

Using Network Analysis to understand RCEP member positions in intra-RCEP trade and FDI

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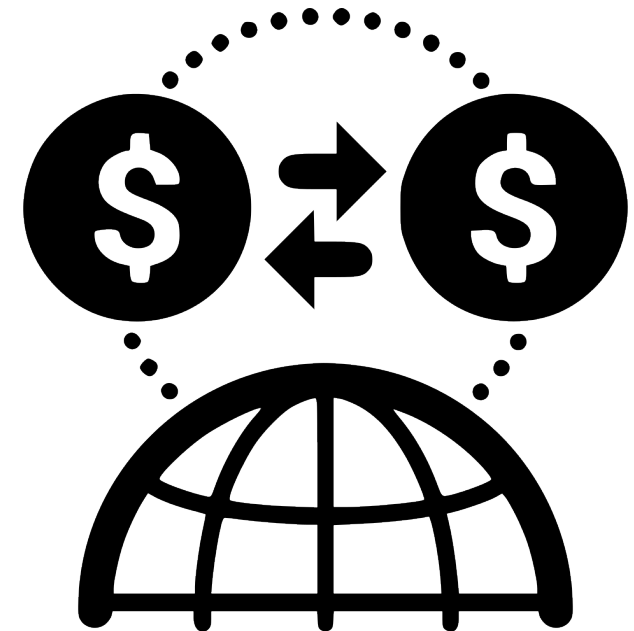
Overview

- Trade and FDI in RCEP
- Objectives and Data
- Constructing the Network Graph
- Network Analysis
 - *Reading the Network Graph*
 - *Centrality Analysis*
 - *Trade & FDI Network Graphs*
 - *Time Comparisons*
- Conclusion



Trade and FDI in RCEP

- RCEP economies make up the world's **largest trading bloc** (ADB, 2022):
 - 30% of the world's trade, 16% of the global FDI stock and 24% of global FDI inflows
- Both trade and foreign direct investment (FDI) are heavily covered in the legal text of RCEP, indicating the importance of their role in the RCEP economies
- Intra-RCEP trade and FDI flows account for 50% and 30% of the total trade and FDI in the RCEP region (ADB, 2022; Nicita et al., 2021)
- Investigation of intra-RCEP relationships can provide a comprehensive view of economic interactions within the economically significant bloc



Objectives

- **Utilizing network analysis to understand the RCEP member positions in intra-RCEP trade and FDI over time by identifying key players, intermediaries and relationships**

Data

- **Trade Data – BACI Data (1995 to 2021)**
 - Bilateral total trade between each pair of RCEP members
- **FDI Data – Orbis Data (2013 to 2022)**
 - Bilateral FDI flows between each pair of RCEP members

Constructing the Network Graph

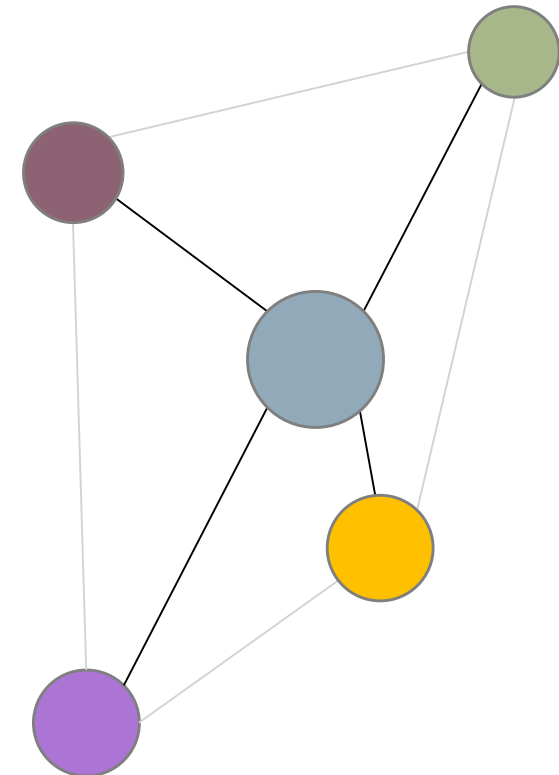
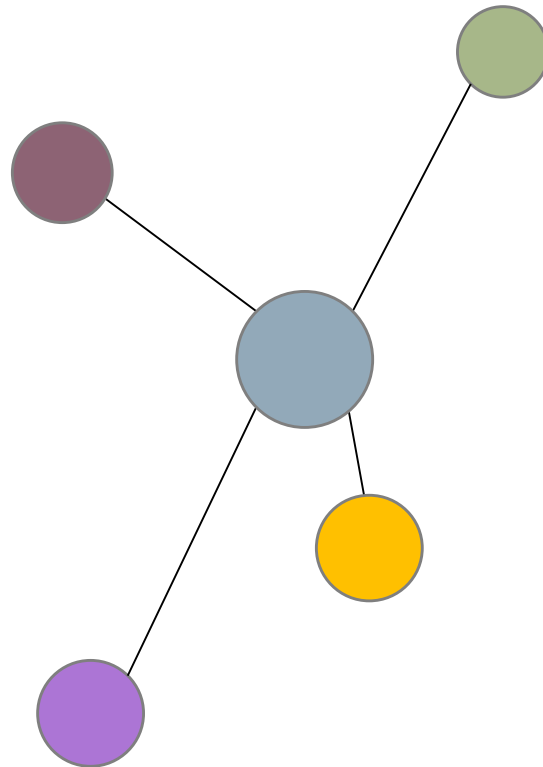
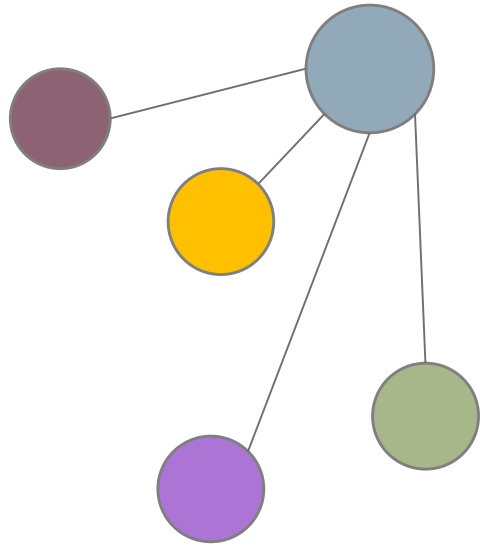
Identifying
the Strongest
Relationships



Layout
Finalization



Filling the
Network



Network Analysis

Reading the Network Graphs

Node Size

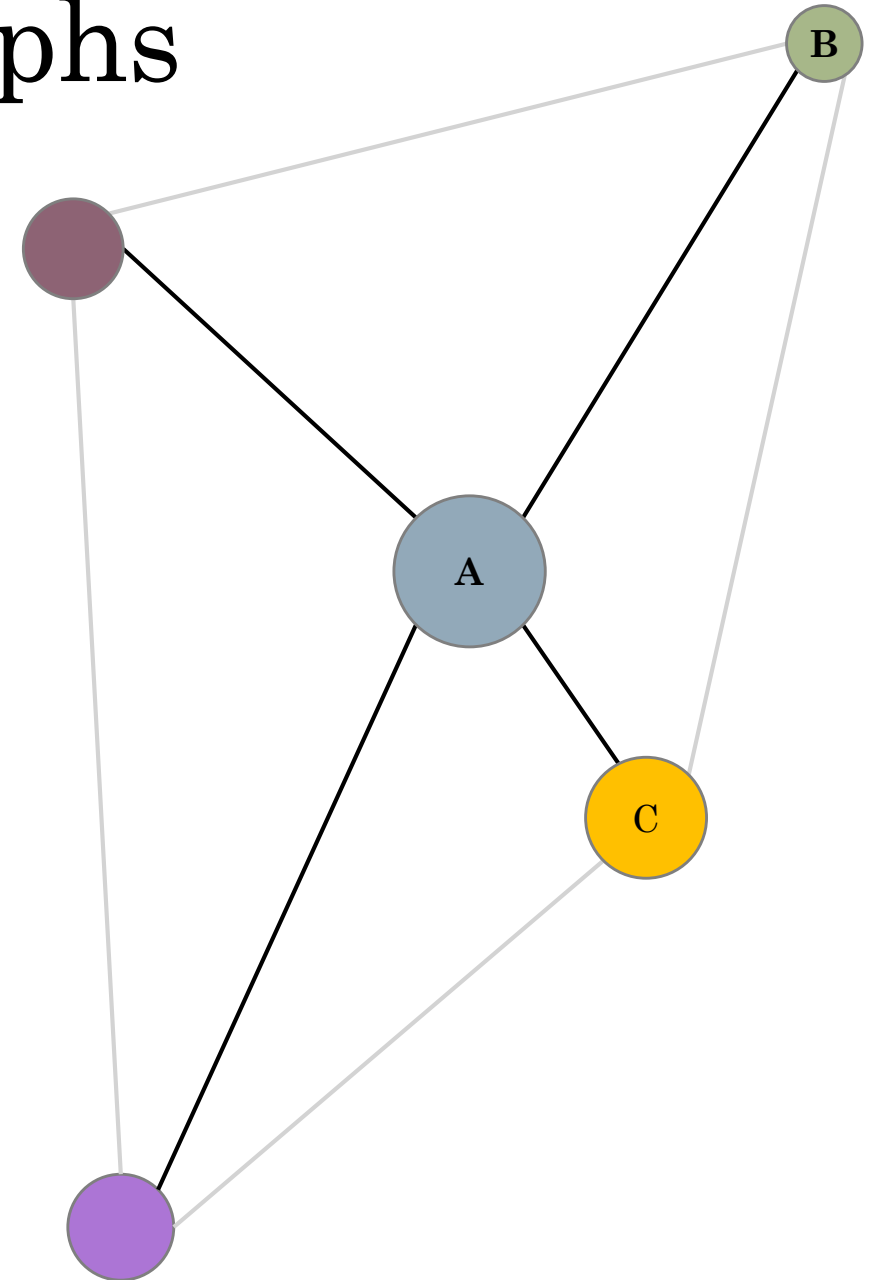
- Reflects the amount of total intra-RCEP trade/FDI flows of the member

Line Colours

- Black – most important relationships (strongest)
- Grey – other significant relationships (underlying)

Edge Length (only applicable to black lines)

- The shorter the length, the greater the amount of trade/FDI flows between the two members



Centrality Analysis

Degree Centrality

- The number of other RCEP parties that a member has economic activity with

(Weighted) Betweenness Centrality

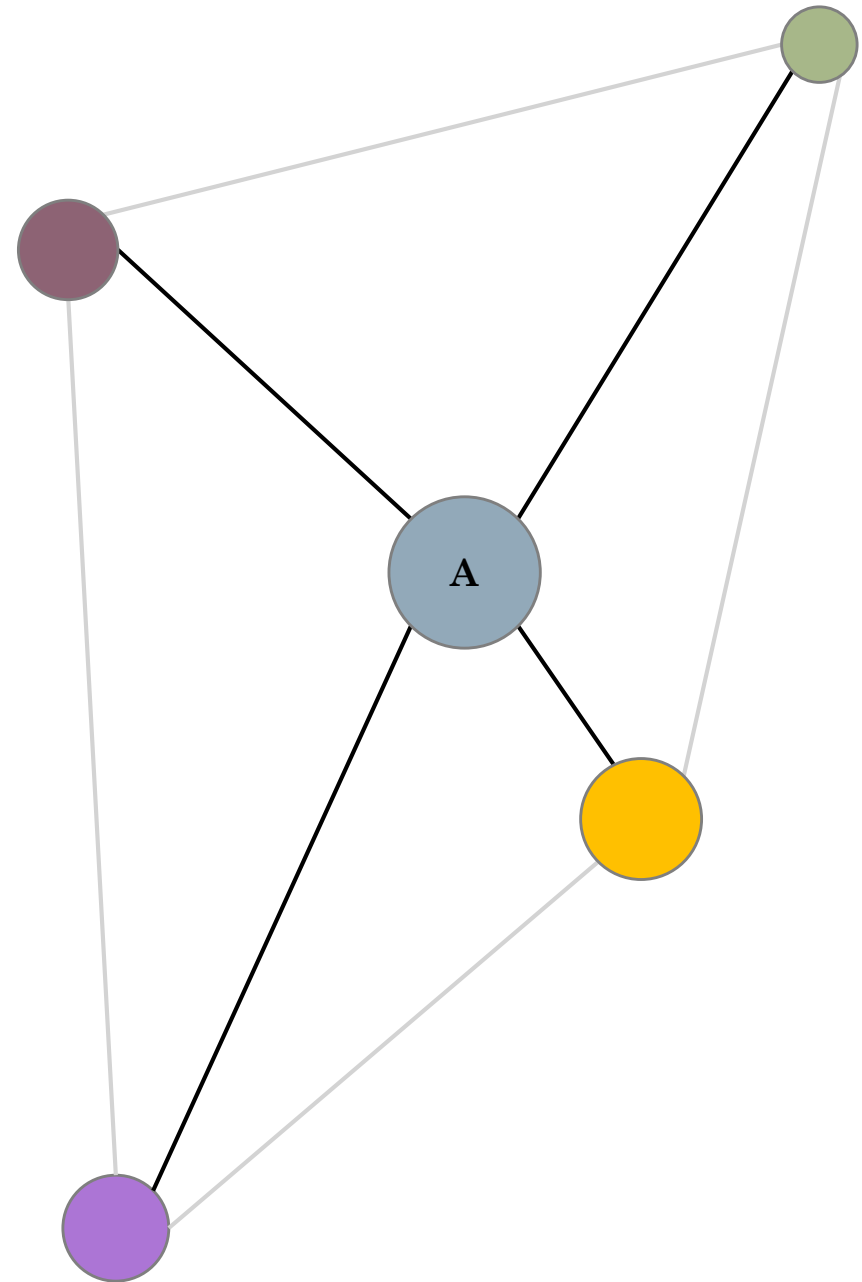
- Frequency of appearance on the shortest path between 2 countries
- A member's significance as an intermediary

(Weighted) Closeness Centrality

- Closeness to other countries in the network
- Highlights a member's strength of its relationships with RCEP as a whole

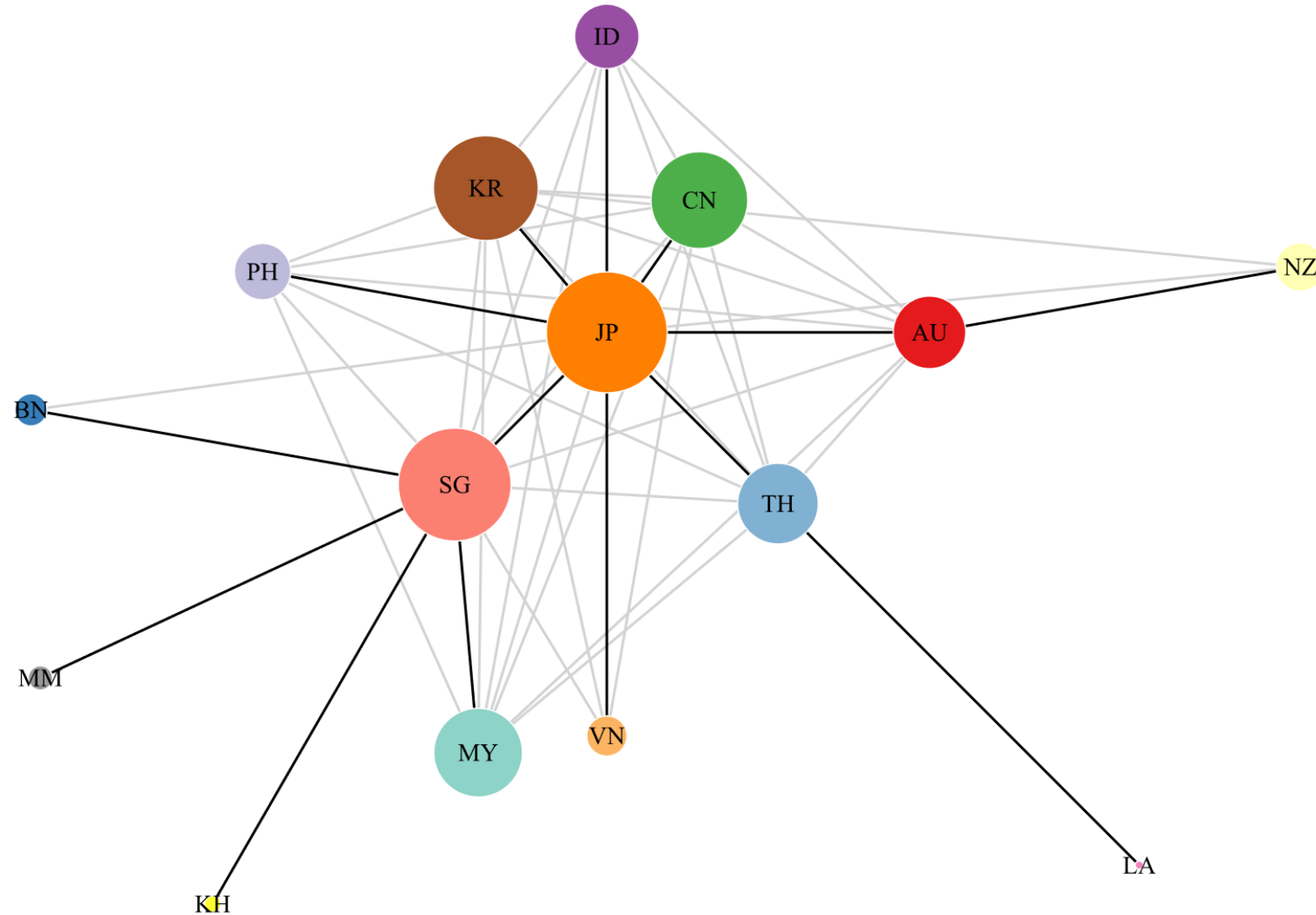
Network Levels

- Strongest – black lines
- Significant – black + grey lines



Trade Network Graphs

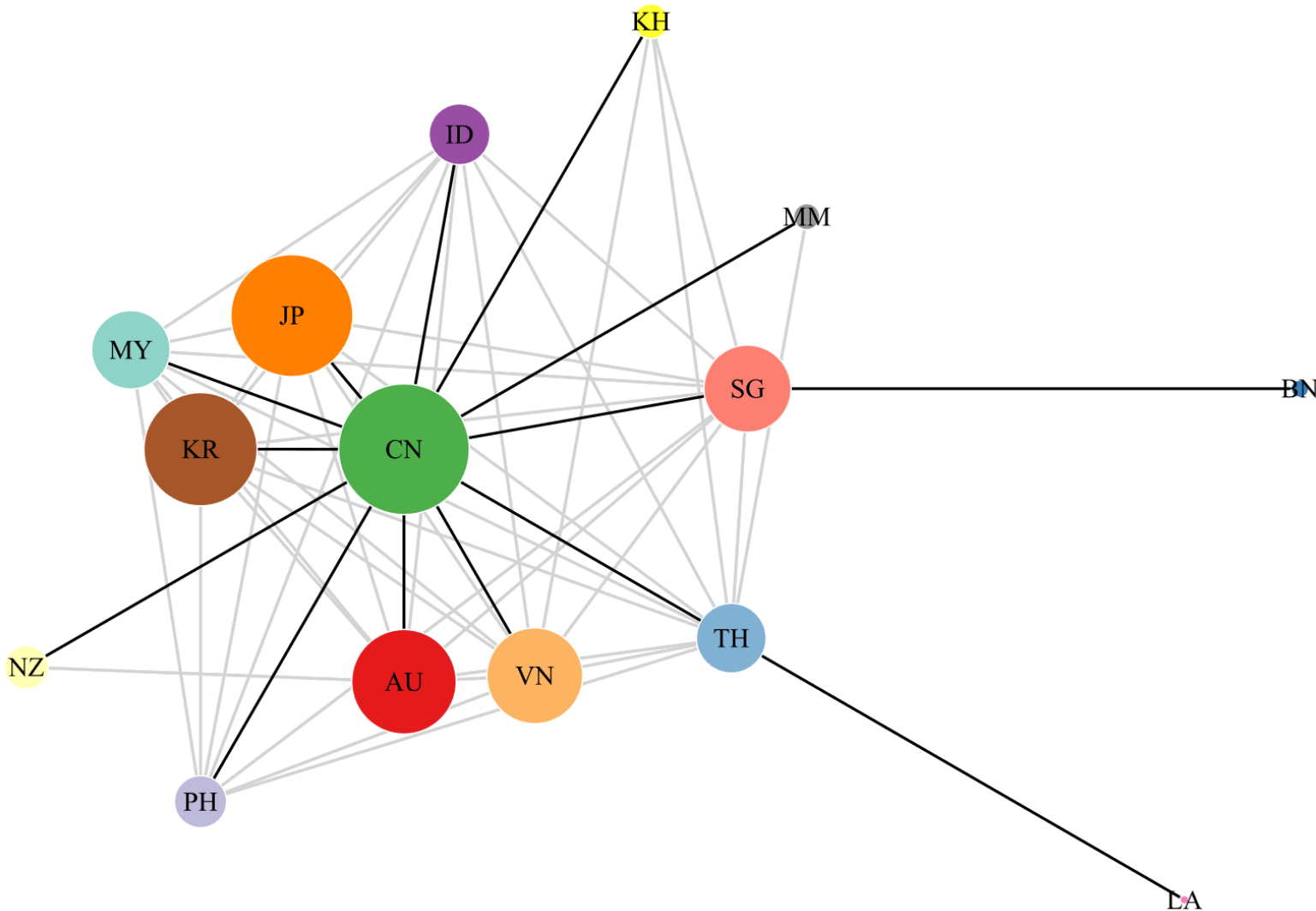
Trade Network Graph (1995)



Measure	Level	Top
Node Size	-	Japan
Shortest Edge Length	-	China-Japan
Degree Centrality	Strongest	Japan
	Significant	Singapore
Betweenness Centrality	Strongest	Japan
	Significant	Japan
Closeness Centrality	Strongest	Japan, Singapore, China
	Significant	Japan, Singapore, China

Source: Authors' calculations using BACI Data.

Trade Network Graph (2021)



Measure	Level	Top
Node Size	-	China
Shortest Edge Length	-	China-Japan
Degree Centrality	Strongest	China
	Significant	China, Thailand
Betweenness Centrality	Strongest	China
	Significant	China
Closeness Centrality	Strongest	China, Japan, South Korea
	Significant	China, Japan, South Korea

Source: Authors' calculations using BACI Data.

Trade Network Graph Comparison

Measure	Level	1995	2021
Largest Node	-	Japan	China
Shortest Edge Length	-	China-Japan	China-Japan
Degree Centrality	Strongest	Japan	China
	Significant	Singapore	China, Thailand
Betweenness Centrality	Strongest	Japan	China
	Significant	Japan	China
Closeness Centrality	Strongest	Japan, Singapore, China	China, Japan, South Korea
	Significant	Japan, Singapore, China	China, Japan, South Korea

Highlights of 1995:

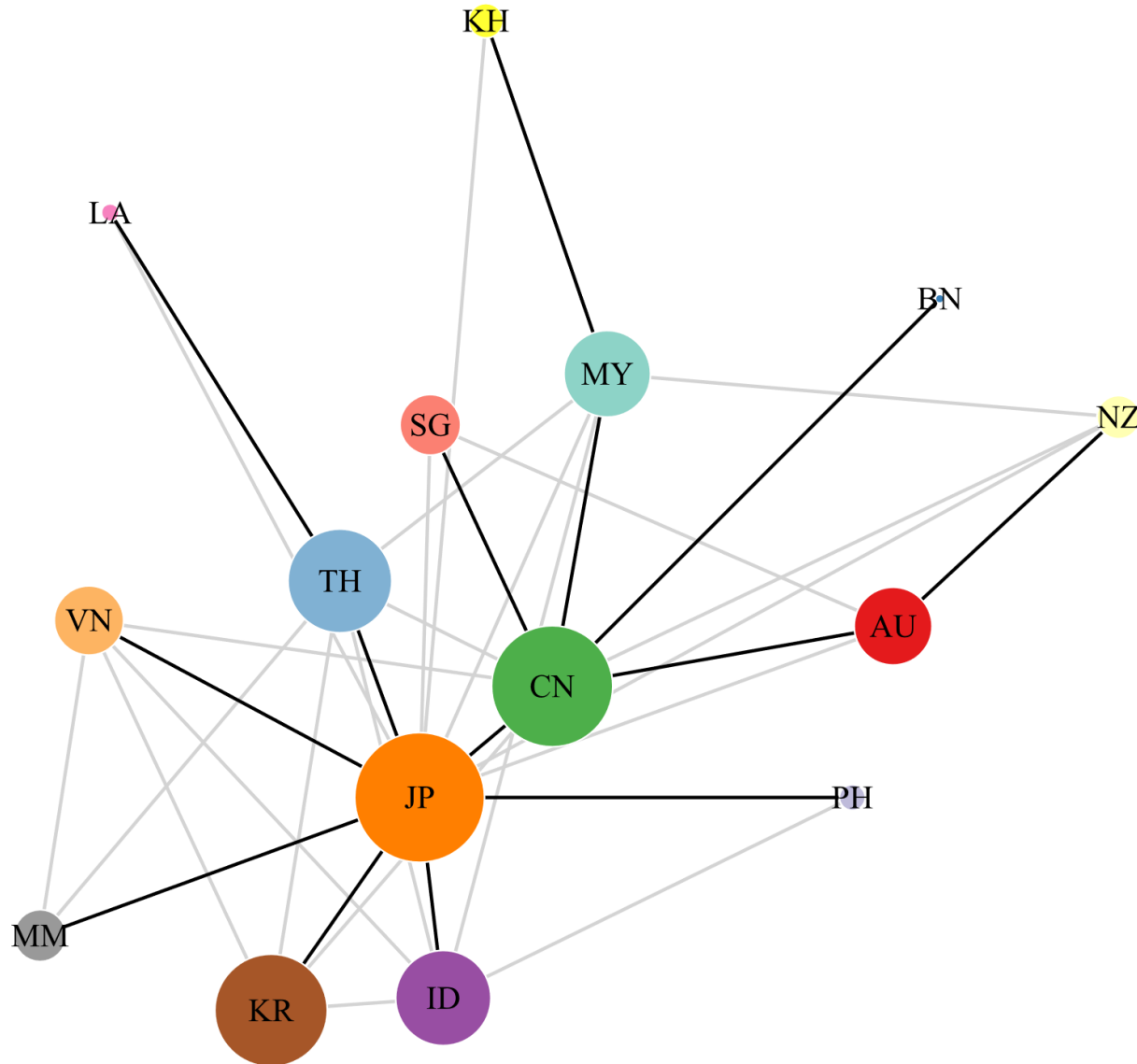
- Key figure(s): Japan, China, Singapore
- Intermediary: Japan
- Relationship: China-Japan

Highlights of 2021:

- Key figure(s): China, Japan, South Korea
- Intermediary: China
- Relationship: China-Japan
- **Singapore** was well-connected in 1995, while **Thailand** has a high volume of underlying relationships in 2021.
- RCEP's trade center: shifted from **Japan** in 1995 to **China** in 2021.

FDI Network Graphs

FDI Network Graph (2013)



Measure	Level	Top
Node Size	-	Japan
Shortest Edge Length	-	China, Japan
Degree Centrality	Strongest	Japan
	Significant	Japan
Betweenness Centrality	Strongest	Japan
	Significant	China, Japan
Closeness Centrality	Strongest	Japan, China
	Significant	Japan, China

Source: Authors' calculations using Orbis Data.

FDI Network Graph (2022)



Measure	Level	Top
Node Size	-	South Korea
Shortest Edge Length	-	Laos-Thailand
Degree Centrality	Strongest	South Korea
	Significant	Japan
Betweenness Centrality	Strongest	South Korea
	Significant	Vietnam
Closeness Centrality	Strongest	South Korea
	Significant	Vietnam

Source: Authors' calculations using Orbis Data.

FDI Network Graph Comparison

Measure	Level	2013	2022
Largest Node	-	Japan	South Korea
Shortest Edge Length	-	China-Japan	Laos-Thailand
Degree Centrality	Strongest	Japan	South Korea
	Significant	Japan	Japan
Betweenness Centrality	Strongest	Japan	South Korea
	Significant	China, Japan	Vietnam
Closeness Centrality	Strongest	Japan, China	South Korea
	Significant	Japan, China	Vietnam

Highlights of 2013:

- Key figure(s): Japan, China
- Intermediary: Japan
- Relationship: China-Japan

Highlights of 2022:

- Key figure(s): South Korea, Vietnam
- Intermediary: South Korea, Vietnam
- Relationship: Laos-Thailand
- **Japan** was well-connected in both time periods, having many underlying relationships with other RCEP members in 2022.
- There is a shift in RCEP's FDI centres, from **Japan** and **China** in 2013 to **South Korea** and **Vietnam** in 2022.

Conclusion

- **Trade Network Graphs:**

- In 1995, Japan's strength as a trade centre within RCEP and Singapore's prominence in underlying trade relationships, particularly with other ASEAN members, is observed.
- In 2021, China was RCEP's trade center, indicated by all measures of importance.

- **FDI Network Graphs:**

- In 2013, China and Japan dominated the FDI flows network, showing their strengths in intra-RCEP relationships.
- In 2022, South Korea and Vietnam's growing importance in the FDI flows network is seen. While South Korea is vital for the strongest relationships, Vietnam shows the importance of its role in underlying relationships.

- **Overall:**

- The positions of the RCEP members in both intra-RCEP trade and FDI flows have changed with time, with China's rise to prominence in intra-RCEP trade, and South Korea and Vietnam's growth as key figures within the intra-RCEP FDI flows network.

- **Future Research:**

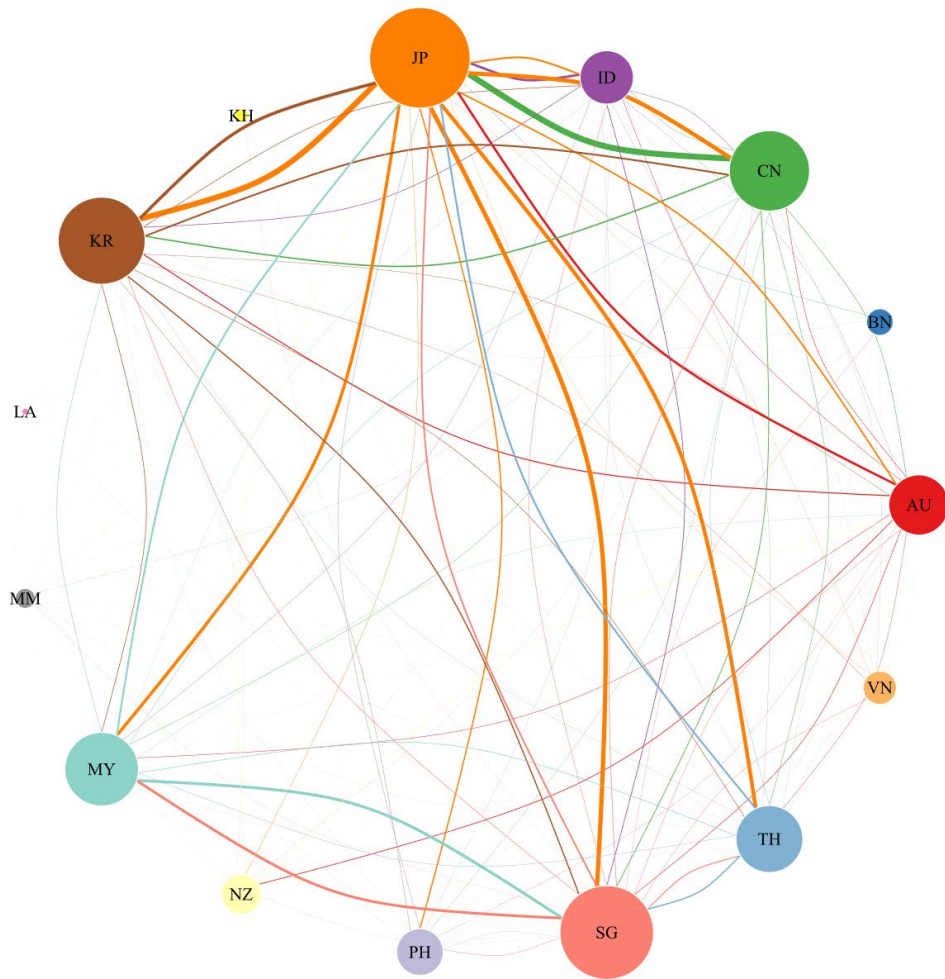
- Exploration of the networks at an industrial or sectoral level to assess for industrial transformation

Thank You!

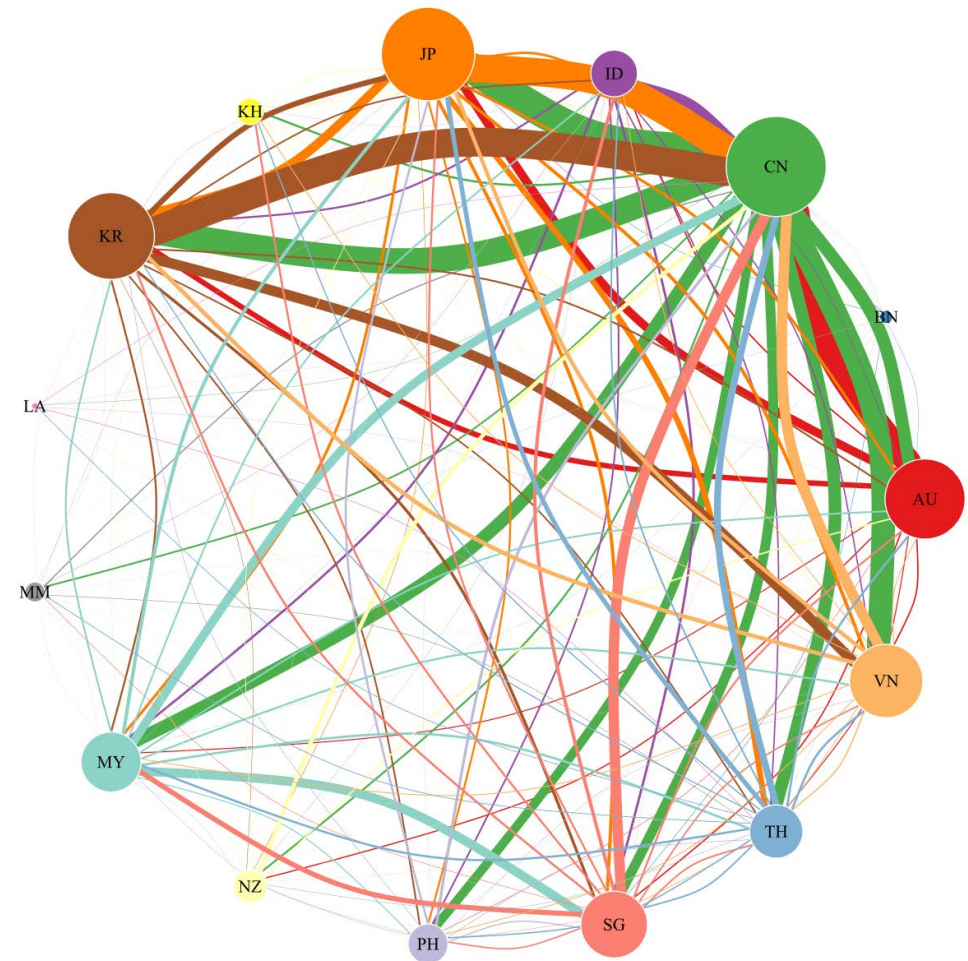
For more details, please keep an eye out for the upcoming report.
The paper will be published on the ACI website in the coming weeks.

Appendices

Trade Exports (1995 & 2021)

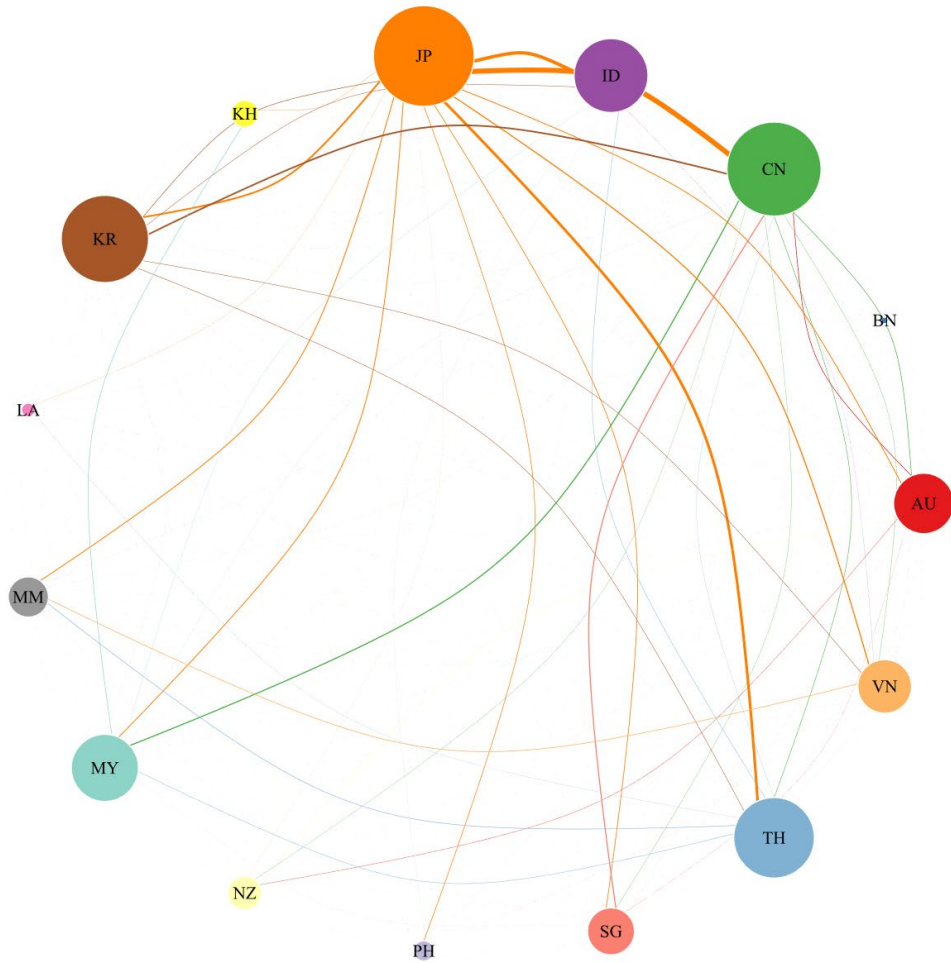


Appendix A: Circle plot of intra-RCEP trade exports in 1995

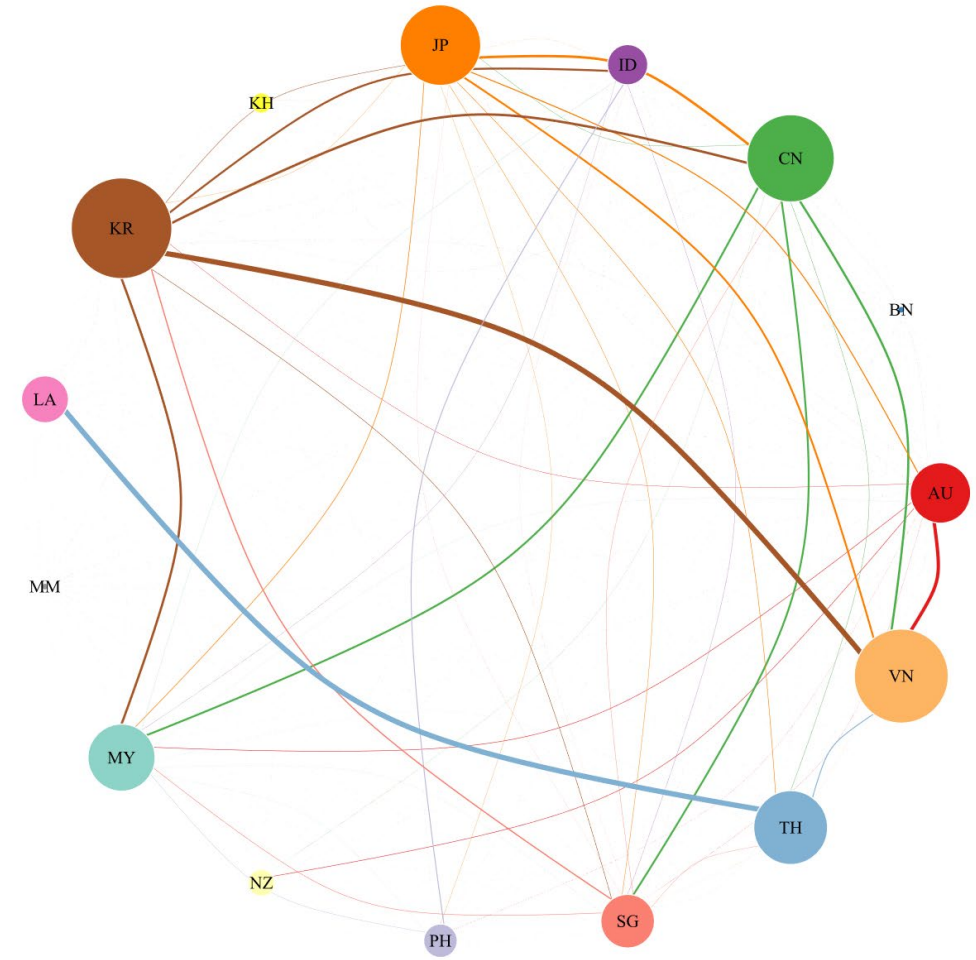


Appendix B: Circle plot of intra-RCEP trade exports in 2021

FDI Outflows (2013 & 2022)



Appendix C: Circle plot of intra-RCEP FDI outflows in 2013



Appendix D: Circle plot of intra-RCEP FDI outflows in 2022

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