Family Ties vs. Country Size: Exploring the Path from Foreign Student to Lawful Permanent Resident Status

SINNEY CHAN

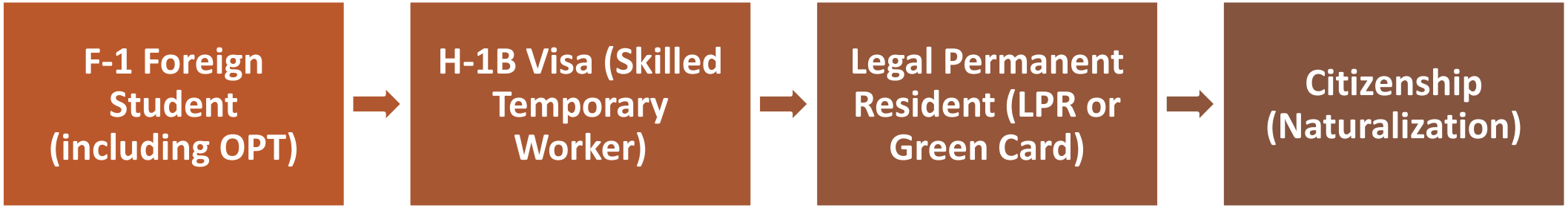
ELIZABETH MULLEN

College of Computing and Technology

Advisor: Dr. Qinggou Wang

Definition and steps

Immigration is the international movement of people into a destination country of which they are not natives or where they do not possess citizenship in order to settle or reside there.



Relevance of Work

Previous work on H-1B visas fostered desire to understand unsettling view of Indian and Chinese Immigrants

Political Issues - Should immigration policies be changed?

- Consider education level, valuable skills (merit-based)
- Eliminate ‘chain migration’ (family reunification)
- Remove limits per country

Evidence of the “migration model” from international student to permanent resident

Questions

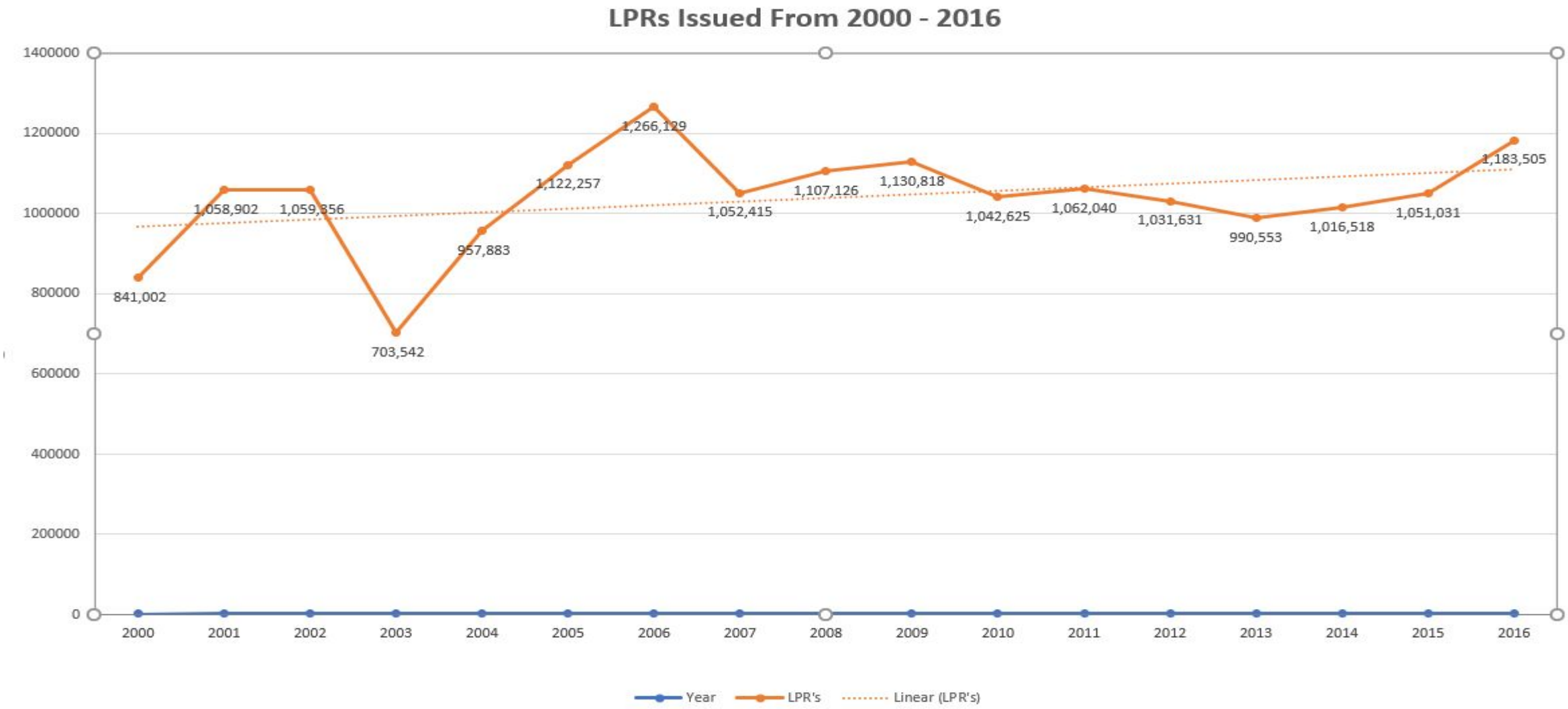
Do the migration patterns from China and India align with other countries when country-of-origin population size is removed from the equation?

Are there any correlations between the attributes of countries that cluster with China or India that might describe migration trends to the United States based on educational prioritization or other demographic measurements?

Does the current structure of the immigration system facilitate the process of attracting highly-skilled and educated foreign workers to the United States as lawful permanent residents, and potentially, US citizens?

Migration Model

US Citizenship	
Legal Permanent Resident Status	H-1B visa is converted to Employment-based preference LPR (adjustment of status)
Temporary Worker Status	H-1B workers can stay from 3 to 10 years. (70% of H-1B workers are in STEM jobs)
Foreign Student Status	F-1 Students come to US to earn Bachelor's, Master's or PhD – Optional OPT for 1 year, or 3 years for STEM graduates



Since 2000, the number of green cards issued averaged just over 1 million per year.

Steps for Analysis:

Gather data from three consecutive years of immigration statistics

Determine what data points could be added to measure a country's education level, or prioritization of education

Determine what data points could build a profile for each country

Cluster the data based on immigration numbers to see which countries have similar immigration patterns. Prior to clustering, remove country of origin's population from data. Express all values relative to the country of origin's population.

Once clustered, look for trends in the populations of the clusters

- Basic demographics
- Education prioritization
- Correlations

Attributes to describe 71 countries:

Fields used for clustering:

- International Student Count (2014, 2015, 2016)
- H-1B Visa Petitions (2014, 2015, 2016)
- Employment-based admissions LPR count (2014, 2015, 2016)
- Total admissions LPR count (2014, 2015, 2016)
- H-Index (of home country)
- % of population with tertiary education or above (of home country)

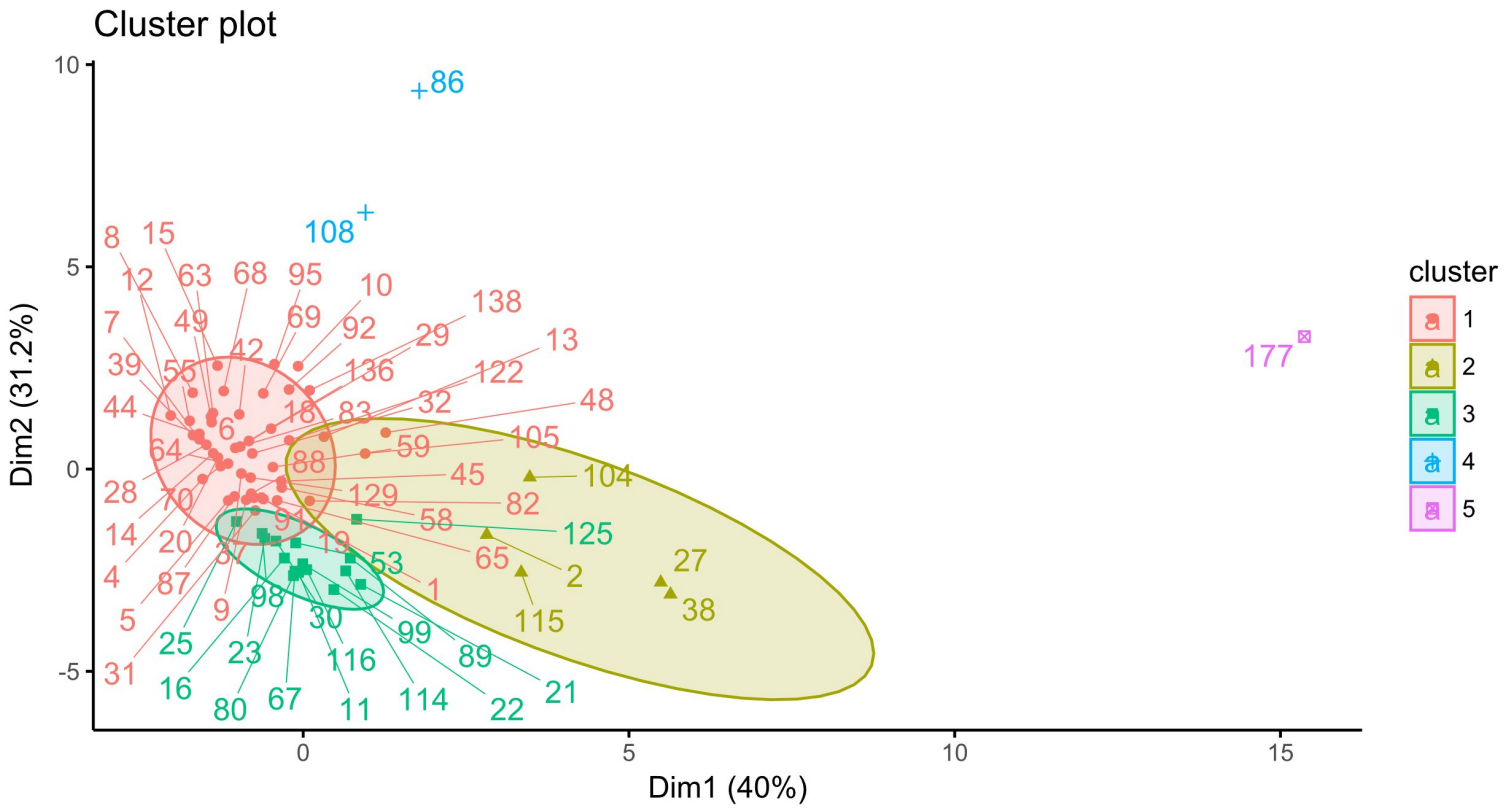
Fields *not* used for clustering:

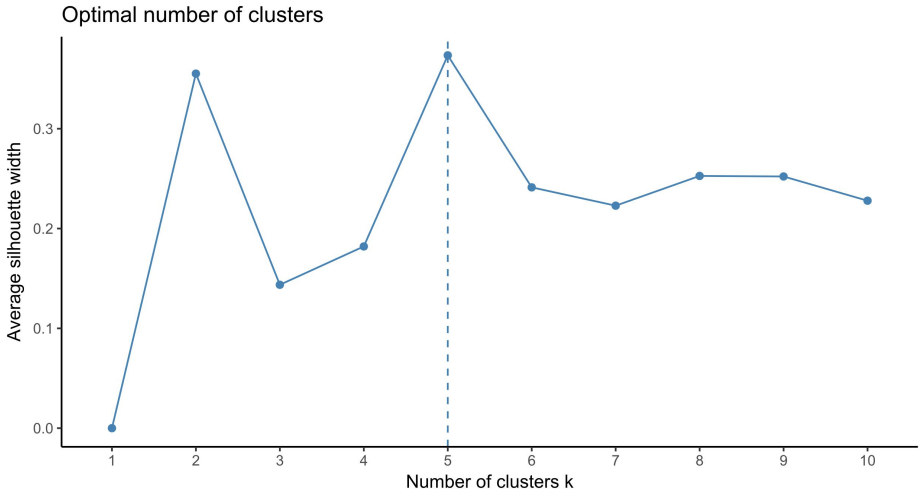
- Growth rate (of home country)
- Median population age (of home country)
- Population density (of home country)
- GDP PPP (of home country)

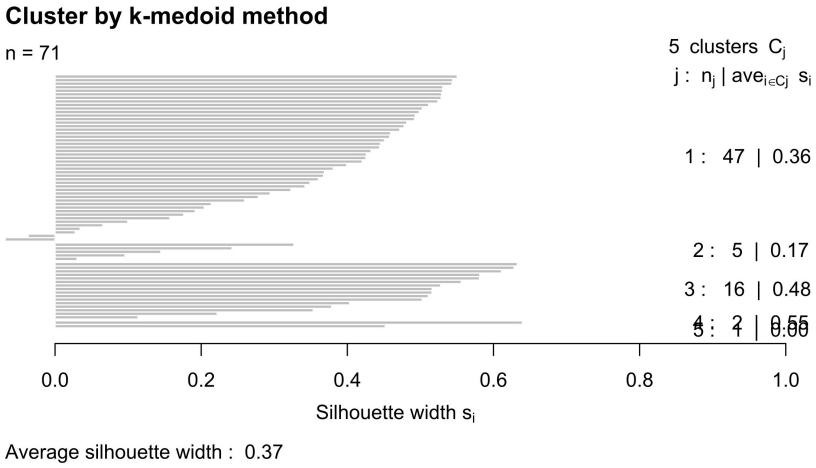
Data source

- Institute of International Education
- The Office of Foreign Labor Certification
- Department of Homeland Security: The 2016 Yearbook of Immigration Statistics
- Scimago Journal & Country Rank
- Our World in Data: Tertiary Education

Using K-Medoids for Optimal Cluster Count of 5

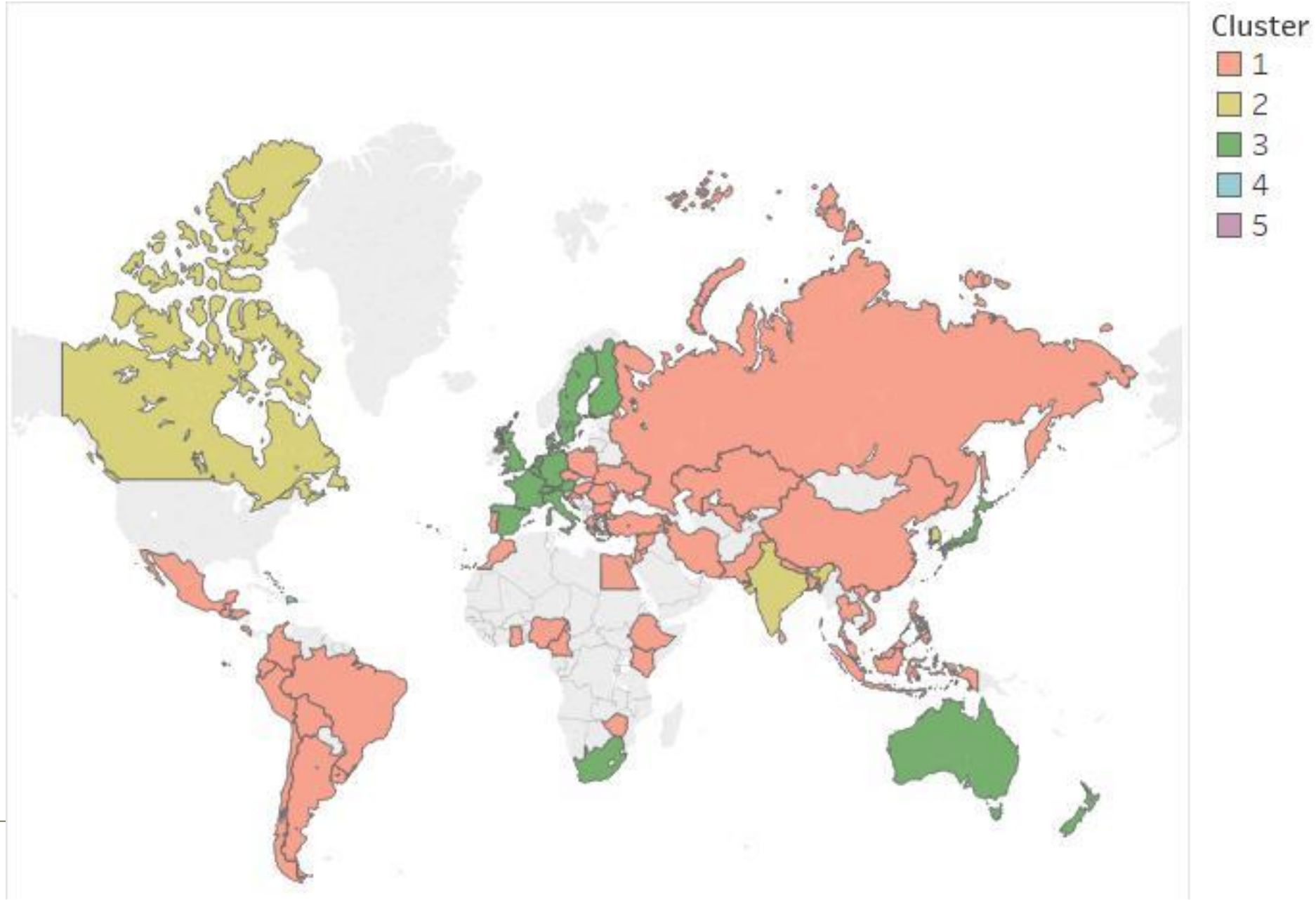






Average silhouette width : 0.37

Clustering Result



How the Countries Clustered

Cluster 1			
Argentina	31		
Armenia	138	Kazakhstan	64
Bangladesh	8	Kenya	28
Bolivia	83	Malaysia	45
Brazil	5	Mexico	10
Bulgaria	105	Morocco	39
Cameroon	55	Nepal	48
Chile	65	Nigeria	7
China	1	Pakistan	6
Colombia	29	Peru	42
Costa Rica	122	Philippines	13
Croatia	129	Poland	37
Czech Republic	87	Porugal	88
Ecuador	69	Romania	59
Egypt	14	Russia	9
Ethiopia	12	Sri Lanka	58
Ghana	49	Syria	63
Greece	82	Thailand	20
Guatemala	68	Turkey	19
Honduras	95	Ukraine	32
Hungary	91	Uruguay	136
Indonesia	4	Uzbekisan	44
Iran	18	Vietnam	15
Jordan	92	Zimbabwe	70

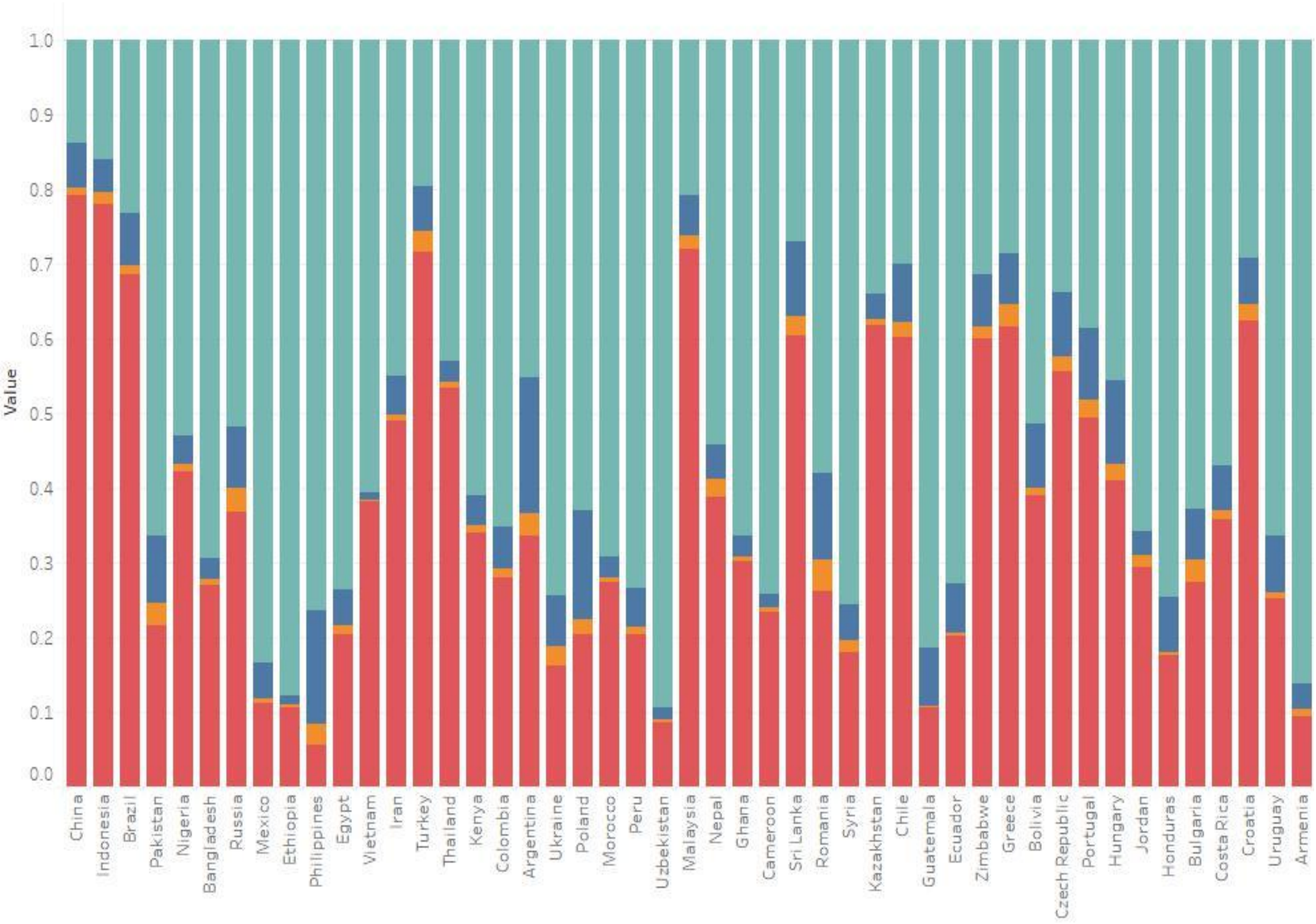
Cluster 2	
Canada	38
Hong Kong	104
India	2
Singapore	115
South Korea	27

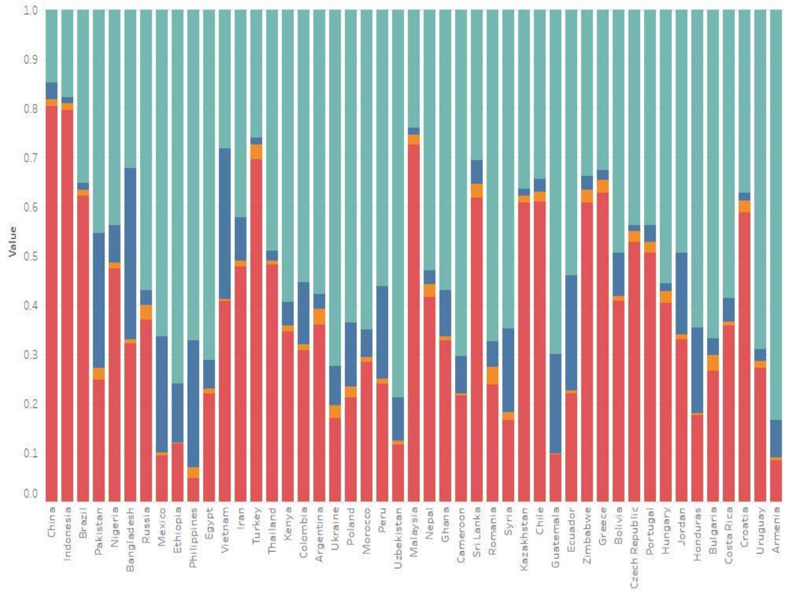
Cluster 3	
Australia	53
Austria	98
Belgium	80
Denmark	114
Finland	116
France	22
Germany	16
Italy	23
Japan	11
Netherlands	67
New Zealand	125
South Africa	25
Spain	30
Sweden	89
Switzerland	99
United Kingdom	21

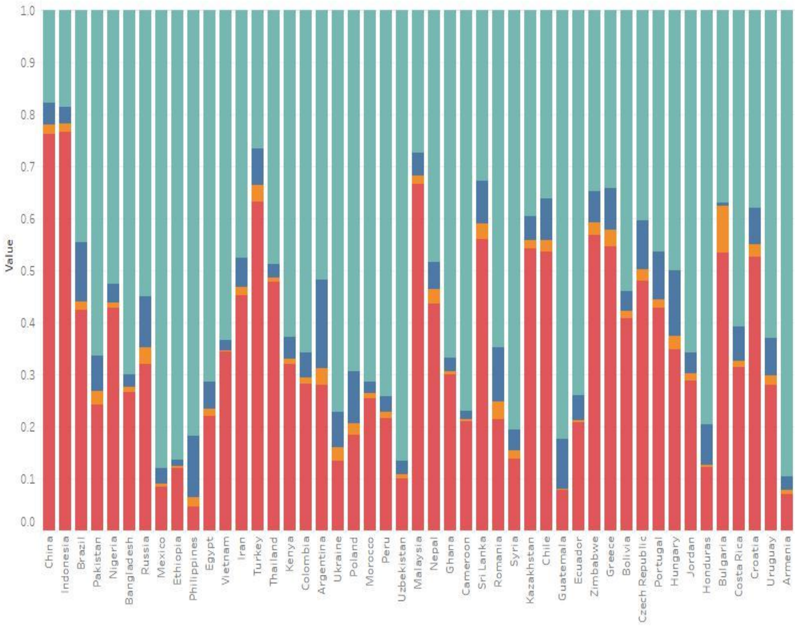
Cluster 4	
Dominican Republic	86
El Salvador	108

Cluster 5	
Bahamas	177

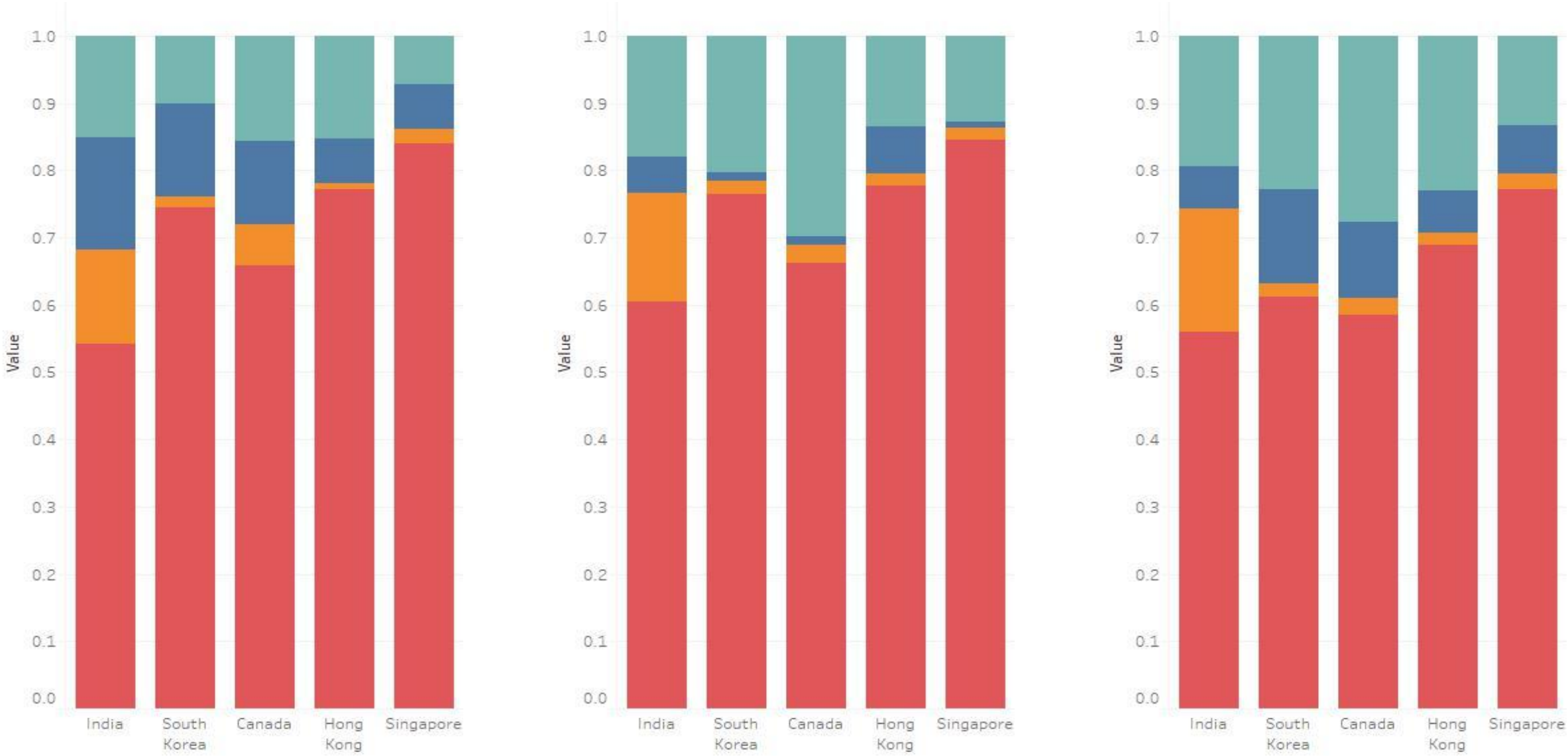
Cluster 1 Migration Relative Population 2014 – 2016



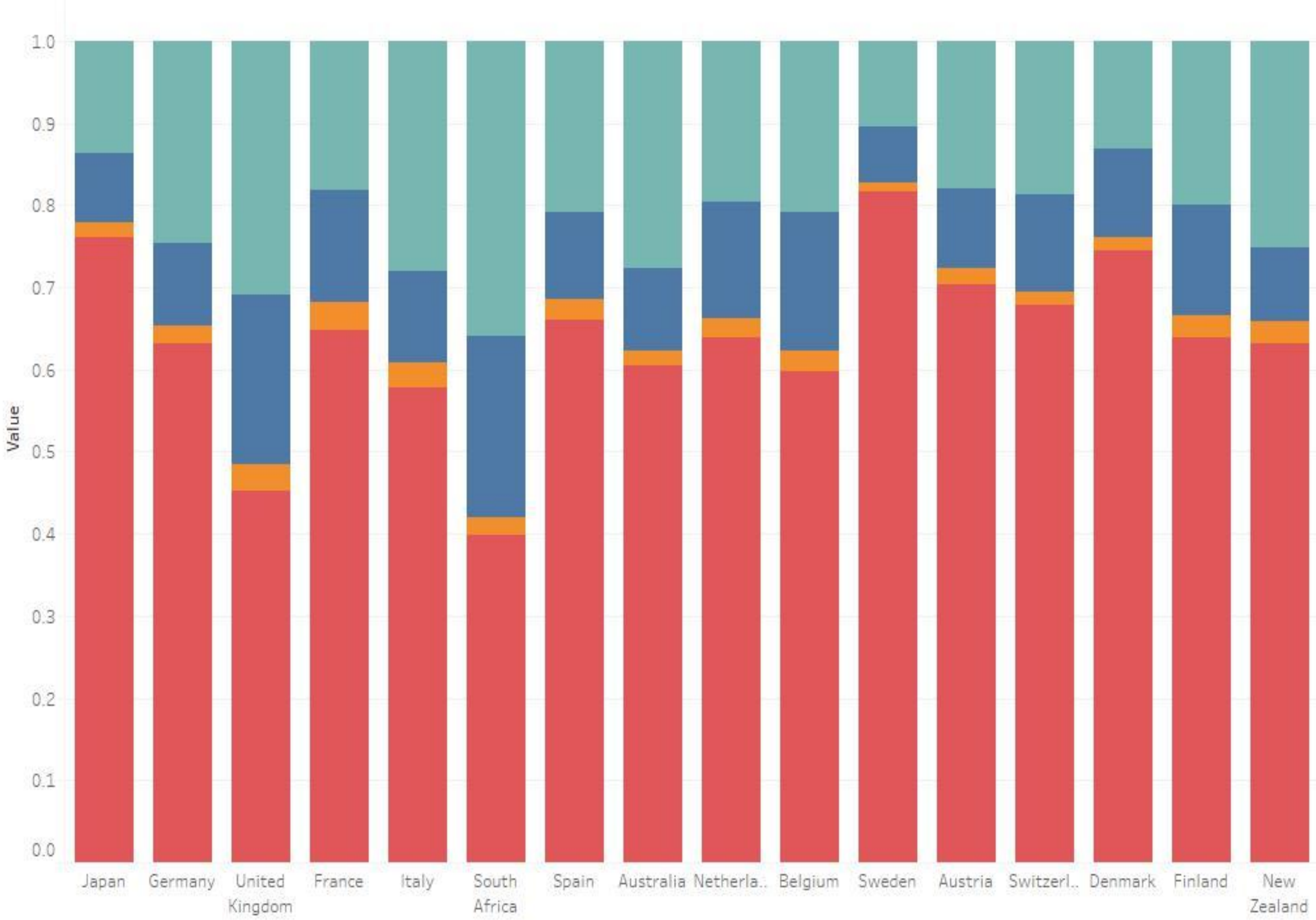


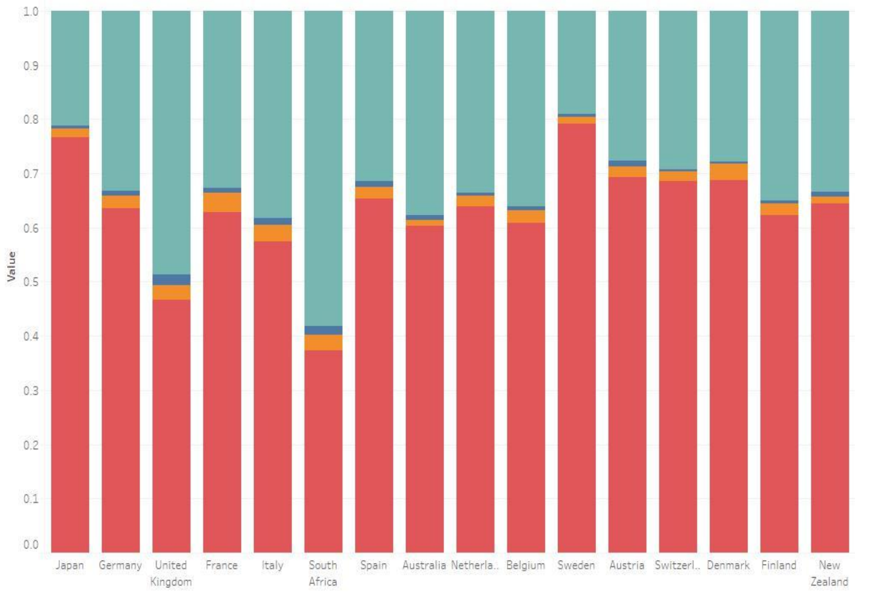


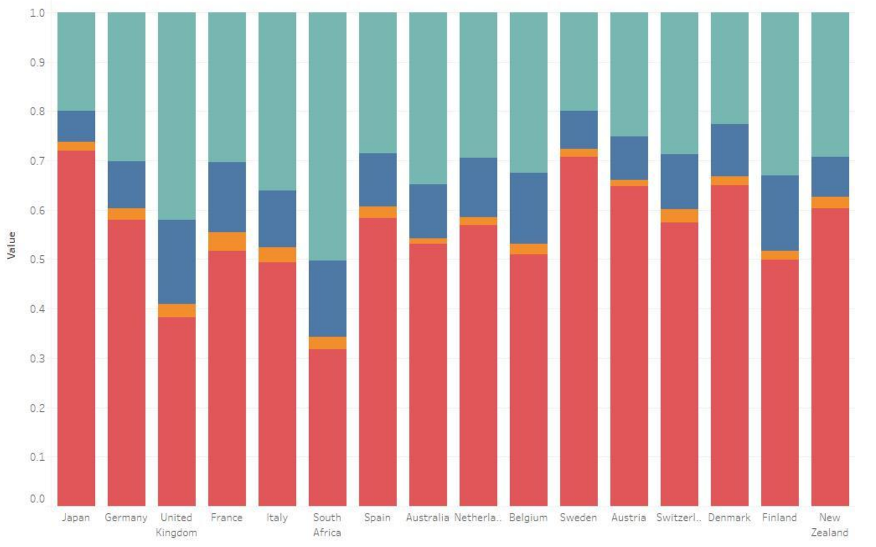
Cluster 2 Migration Relative Population 2014 - 2016



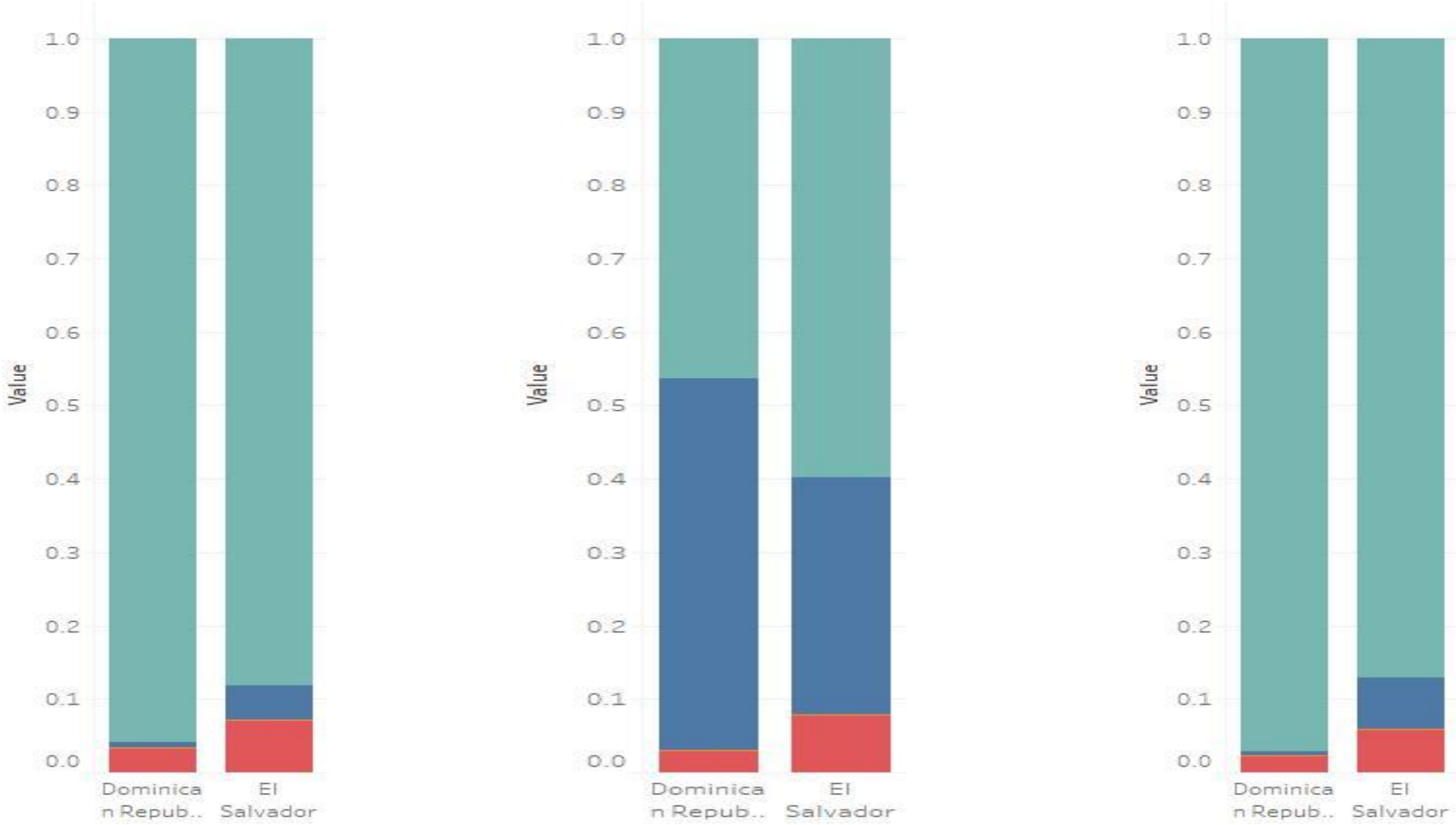
Cluster 3 Migration Relative Population 2014 - 2016



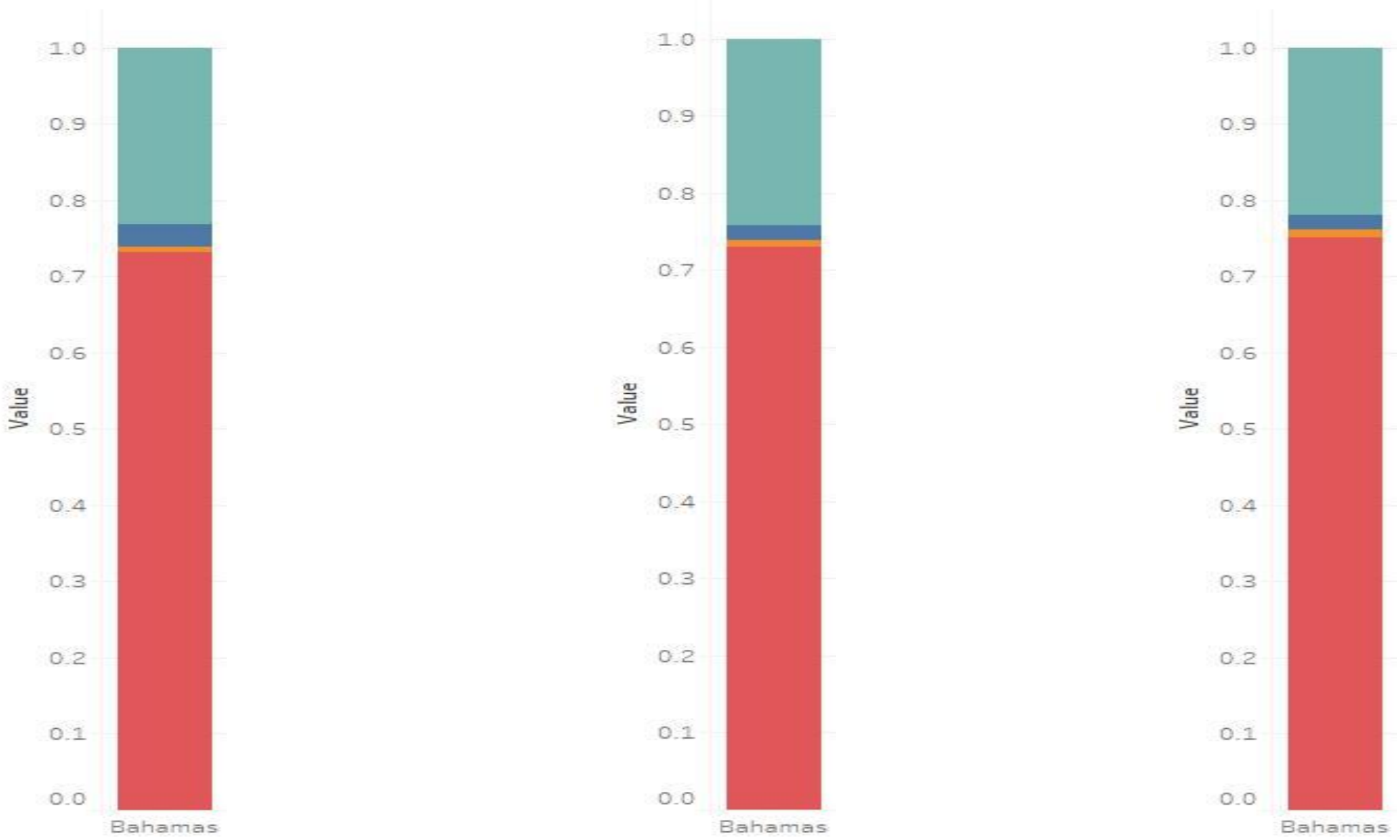


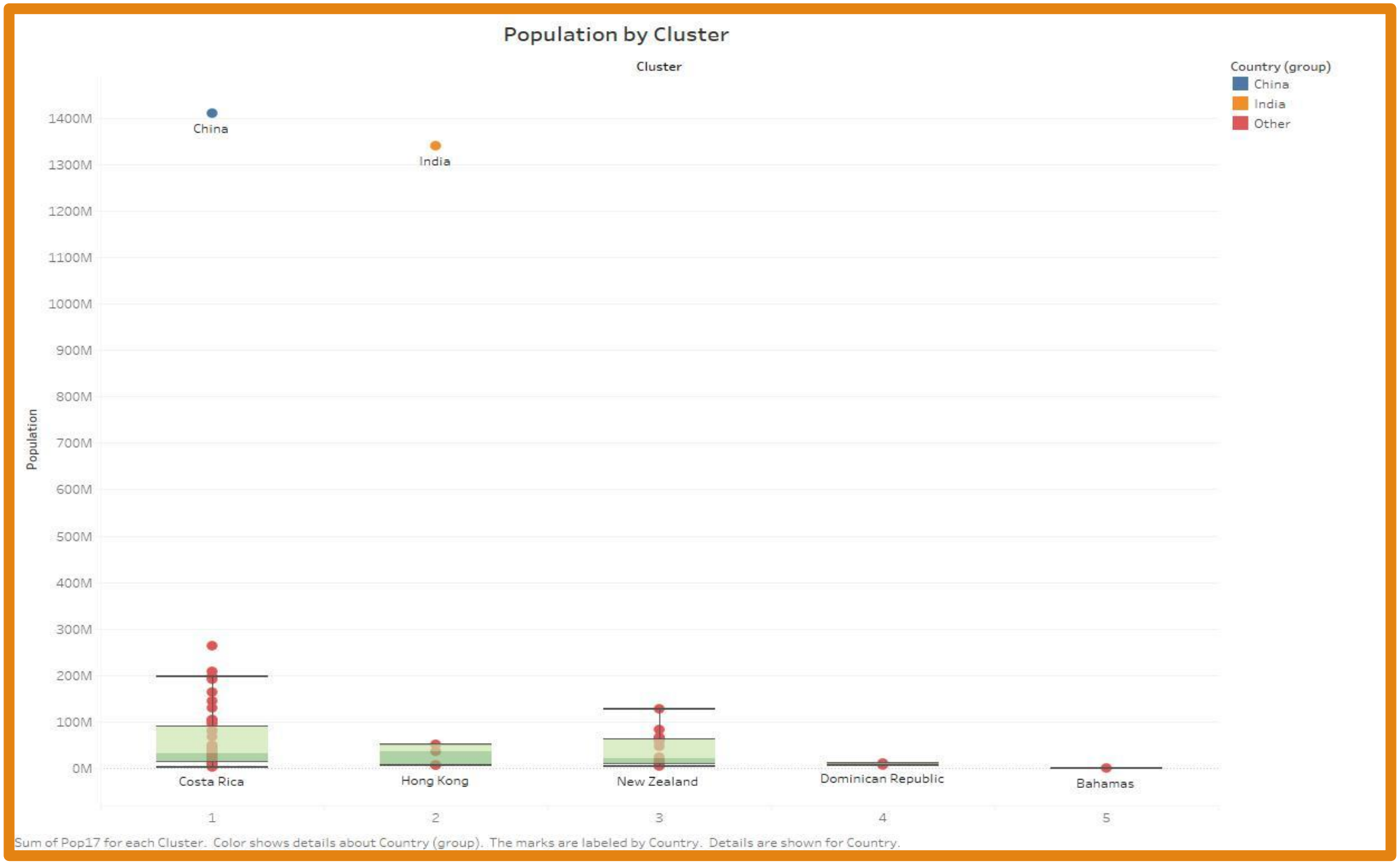


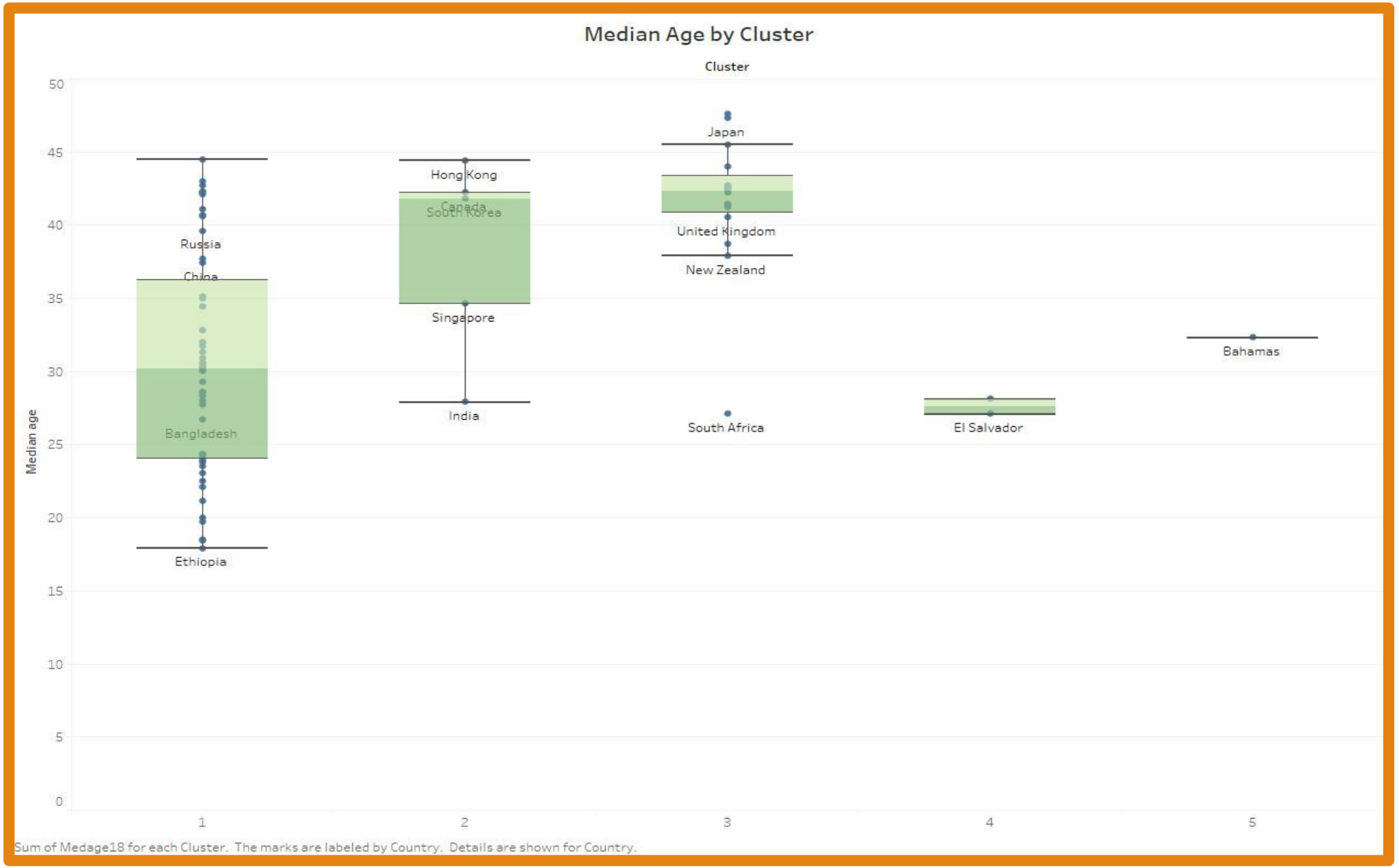
Cluster 4 Migration Relative Population 2014 - 2016



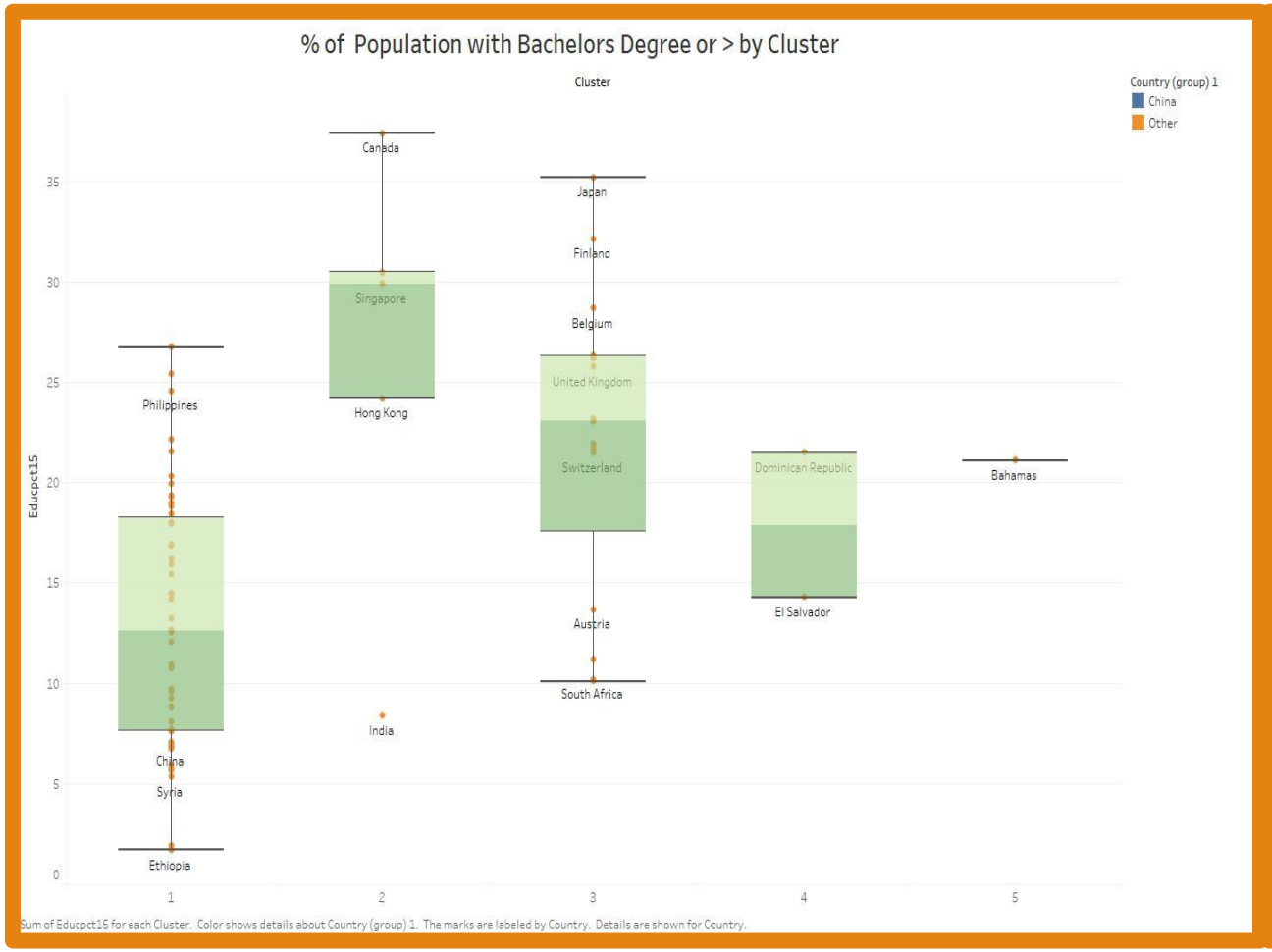
Cluster 5 Migration Relative Population 2014 - 2016

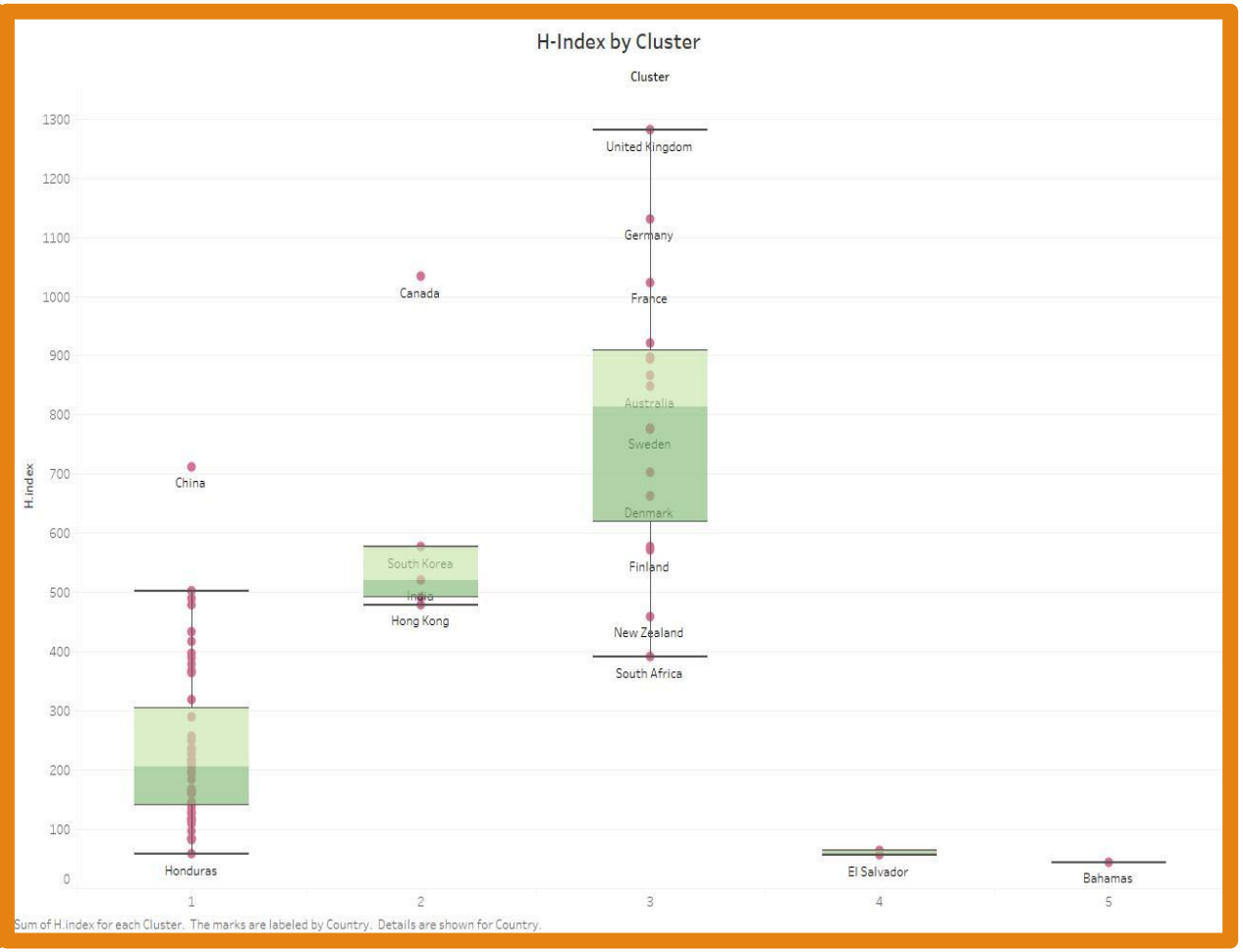



Population by Cluster
Cluster
Country (group)
China
India
Other
1400M
1300M
1200M
1100M
1000M
900M
800M
700M
600M
500M
400M
300M
200M
100M
0M
Population
China
India
Costa Rica
Hong Kong
New Zealand
Dominican Republic
Bahamas
1
2
3
4
5
Sum of Pop17 for each Cluster. Color shows details about Country (group). The marks are labeled by Country. Details are shown for Country.


Median Age by Cluster
Cluster
Median age
50
45
40
35
30
25
20
15
10
5
0
Russia
China
Bangladesh
Ethiopia
Hong Kong
Canada
South Korea
Singapore
India
Japan
United Kingdom
New Zealand
South Africa
El Salvador
Bahamas
1
2
3
4
5
Sum of Medage18 for each Cluster. The marks are labeled by Country. Details are shown for Country.

Measures of Education Priority by Cluster



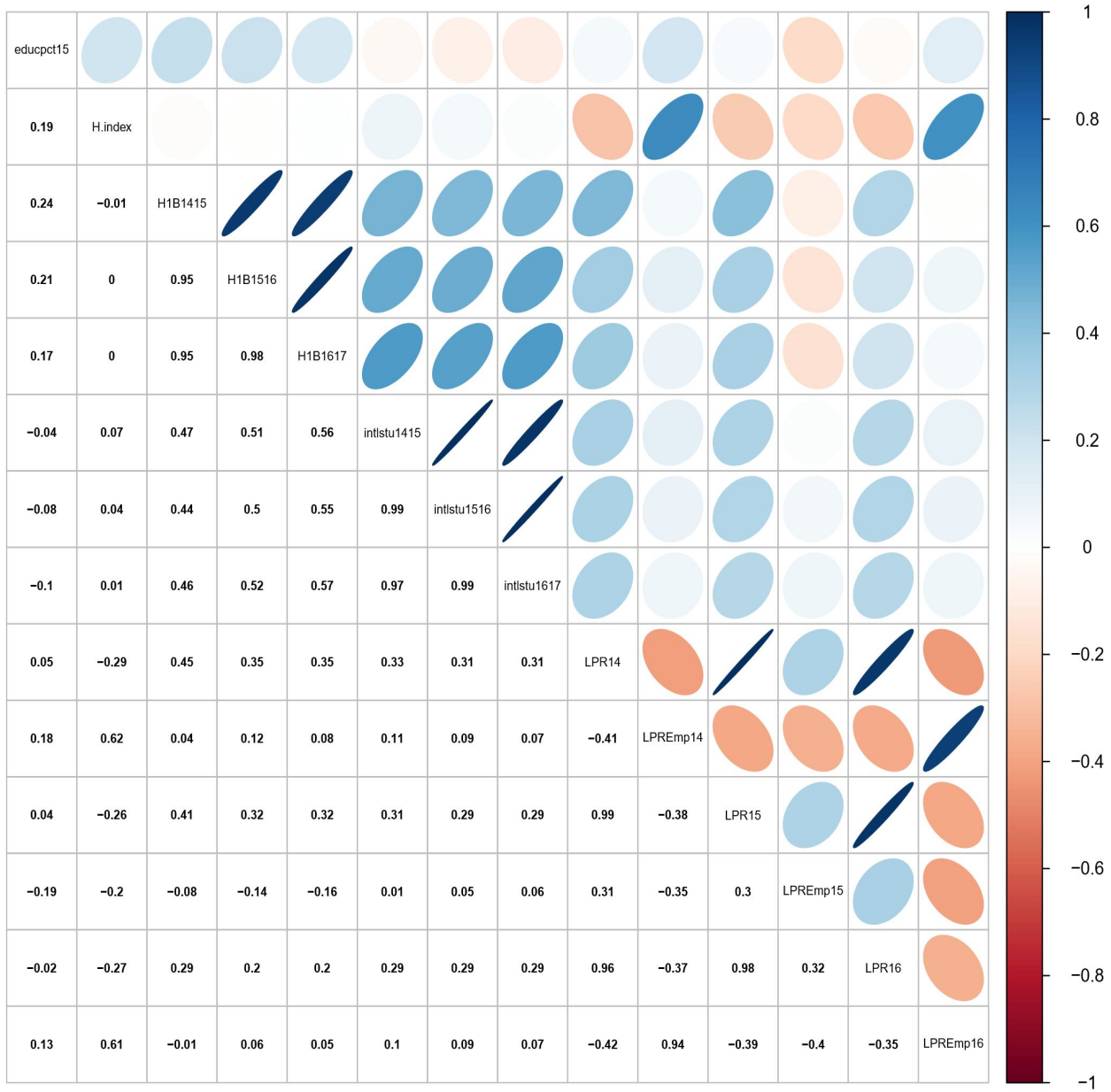


Cluster 1

Strong positive correlation between International students and H-1B's.

Moderate correlation between International students and other LPRs

No correlation between International Students and Employment-based LPRs



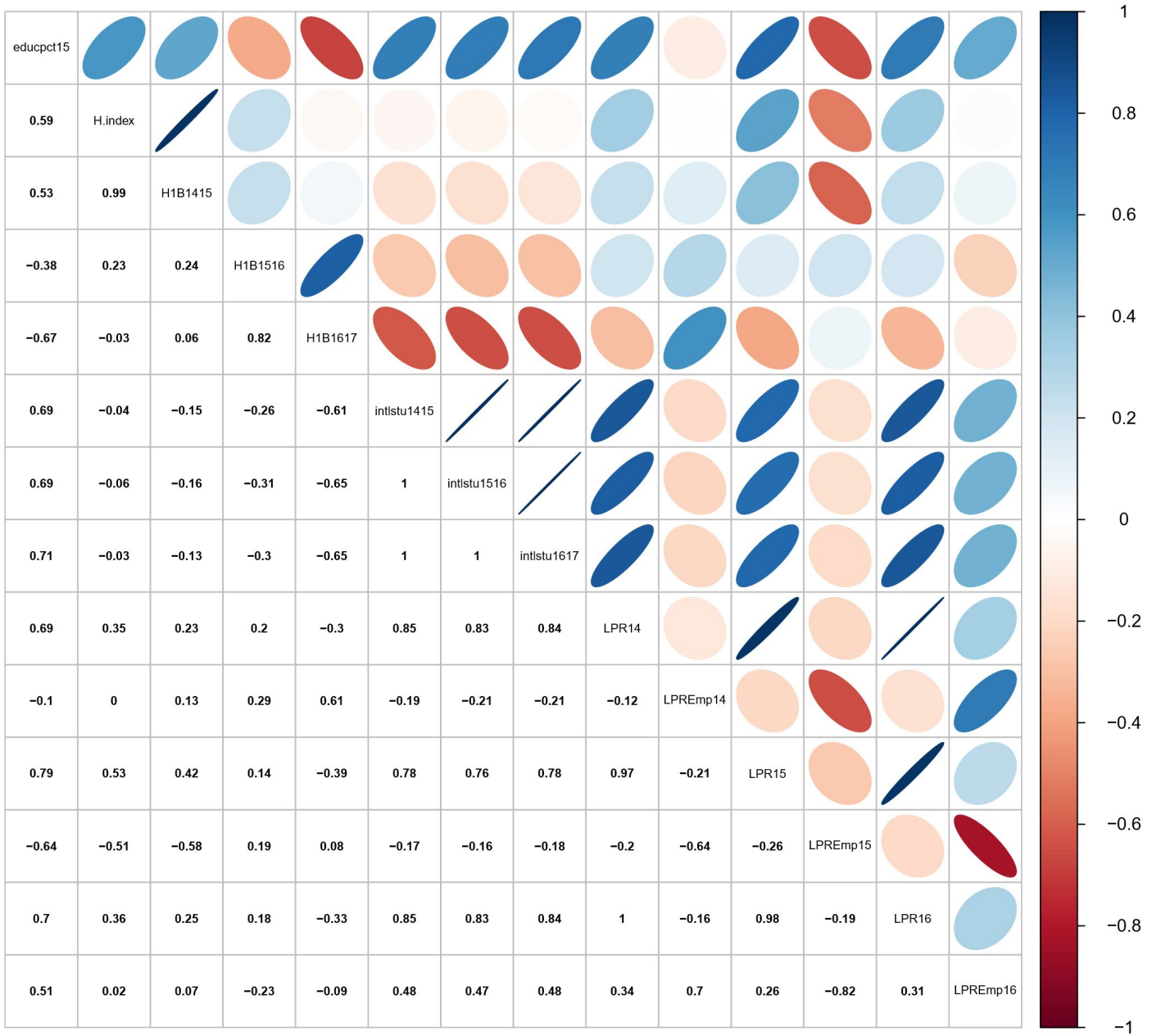
Cluster 2

Negative correlation between International Students and H-1B's

Very strong positive correlation between international students and other LPRs

Very strong positive correlation between educational prioritization and all LPRs *most of the time*

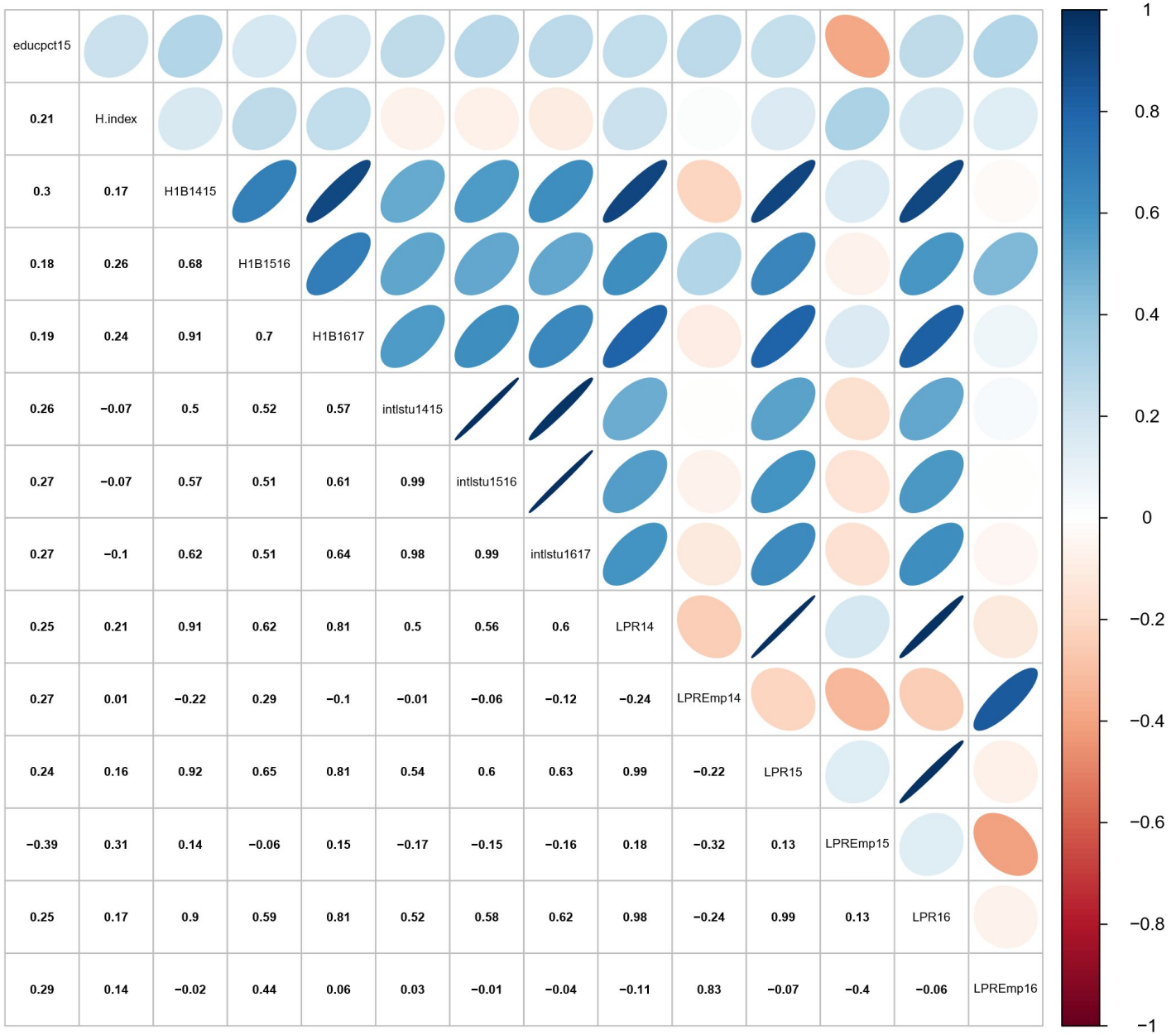
International students and employment-based LPRs changes from weak and negative to moderate and positive over the three years

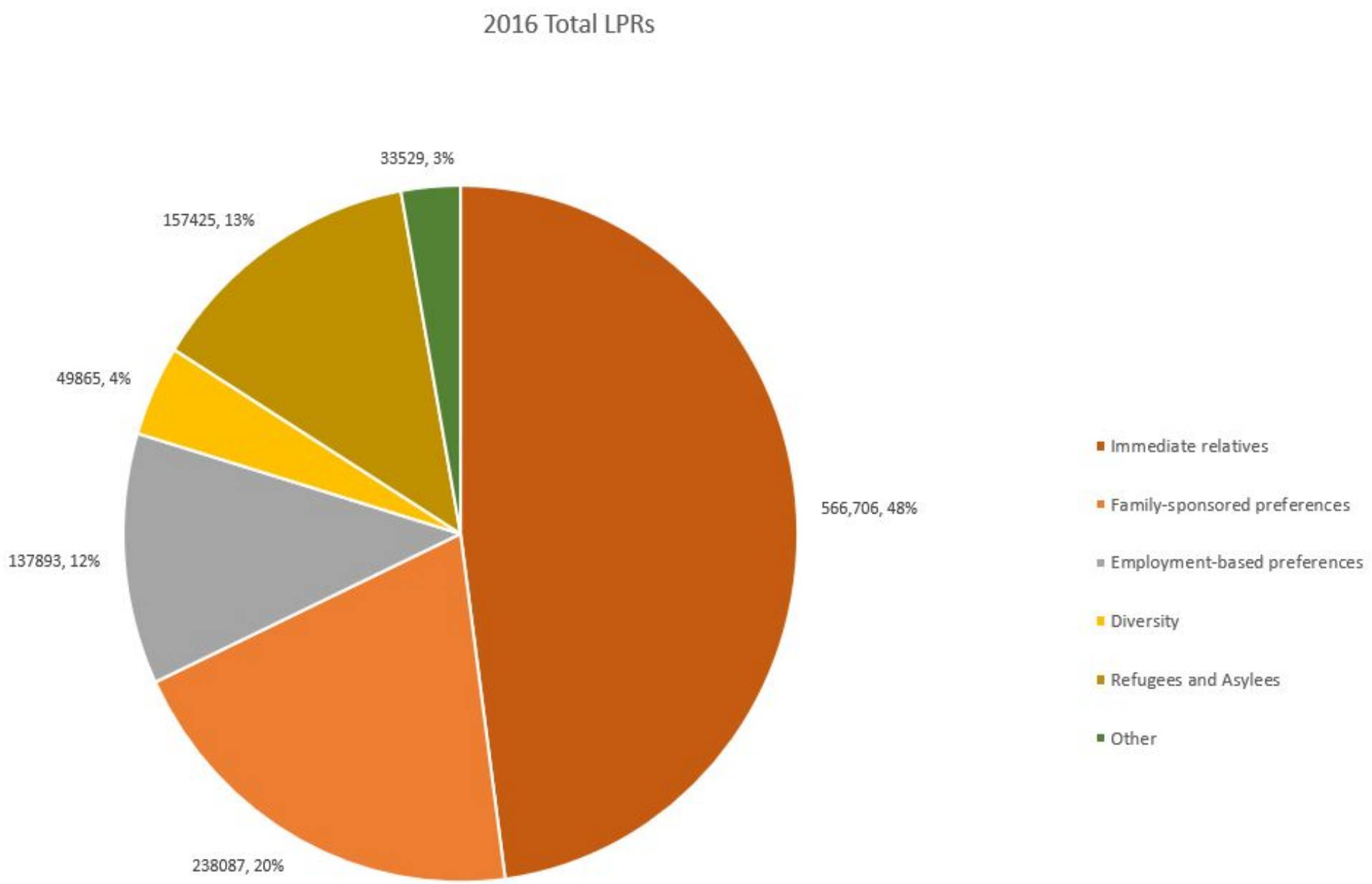


Cluster 3

Strong positive correlation between International students and H-1B's and other LPRs, but not employment-based LPRs

Weak and sometimes negative correlation between H-1B's and employment-based LPRs




2016 Total LPRs
33529, 3%
157425, 13%
49865, 4%
137893, 12%
566,706, 48%
238087, 20%
Immediate relatives
Family-sponsored preferences
Employment-based preferences
Diversity
Refugees and Asylees
Other

What does this mean?

	Employment-based	Family-based	Overall Cap
Limit (per year)	140,000	480,000	7% per country [2% for dependent area]
	Plus family-preference left unused from the previous year	minimum of 226,000	Of the sum of the Employment-based preference and Family-based preference green cards issued in that year

In 2016, the per country limit was 25,644 (7% of 366,338).

The number of green cards issued to a particular country is 2 to 9(?) times more likely to be for a class of admission other than employment-based preference.

What does this mean?

In 2016:

Total LPRs: 1,183,505

Top 3 countries (for LPR status):

- China (1) 81,772 (19,942 employment-based)
- Mexico (10) 174,534 (6078 employment-based)
- India (2) 64,687 (20,747 employment-based)

Per country preference-based limit: 25,644 (7% of 366,338)

* this includes spouses and children

How many times more likely that a green card was given to a non-employment-based admission from the same country?

Country	Cluster	Rank	2014	2015	2016							
China	1	1	2.34	4.18	3.10		Australia	3	53	2.78	43.62	2.22
India	2	2	0.90	3.39	2.12		Cameroon	1	55	37.28	9.29	46.11
Indonesia	1	4	3.57	14.55	4.57		Sri Lanka	1	58	2.64	6.57	3.01
Brazil	1	5	3.33	24.27	2.96		Romania	1	59	4.96	13.13	5.32
Pakistan	1	6	7.30	1.66	8.70		Syria	1	63	15.70	3.79	18.92
Nigeria	1	7	13.51	5.78	14.01		Kazakhstan	1	64	9.81	25.69	7.45
Bangladesh	1	8	25.15	0.93	27.67		Chile	1	65	3.85	13.25	3.46
Russia	1	9	6.36	19.56	4.71		Netherlands	3	67	1.39	61.33	1.43
Mexico	1	10	17.52	2.82	27.72		Guatemala	1	68	10.33	3.45	7.50
Japan	3	11	1.60	37.81	2.16		Ecuador	1	69	11.10	2.29	15.03
Ethiopia	1	12	66.58	6.38	68.64		Zimbabwe	1	70	4.50	11.98	4.70
Philippines	1	13	4.99	2.60	5.96		Belgium	3	80	1.23	46.29	1.24
Egypt	1	14	14.90	12.38	12.67		Greece	1	82	4.08	17.63	3.27
Vietnam	1	15	54.16	0.92	31.87		Bolivia	1	83	5.99	5.56	13.63
Germany	3	16	2.49	37.28	2.21		Dominican Republic	4	86	151.14	0.91	184.34
Iran	1	18	8.56	4.83	7.31		Czech Republic	1	87	3.97	34.39	3.30
Turkey	1	19	3.27	17.92	2.87		Portugal	1	88	4.01	13.28	4.11
Thailand	1	20	15.44	24.78	18.44		Sweden	3	89	1.50	38.48	1.58
United Kingdom	3	21	1.50	24.59	1.47		Hungary	1	91	4.08	34.32	2.97
France	3	22	1.33	37.47	1.13		Jordan	1	92	21.45	2.98	15.94
Italy	3	23	2.49	33.75	2.09		Honduras	1	95	10.04	3.68	9.11
South Africa	3	25	1.62	36.75	2.24		Austria	3	98	1.83	26.88	1.90
South Korea	2	27	0.72	17.06	0.62		Switzerland	3	99	1.58	63.00	1.55
Kenya	1	28	15.21	12.37	13.83		Hong Kong	2	104	2.32	1.96	2.63
Colombia	1	29	11.59	4.39	12.90		Bulgaria	1	105	9.21	19.68	57.36
Spain	3	30	1.94	29.58	1.66		El Salvador	4	108	19.01	1.85	11.61
Argentina	1	31	2.50	18.23	2.05		Denmark	3	114	1.21	100.50	1.14
Ukraine	1	32	10.76	9.02	10.21		Singapore	2	115	1.08	15.62	0.88
Poland	1	37	4.29	4.88	6.02		Finland	3	116	1.48	80.40	1.17
Canada	2	38	1.26	22.73	1.45		Costa Rica	1	122	9.46	12.09	8.38
Morocco	1	39	24.75	11.45	29.17		New Zealand	3	125	2.81	41.75	2.62
Peru	1	42	14.11	3.00	22.68		Croatia	1	129	4.71	22.20	4.39
Uzbekistan	1	44	51.46	9.04	31.77		Uruguay	1	136	8.89	28.14	7.68
Malaysia	1	45	3.91	17.09	5.13		Armenia	1	138	24.78	10.99	33.74
Nepal	1	48	12.06	18.67	8.27		Bahamas	5	177	7.72	12.68	9.93
Ghana	1	49	24.41	5.98	26.58							

Conclusion

Does the current structure of the immigration system facilitate the process of attracting highly-skilled and educated foreign workers to the United States as lawful permanent residents, and potentially, US citizens?

No!

International student population increasing, but limits on H-1B and Employment-based LPR stifle flow

Permanent residency favors family reunification

Employment-based LPRs are very often waitlisted

If you have relatives in the U.S., your chance of getting a green card is much higher

Conclusions

Do the migration patterns from China and India align with other countries when country-of-origin population size is removed from the equation?

What appear to be trends could be attributed to the regulations that govern H-1B's and LPR's (limited lottery distribution of H-1B's and caps on preference-based immigration.)

The year 2015 was inconsistent with prior years and following years, enough to disrupt any trends.

Cluster 1 (China, Mexico)- family reunification (countries either have large student population or large non-employment based LPRs)
Cluster 2 (India) "migration model" of International student -> H-1B ->Employment-based LPR
Cluster 3 (Western Europe, Australia and New Zealand) "established countries, consistent patterns"

“It’s not what you know, it’s who you know (specifically, to whom you are related!)”

- Any immigrant applying for a green card

Future Work/ Limitations

Limitations

- Some data were missing due to inconsistency of country names
- Lack of demographics data(gender, age, and etc.)
- H-1B information is hard to get and not “apples-to-apples” comparison

Future work

- Analyze newer data under Trump Administration
- Determine if better measures for educational priority exists
- Analyze more than 3 years of data
- Explore the relationship of policy changes and the number of immigrants
- Determine what upper limit for India might be

Thank you

Dr. Qinggou Wang

Dr. Todd Gary