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EE406

Network Analysis And Global Supply Chain

October 27&29, 2021

GROUP A

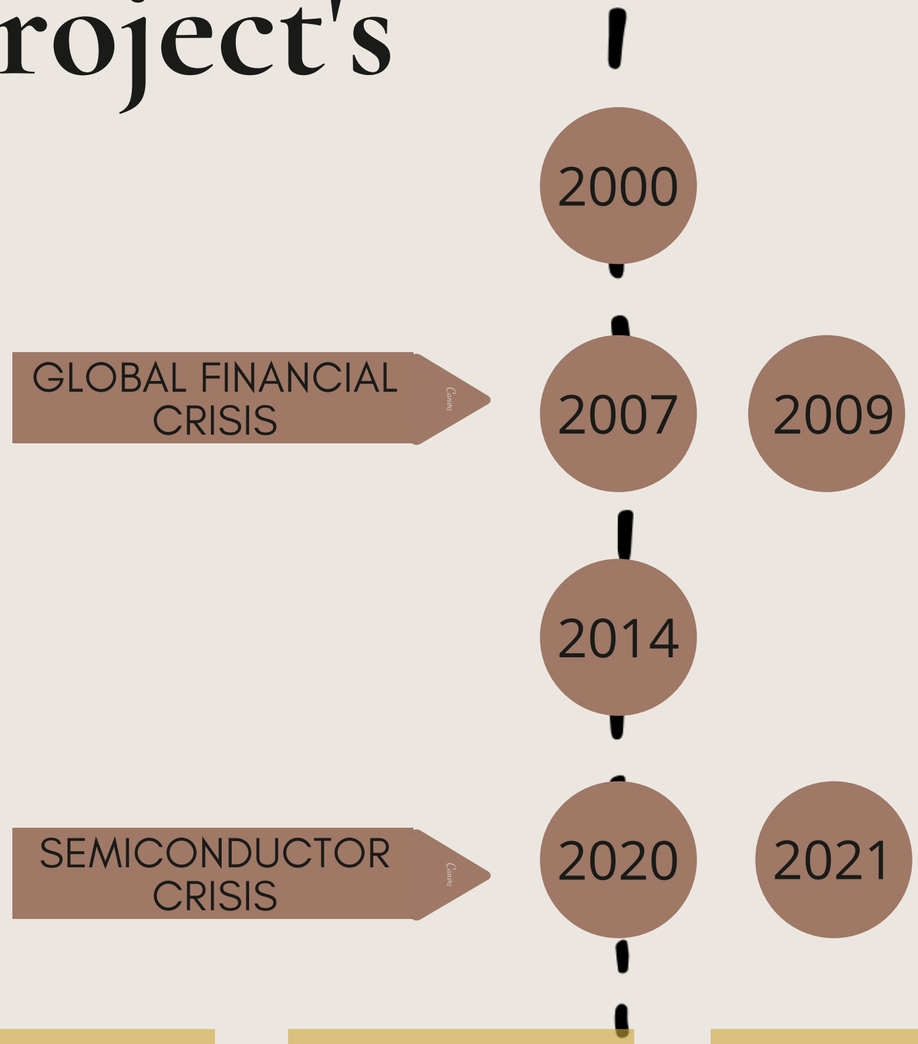
Introduction and project's background

What is WIOD?

WIOD is a set of the databases series covering 28 EU countries and 15 other major countries in the world for the period from 2000 to 2014.

Introduction and project's background

- GLOBAL FINANCIAL CRISIS
  - Global financial crisis occurred at the USA between at the end of 2007 and mid-2009.
  - There was a downturn in the US housing market.
  - Many banks around the world incurred large losses and relied on government support to avoid bankruptcy.
- SEMICONDUCTOR CRISIS
  - "Higher prices but fewer options"



Sources of Data

WIOD :
THE WORLD INPUT-OUTPUT DATABASE FOR THE PERIOD FROM 2000 TO 2014

Analytical Methodology

Gephi

Id	Label	timeset	Degree	Weighted Degree	Eccentricity	closenesscentrality	harmonicclosenesscentrality	betweenesscentrality
AUS_r1	AUS_r1		59	37788.581779	3	0.468133	0.503175	0.005424
AUS_r2	AUS_r2		8	1587.439198	4	0.339823	0.351701	0.000064
AUS_r3	AUS_r3		6	836.817173	4	0.334243	0.34932	0
AUS_r5	AUS_r5		51	38280.768647	4	0.438606	0.47585	0.002417
AUS_r6	AUS_r6		16	2807.664982	4	0.404959	0.430159	0.000132
AUS_r11	AUS_r11		45	11031.172142	3	0.443305	0.476871	0.002008
AUS_r27	AUS_r27		68	73742.738529	4	0.463722	0.503968	0.006219
AUS_r29	AUS_r29		72	40329.130894	4	0.46343	0.505556	0.006477
AUS_r30	AUS_r30		43	18094.010836	4	0.394737	0.431859	0.000413
AUS_r36	AUS_r36		46	19808.824214	4	0.411534	0.44932	0.001358
AUS_r44	AUS_r44		37	32549.964077	4	0.365127	0.398186	0.000071
AUS_r50	AUS_r50		53	33089.005974	4	0.421203	0.461224	0.001131
AUS_r51	AUS_r51		52	20792.897865	4	0.429573	0.468367	0.001243
AUS_r54	AUS_r54		52	15270.818151	4	0.434141	0.472876	0.001863
EU_r1	EU_r1		109	381879.184994	3	0.515428	0.558503	0.002571
EU_r5	EU_r5		158	780807.700085	3	0.542836	0.597052	0.00814
CHN_r1	CHN_r1		70	243343.509777	3	0.472669	0.511565	0.001582
CHN_r5	CHN_r5		65	165738.190506	4	0.463138	0.502154	0.00116
CHN_r6	CHN_r6		85	233780.327	3	0.494816	0.534014	0.00238
CHN_r27	CHN_r27		103	195912.223049	3	0.49763	0.544218	0.002375
IDN_r1	IDN_r1		29	22118.994179	4	0.43724	0.464512	0.001709
IDN_r5	IDN_r5		37	30251.961857	4	0.440383	0.470975	0.002452
IDN_r36	IDN_r36		20	7958.78957	4	0.419042	0.445011	0.000455

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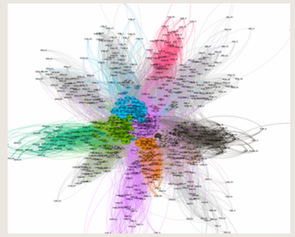


INTRODUCTION AND PROJECT'S BACKGROUND

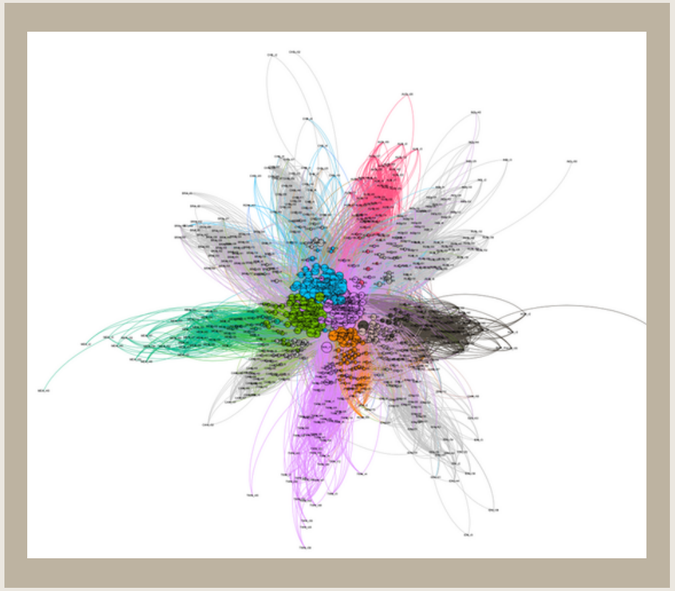
SOURCES OF DATA

BRIEFS OF ANALYTICAL METHODOLOGIES

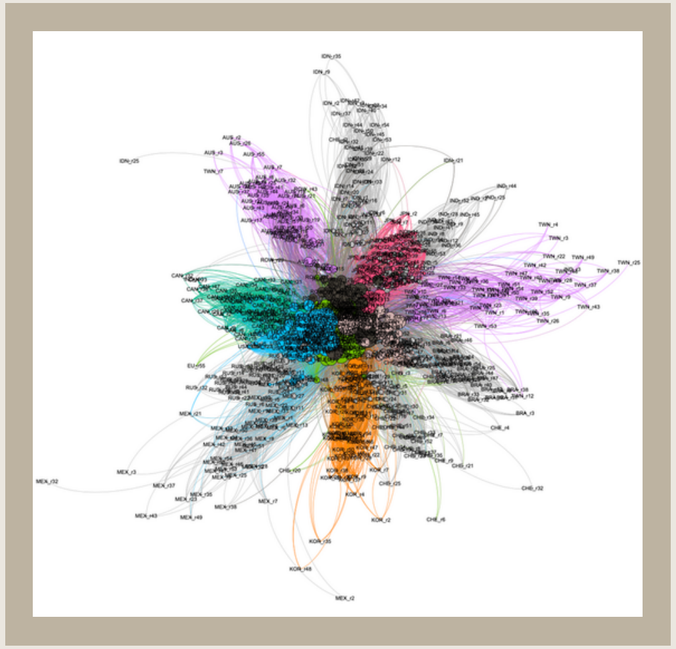
RESULTS

POLICY RECOMMENDATIONS

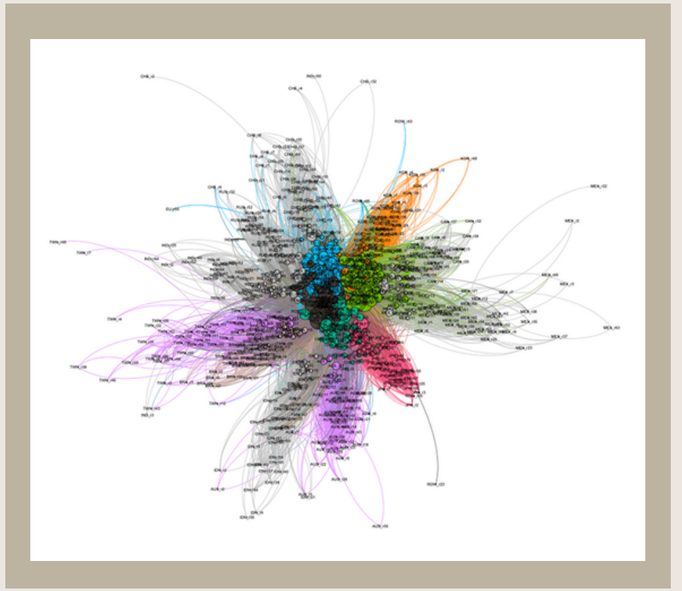
Results: Comparison of main network indicators



NETWORK DIAMETER 2000

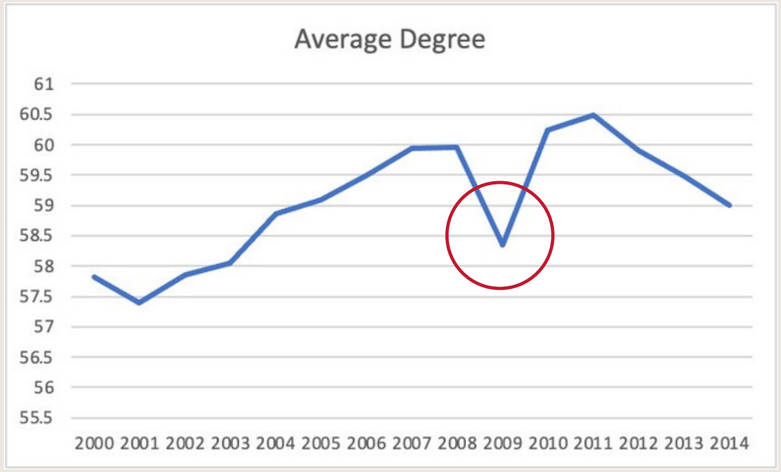


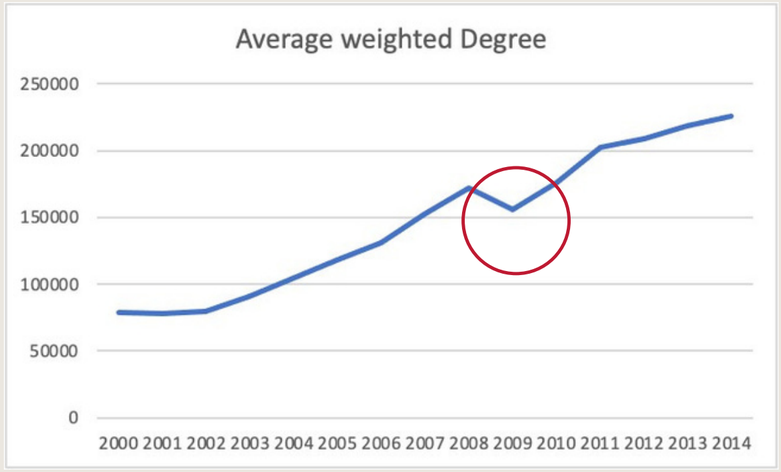
NETWORK DIAMETER 2009



NETWORK DIAMETER 2014

Results: Comparison of main network indicators

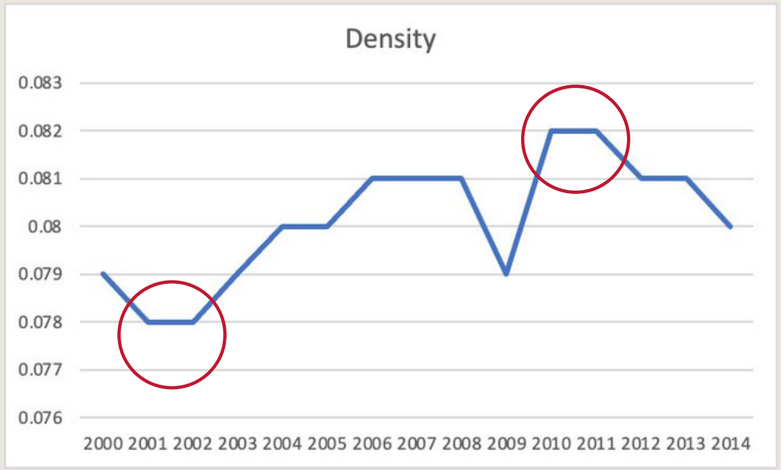


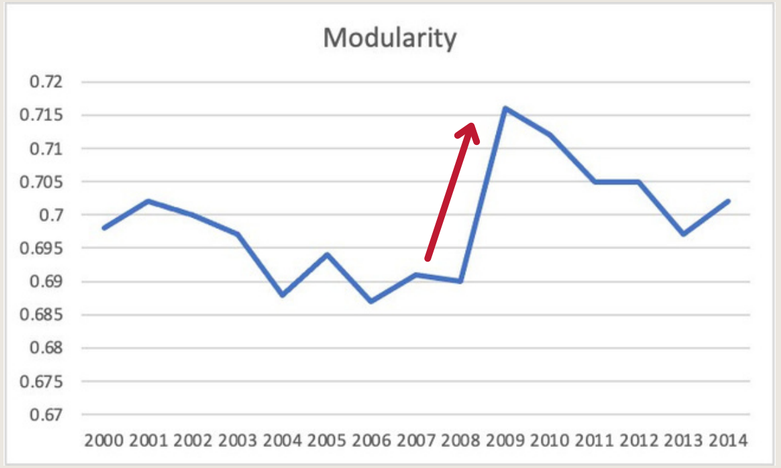


CONCLUSION

- Average degree
  - In 2011, there are highest average number of edges connected to a node which is 60.488
  - During 2009, the average degree is dramatically drop due to financial crisis.
- Average weighted Degree
  - Between 2000 and 2008, the average weighted degree is increase and drop in 2009, then it is continuously until 2014

Results: Comparison of main network indicators

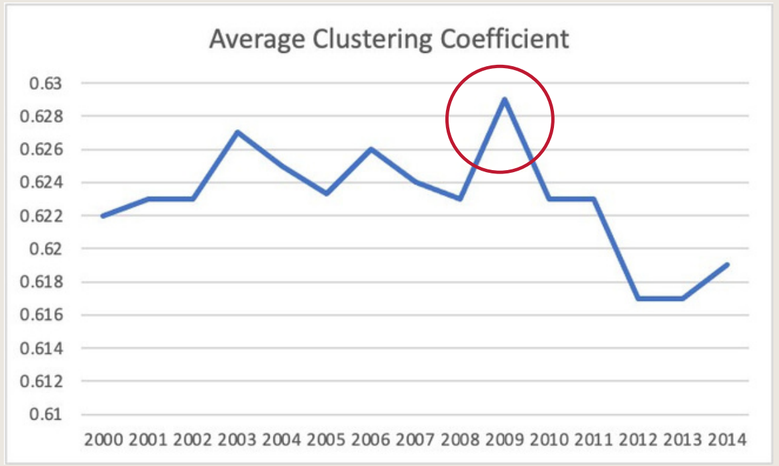


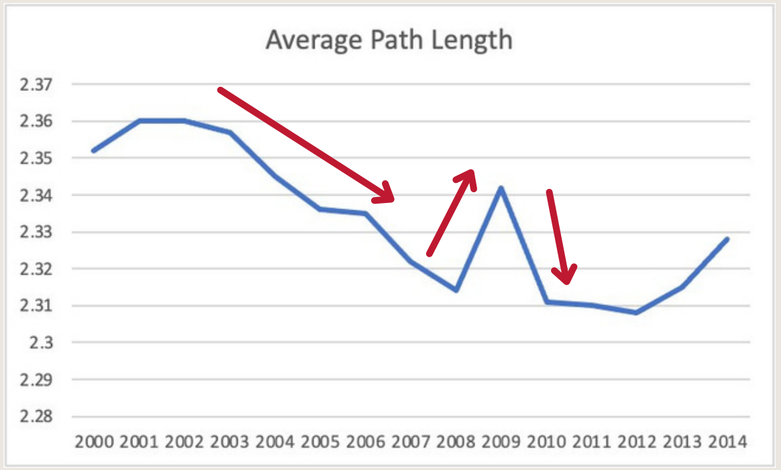


CONCLUSION

- Graph Density
  - During 2010 and 2011, the graph density is 0.082 which is a highest graph density while the lowest graph density is 0.078 in the year 2001 and 2002.
- Modularity
  - The modularity is fluctuate between 2000 and 2014.
  - In 2009, it is dramatically increase and then decrease until 2013.

Results: Comparison of main network indicators

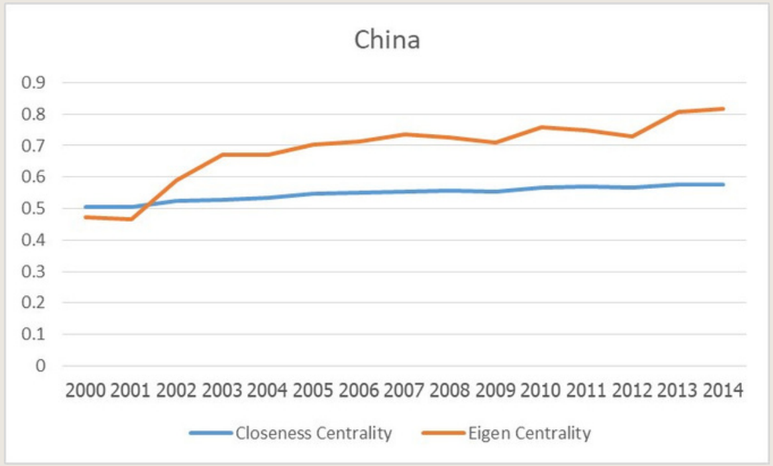


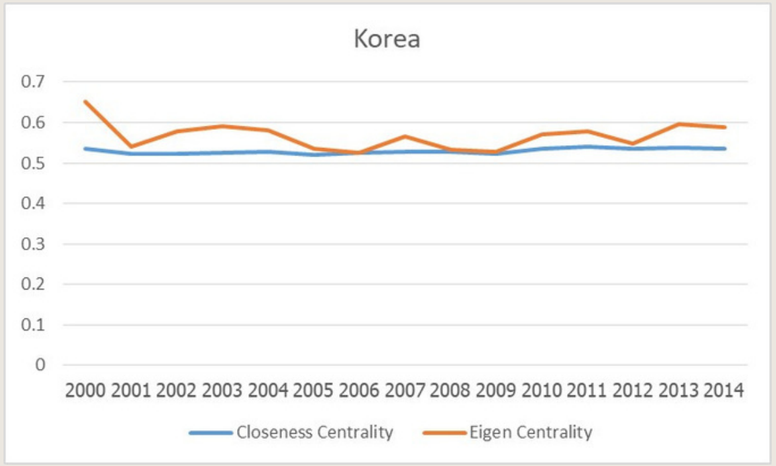


CONCLUSION

- Average Clustering Coefficient
  - The peakest average clustering coefficient is in 2009 which are 0.629
- Average Path Length
  - Since 2000 until 2008, the average path length is decrease and then it is significantly increase between 2008 and 2010 and drop again after 2009.

Results: Comparative analysis of main electronic exporters using centrality indices

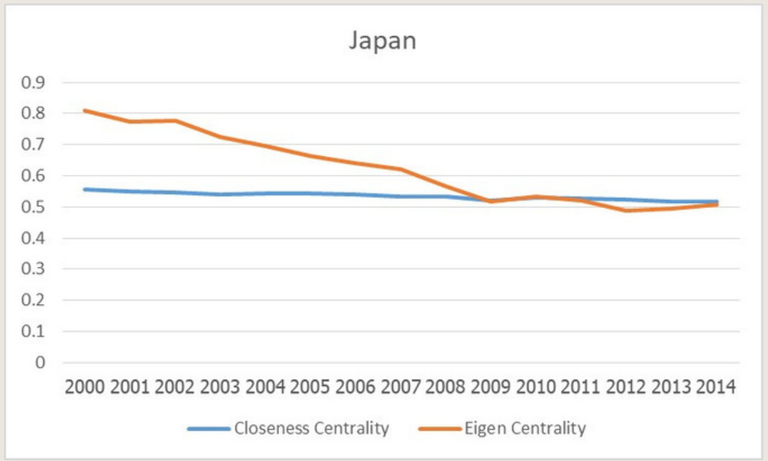


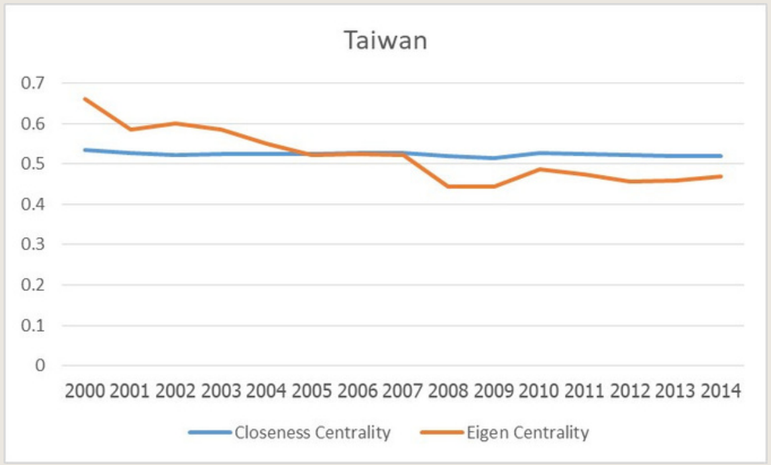


Conclusion

- For China, both indicators are moving in the same direction.
- For Korea, Eigen centrality is volatile but closeness centrality is stable.

Results: Comparative analysis of main electronic exporters using centrality indices

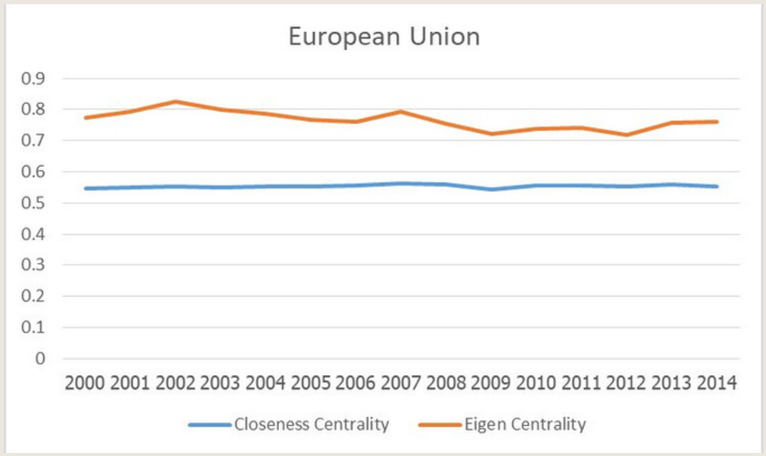


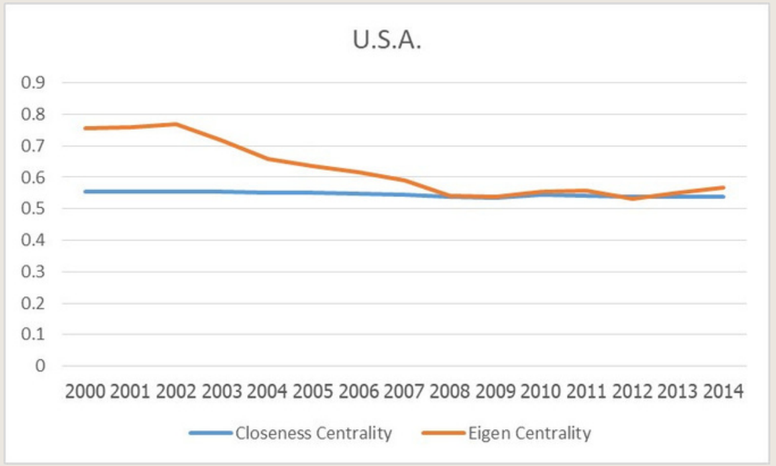


Conclusion

- For Japan, Eigencentrality is quite volatile while closeness centrality is stable.
- For Taiwan, both indicators are same like Japan. Closeness centrality is stable but Eigen centrality is volatile.
- So, both indicators for Japan and Taiwan are inconclusive direction.

Results: Comparative analysis of main automotive exporters using centrality indices

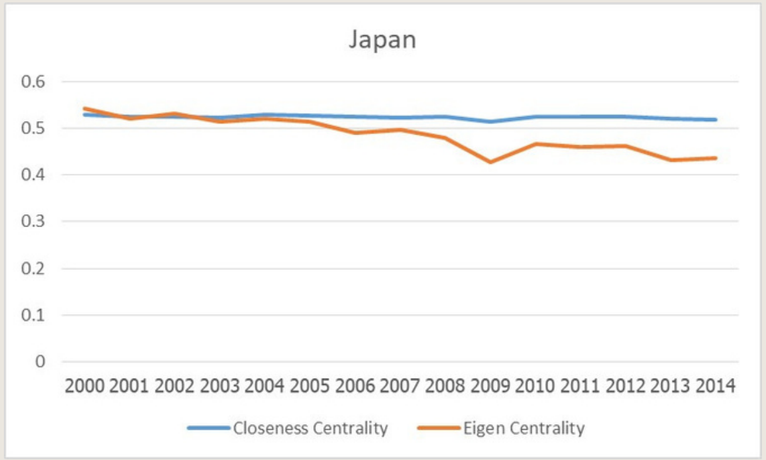


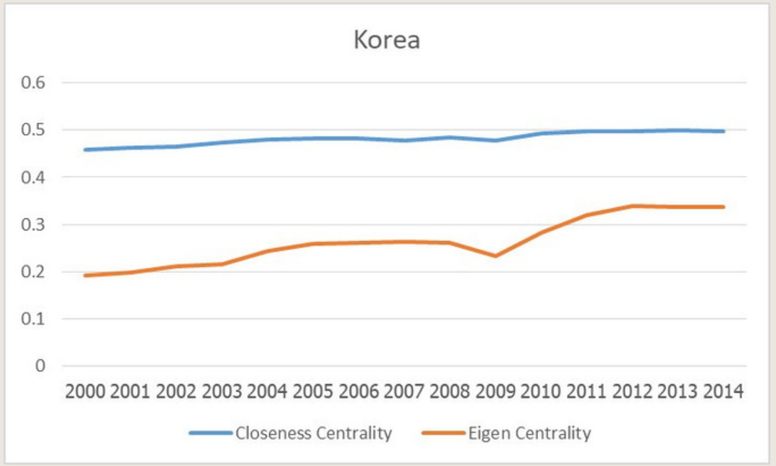


Conclusion

- For EU, both indicators seem to move in the same direction.
- For U.S.A, both indicators are not moving in the same direction.

Results: Comparative analysis of main automotive exporters using centrality indices





Conclusion

- For Japan, both indicators are not moving in the same direction.
- For Korea, both indicators are moving in the same direction.

Summary & Policy Recommendations

- Automotive industry seems to be prioritized as the most important in the European Union comparing to USA, Japan, and Korea.
- Korea originated at the lowest in automotive exporters comparing to those 3 countries and increase significantly since 2009. On the other hand, Eigen-vector centrality of USA and Japan slightly declined since 2008 and 2005 respectively. USA and Japan should create a culture of quality.
- As we are living in technological-based society, to stabilize the industry, all countries should improve their inventory planning in order to prevent the unexpected situation in the future. (ex,semiconductor crisis during 2020-2021).

Thank you!

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GROUP A