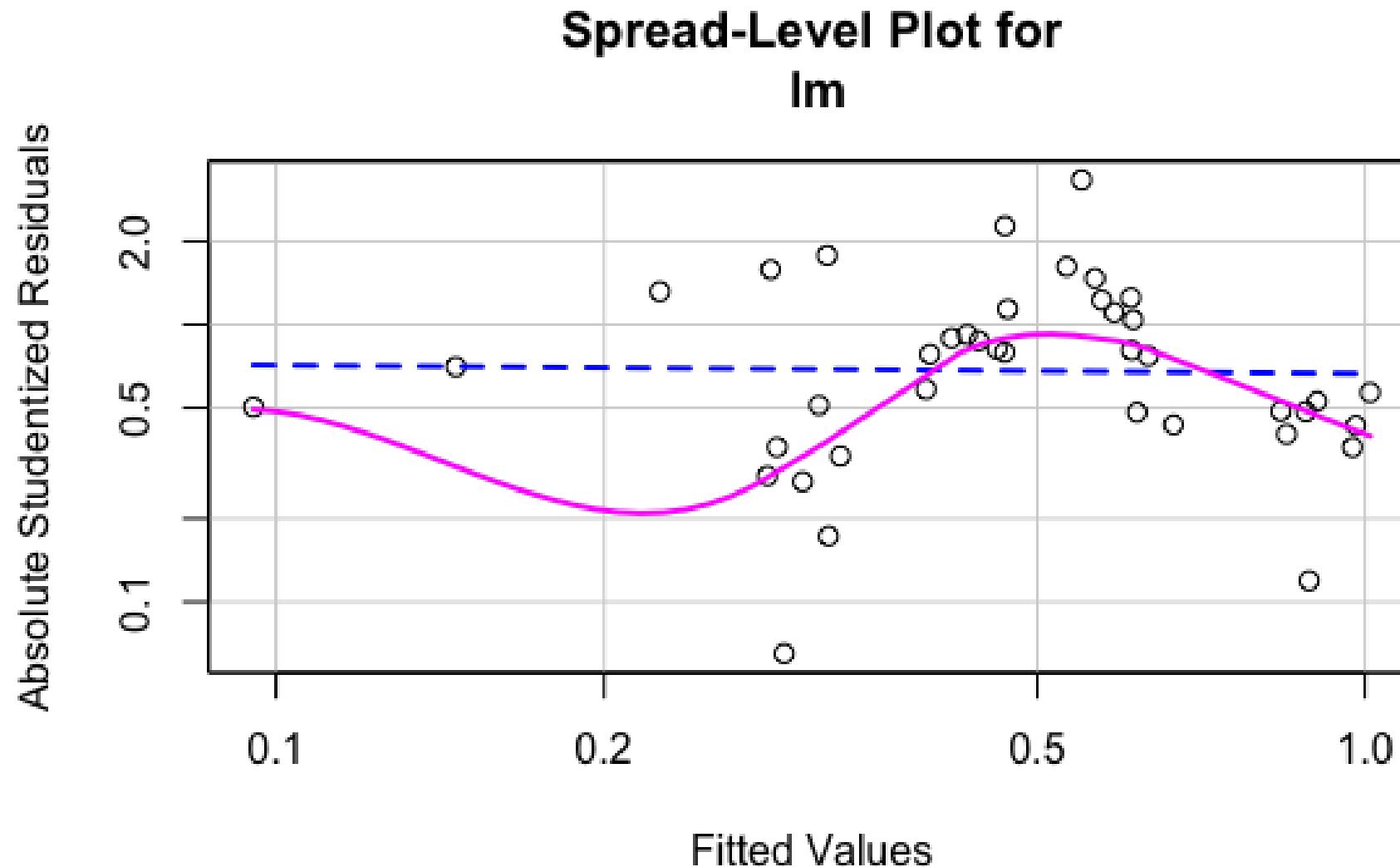
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<b>Variable</b>	<b>VIF</b>
Union Years	1.85
Indegree	3.48
Unemployment	2.59
Economic Openness	2.67
LNGDP	3.38
Betweenness Centrality	6.02
Eigenvector Centrality	14.05

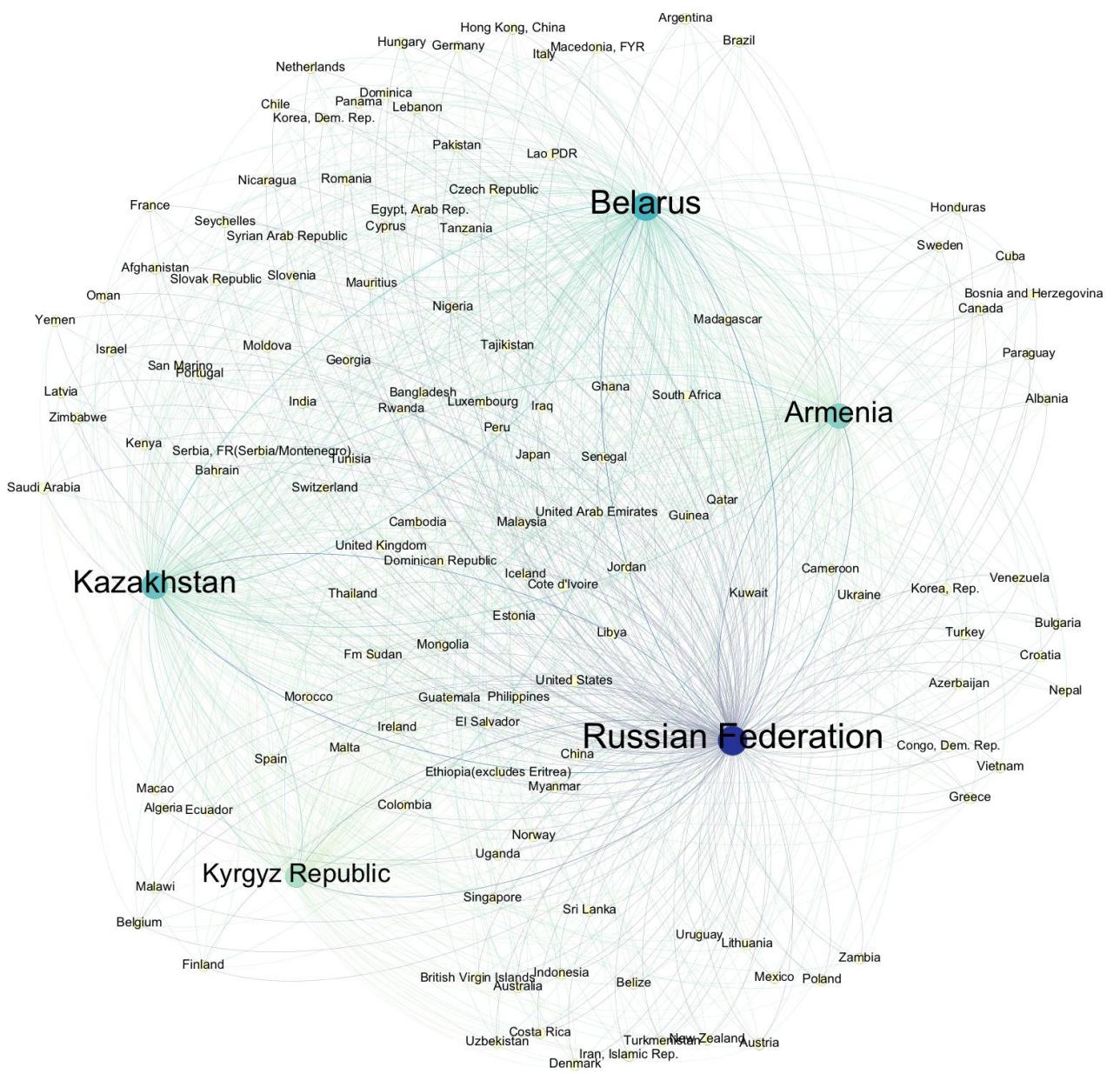


# Variation plot

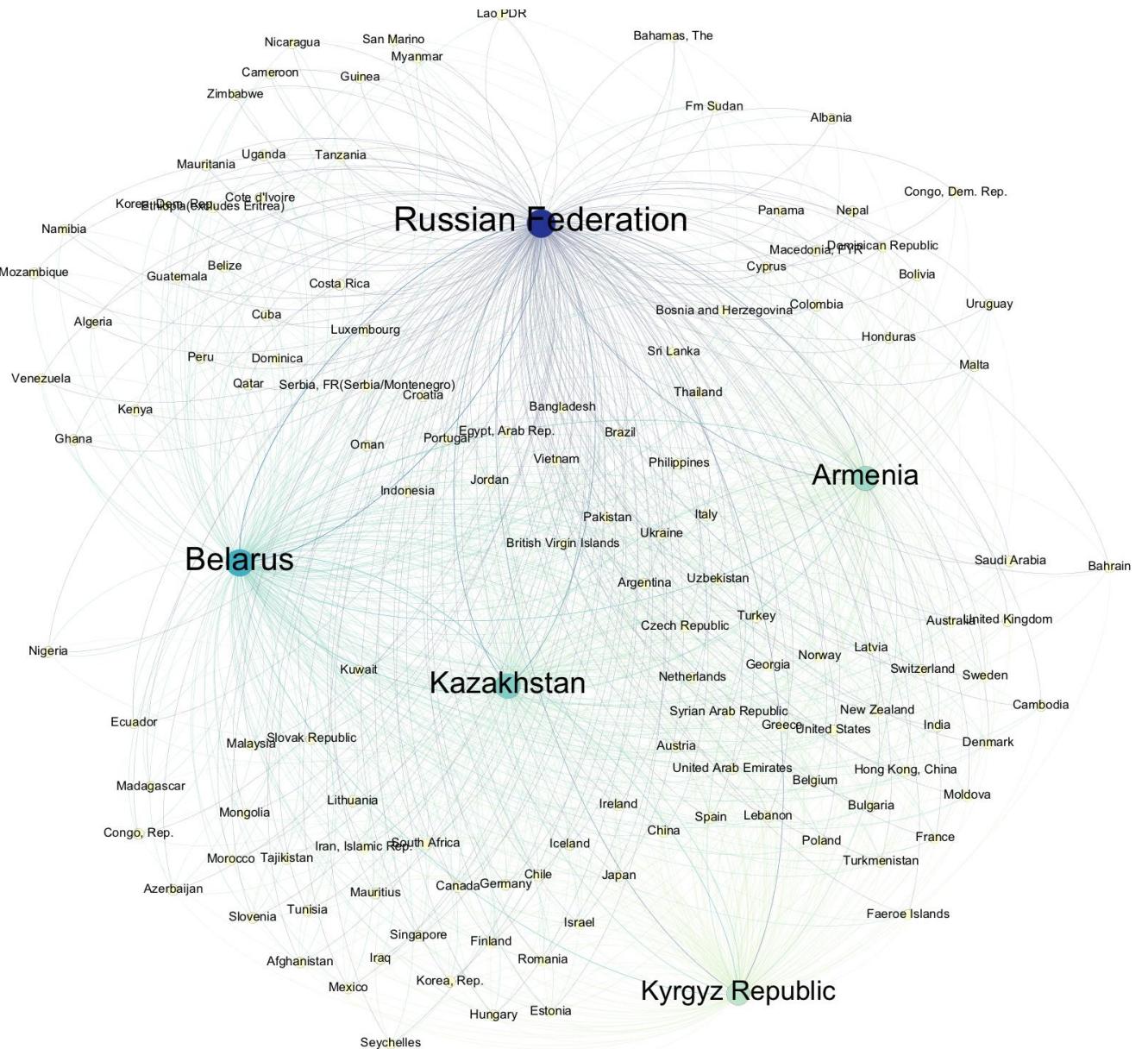
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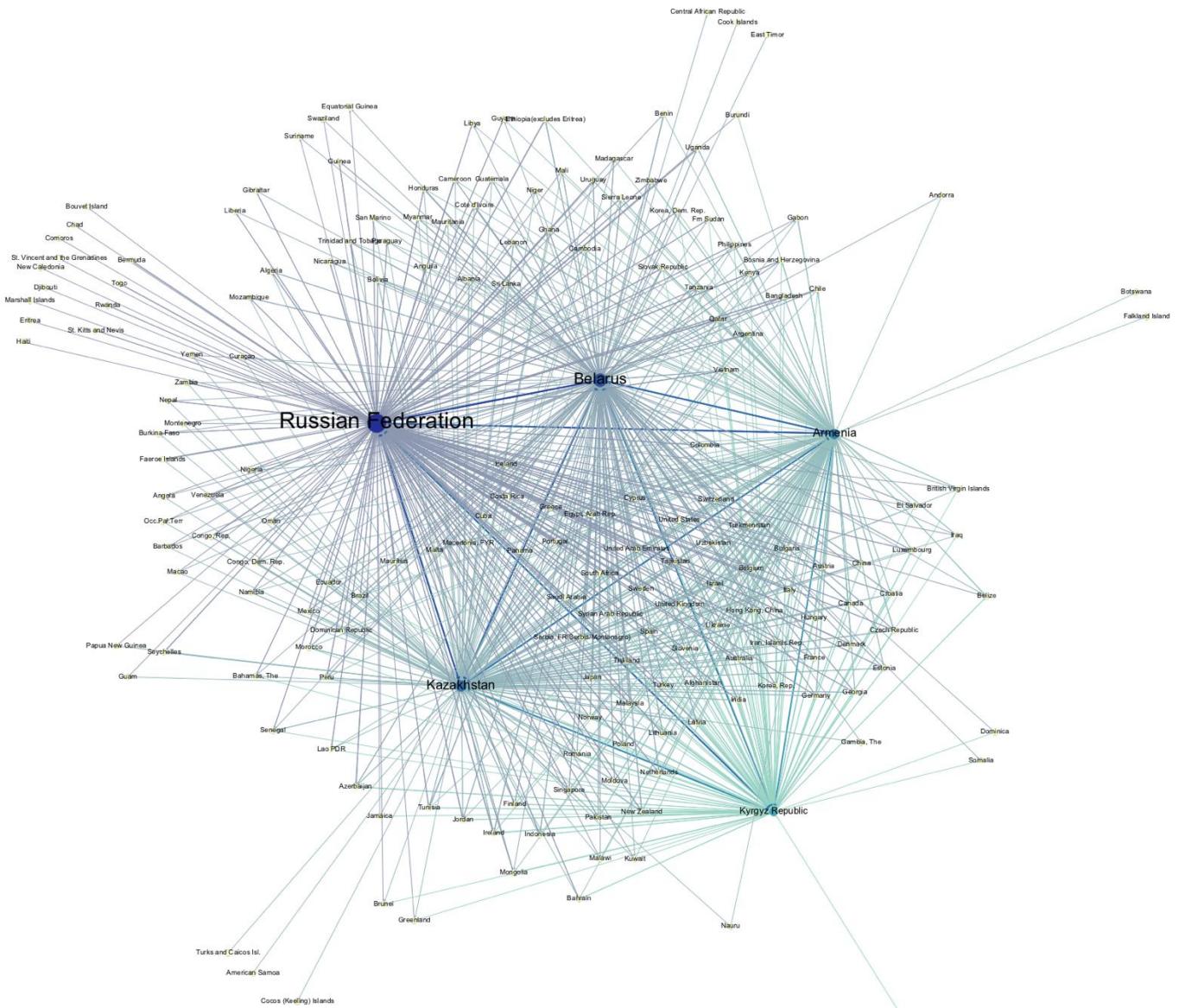
2008



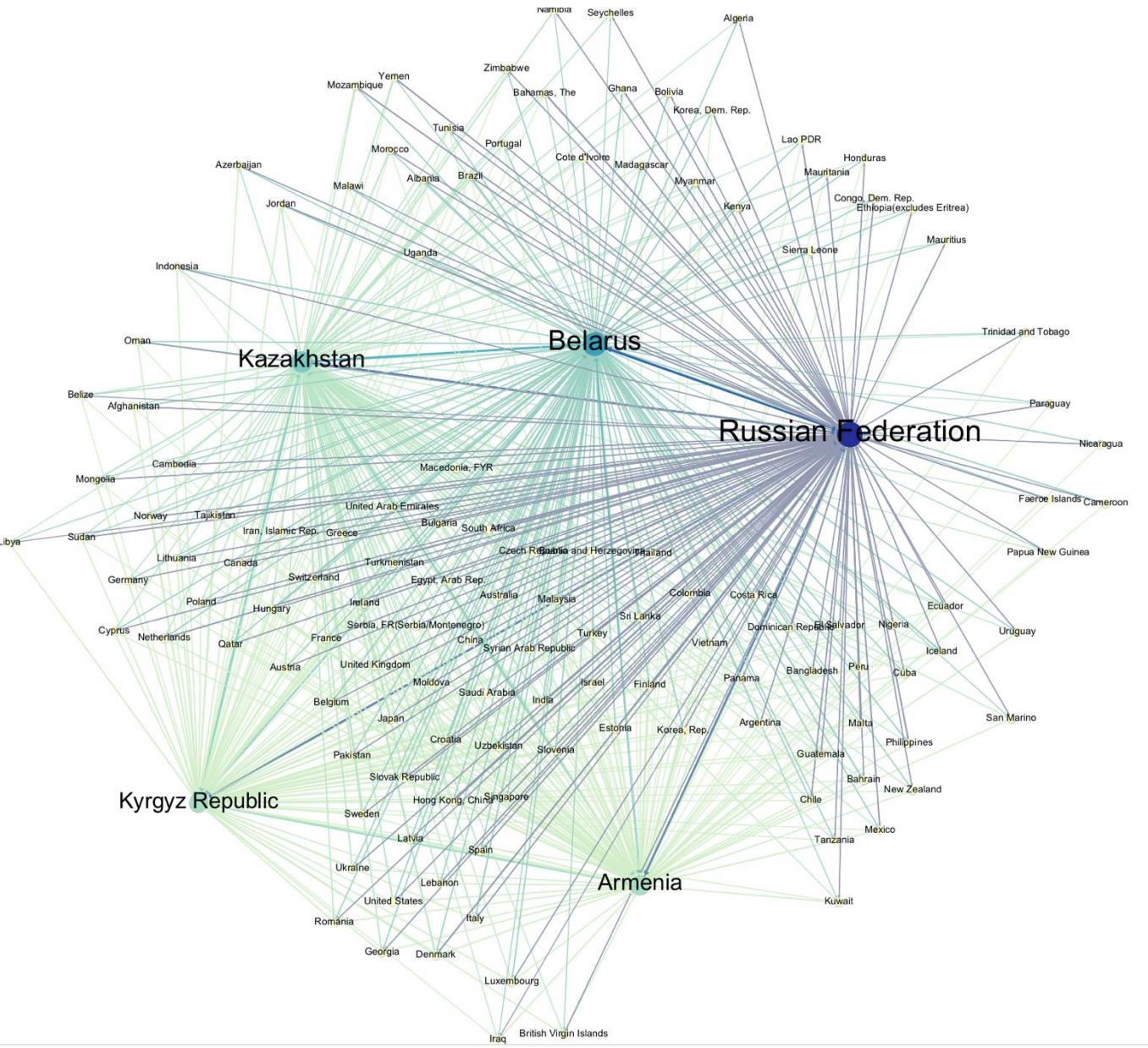
2009



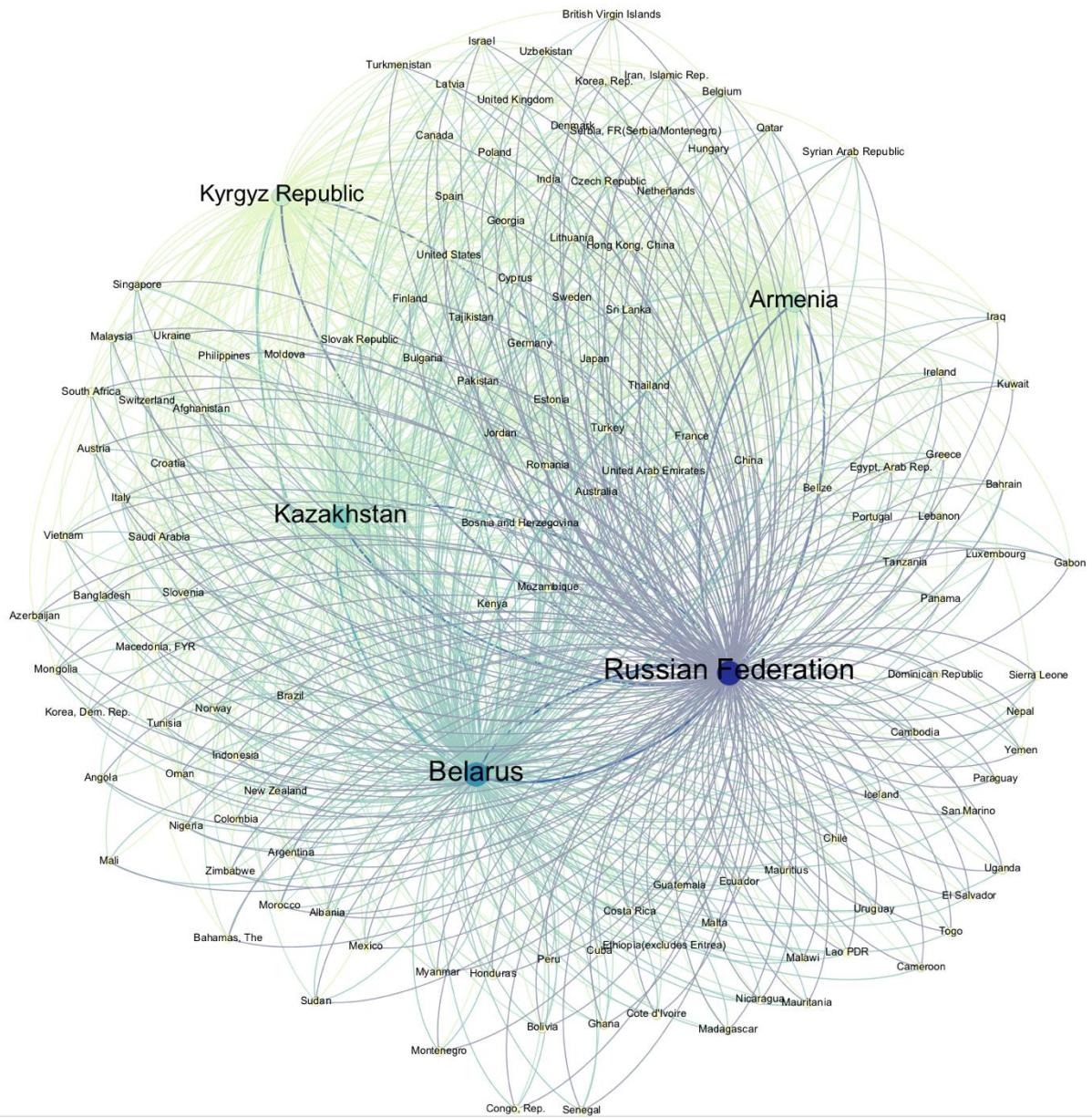
# 2011



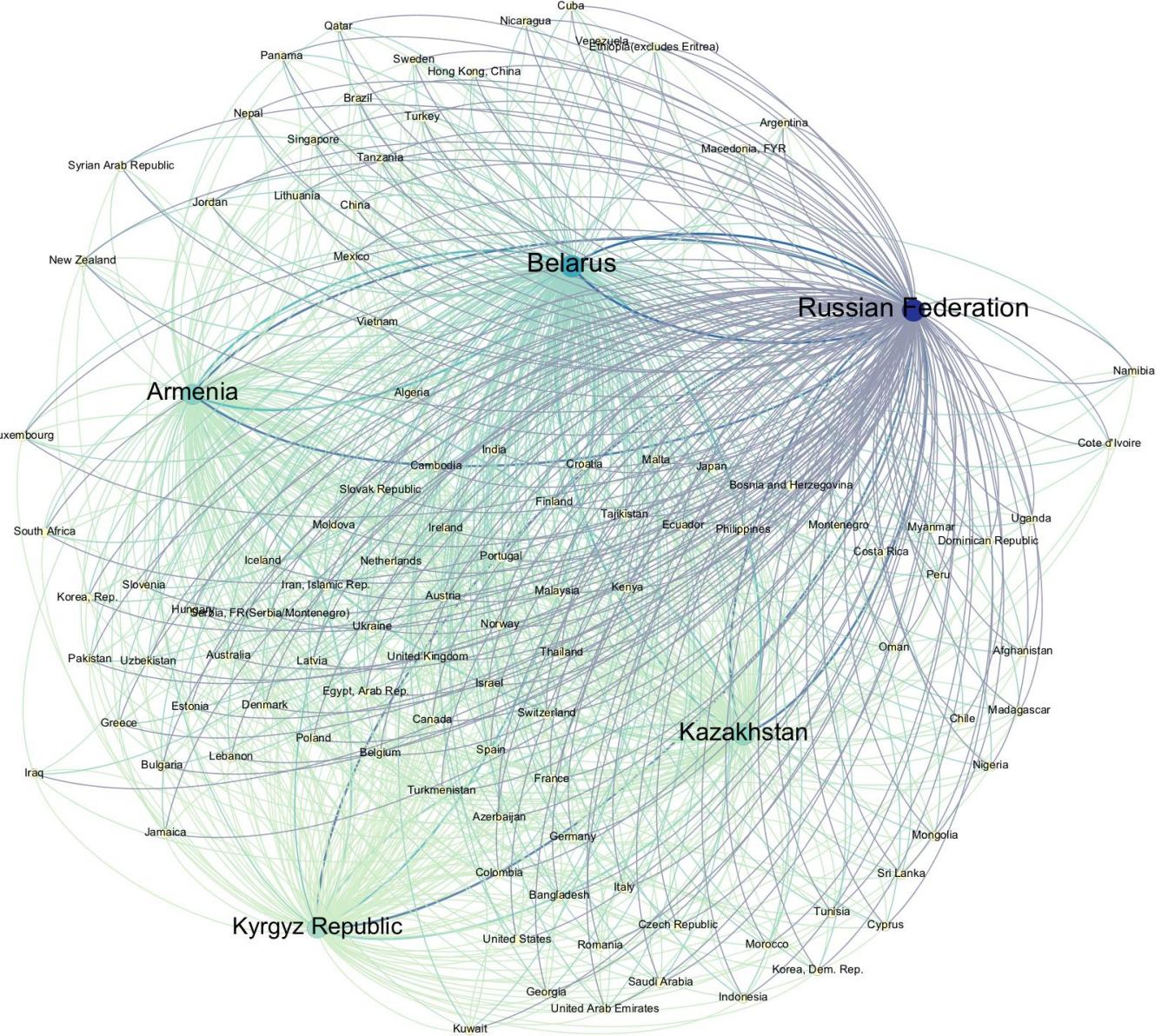
2012



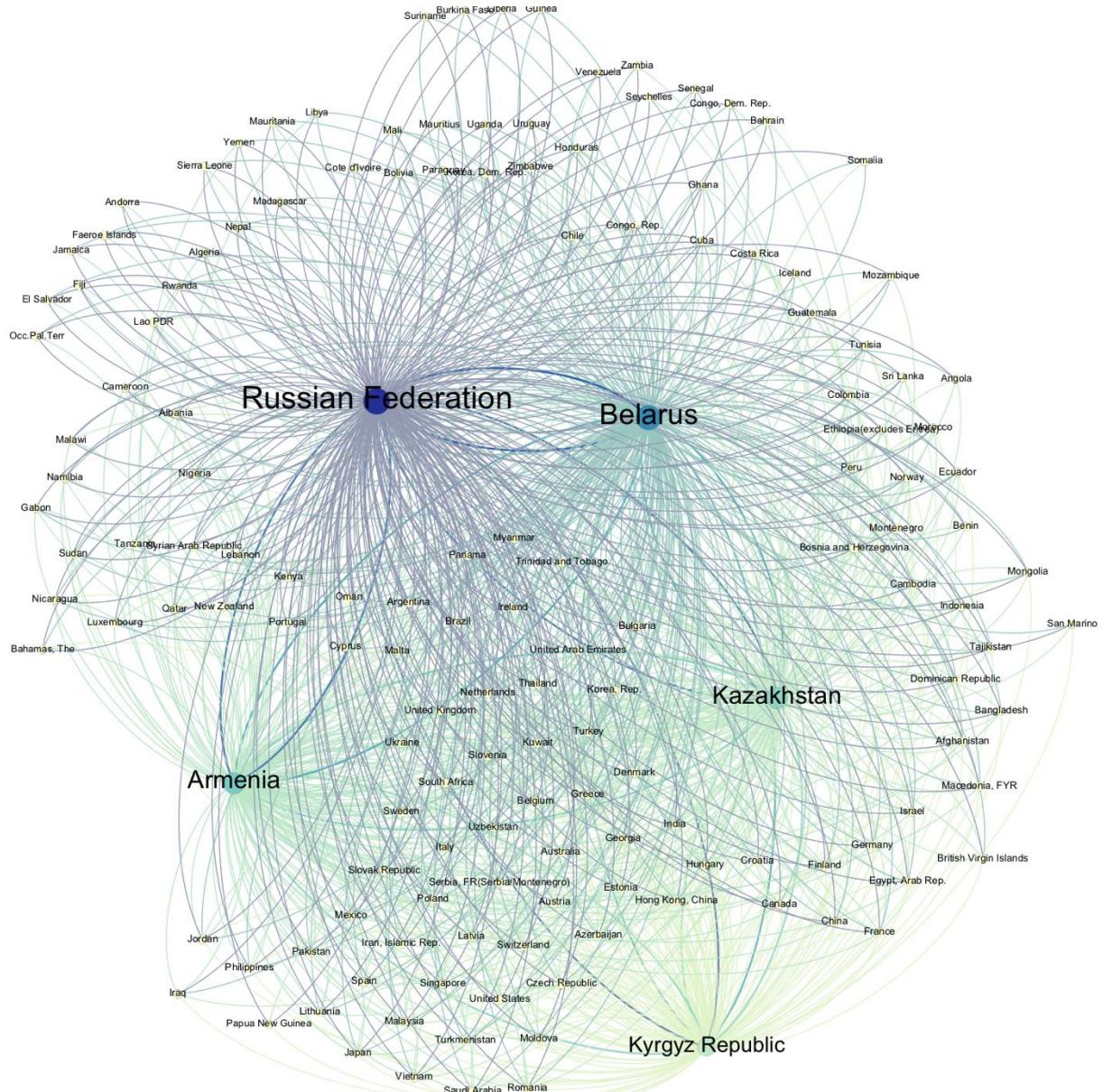
2013



2015



# 2016



2017

