浙江大学 国际联合商学院
INTERNATIONAL BUSINESS SCHOOL
ZHEJIANG UNIVERSITY

Business Cycle Synchronization and Multilateral Trade Integration in the BRICS

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April 11 (Monday), 2022

Outline

1. Introduction and Background
2. Business Cycle Synchronization in the BRICS
3. Trade Integration in the BRICS
   - Bi-lateral and Regional Trade Integration in the BRICS
   - Multilateral Trade Integration in the BRICS: A Network Approach
4. Conclusion and Policy Implication

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1. BRIC & BRICS: background

Goldman Sachs

GS Global Economics Website
Economics Research from the GS Financial Workbench℠ at https://www.gs.com

Global Economics Paper No: 66

Building Better Global Economic BRICs

- In 2001 and 2002, real GDP growth in large emerging market economies will exceed that of the G7.
- At end-2000, GDP in US$ on a PPP basis in Brazil, Russia, India and China (BRIC) was about 23.3% of world GDP. On a current GDP basis, BRIC share of world GDP is 8%.
- Using current GDP, China's GDP is bigger than that of Italy.
- Over the next 10 years, the weight of the BRICs and especially China in world GDP will grow, raising important issues about the global economic impact of fiscal and monetary policy in the BRICs.
- In line with these prospects, world policymaking forums should be re-organised and in particular, the G7 should be adjusted to incorporate BRIC representatives.

Many thanks to David Blake, Paulo Leme, Binit Patel, Stephen Potter, David Walton and others in the Economics Department for their helpful suggestions.

Jim O'Neill
30th November 2001

2001 BRIC = Brazil, Russia, India, China.

2010 BRICS = Brazil, Russia, India, China, South Africa.

NATIONAL INSTITUTE FOR THE HUMANITIES AND SOCIAL SCIENCES

South African BRICS Think Tank

invitation

ONLINE ACCESS ONLY

Promoting BRICS Economic Integration via Central Bank Digital Currencies

TECHNICAL CONFERENCE

Date: 11 April 2022 – 12h00 to 16h00 (SAST)

Register here

Conference Facilitator:
Dr Jaya Josie, Visiting Professor, Zhejiang University, International Business School

Conference Synopsis

The COVID-19 pandemic and consequent economic crisis have altered global trade. One of the profound changes has been the shift towards digital payments. With this shift, Central Bank Digital Currencies (CBDCs) are rapidly gaining ground, with all BRICS nations in the process of researching or adopting such options. The CBDC offers great opportunities to promote financial inclusion while also disrupting the traditional banking architecture in these countries. The new financial infrastructure could also promote cross-border financial services but is dependent on countries recognising the need to promote integration and currency interoperability. There is a need for focus, planning and coordinated action by Central Banks, financial institutions of BRICS countries that require the involvement of international standard institutions. As the BRICS develops these currencies in test environments, it is important to collate the research that addresses interoperability and international exchange issues. The BRICS will need to investigate the potential of using multiple CBDC bridging technologies and other alternatives to promote international trade and foreign investment from the outset before the currencies are formally adopted. Making changes to these systems at a later stage will prove to be more expensive. To enable international trade through the CBDC, one must explore the broad dimensions of system interoperability and the arrangements that the Central Banks must consider to implement such structures. This conference explores these ideas, developing policy recommendations for the BRICS.

Kindly register: here

For Further Information Contact: Krish Chetty: E kchetty@hsrc.ac.za

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Regional Economic Integration & Macro Interdependence

- To deepen economic cooperation within the BRICS,
- the progress of regional economic integration
- -> the degree of business cycle synchronization
- -> the direction and magnitude of macro interdependence and growth spillovers among the BRICS.

2. Business Cycle Synchronization in the BRICS

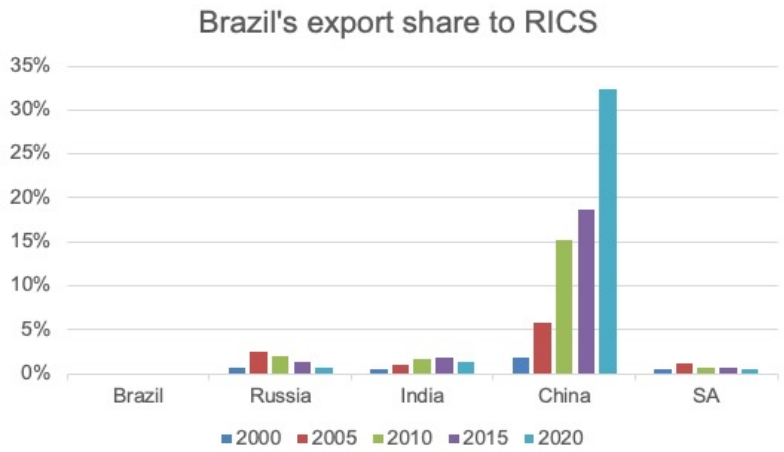
- We follow the analytical framework in Dai (2020).

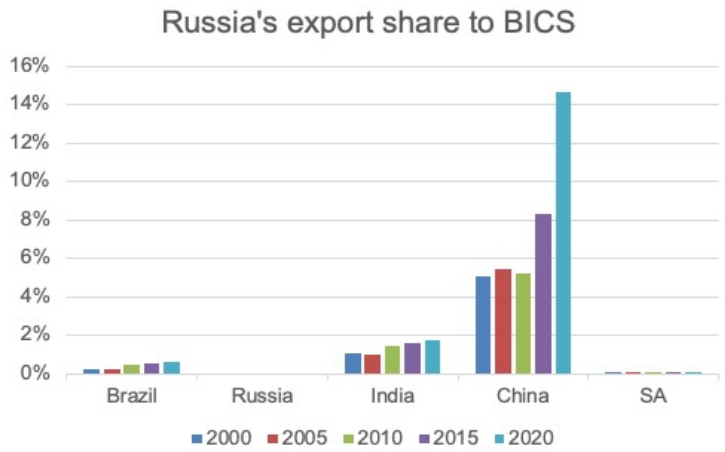
1) Measurement of Business Cycles

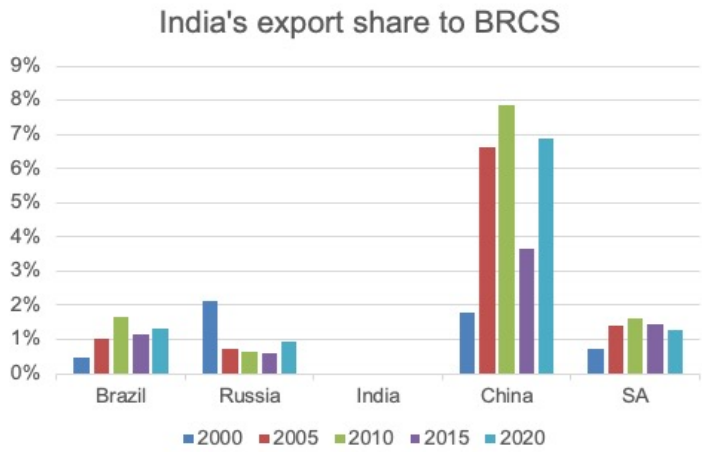
2) Synchronization of Business Cycles

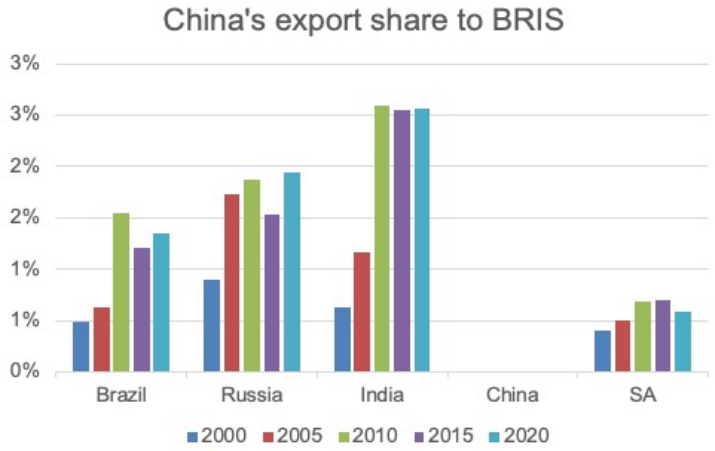
3. Trade Integration in the BRICS

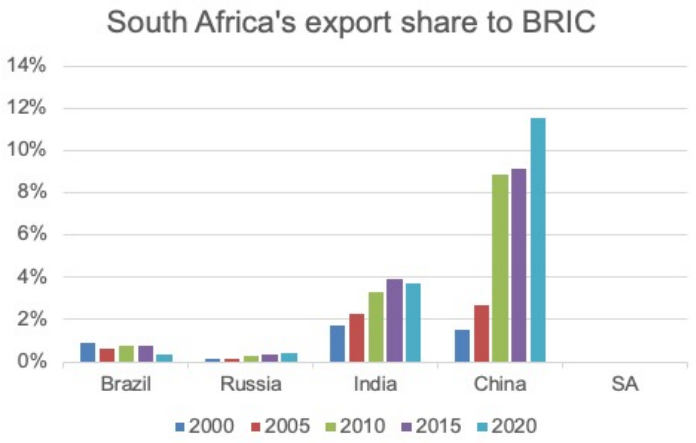
3.1 Bi-lateral export shares in the BRICS











Data Source: International Monetary Fund (IMF) – Direction of Trade Statistics (DOTS), author's calculation.

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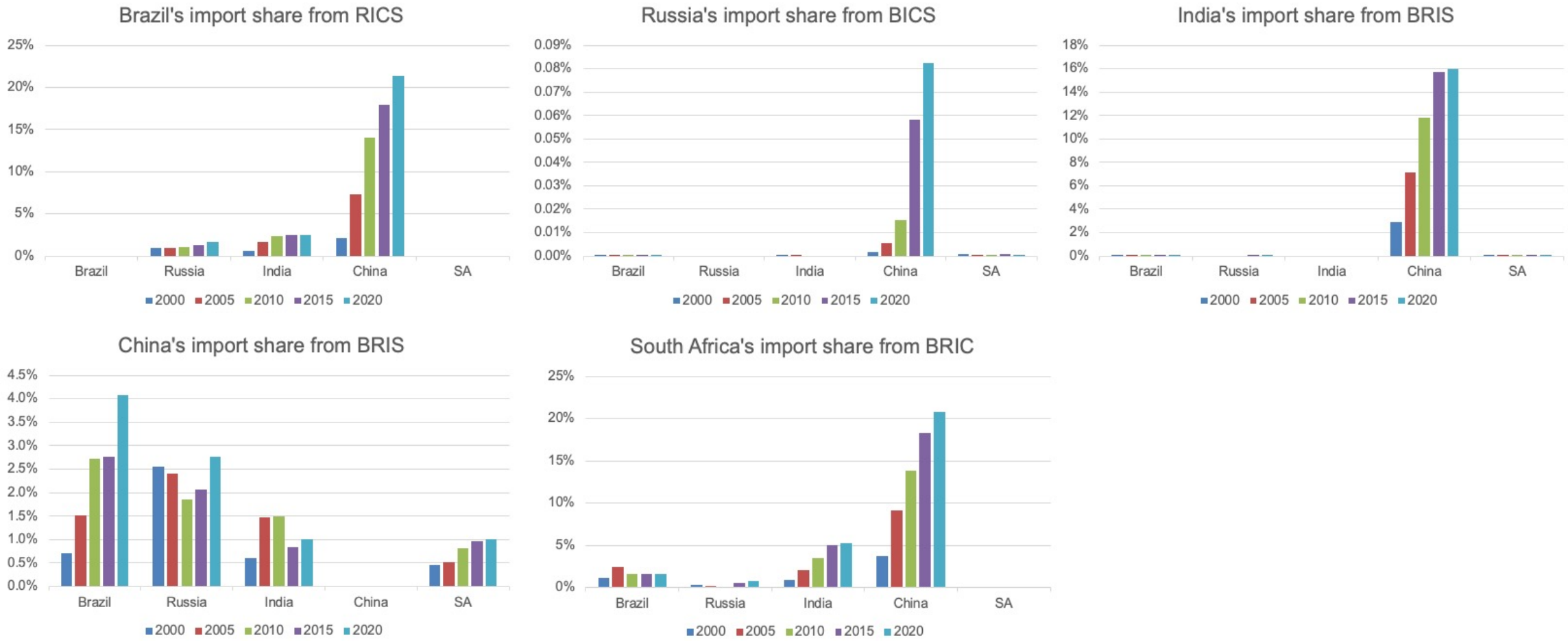
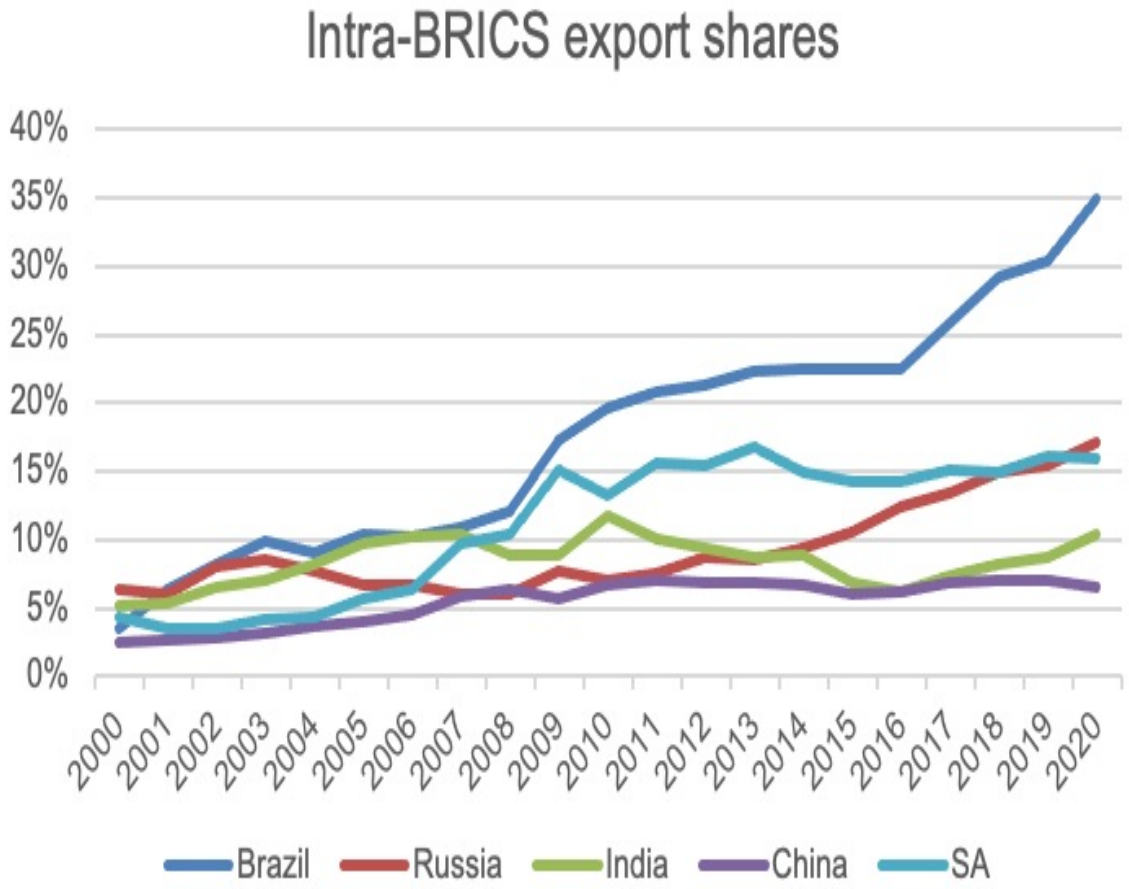
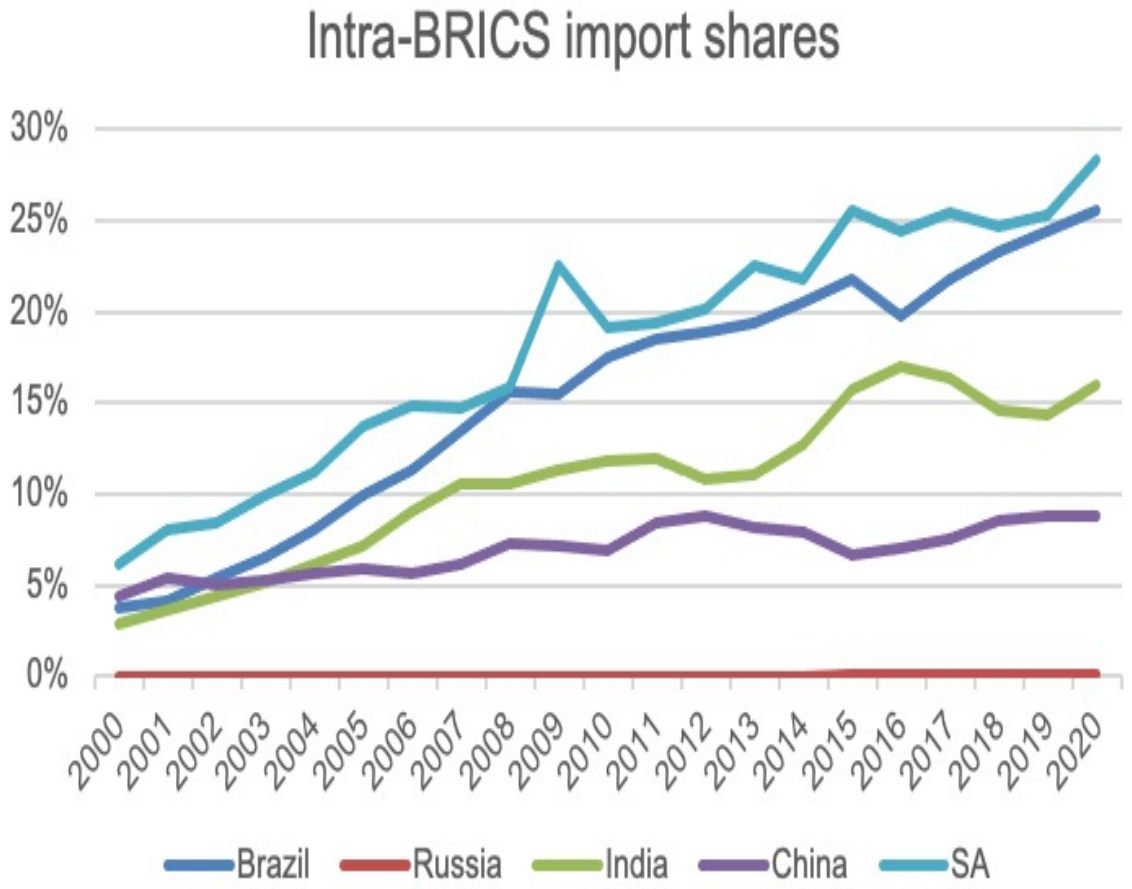
3.1 Bi-lateral import shares in the BRICS



Data Source: International Monetary Fund (IMF) – Direction of Trade Statistics (DOTS), author's calculation.

3.2 Intra-BRICS export and import shares (2000-2020)



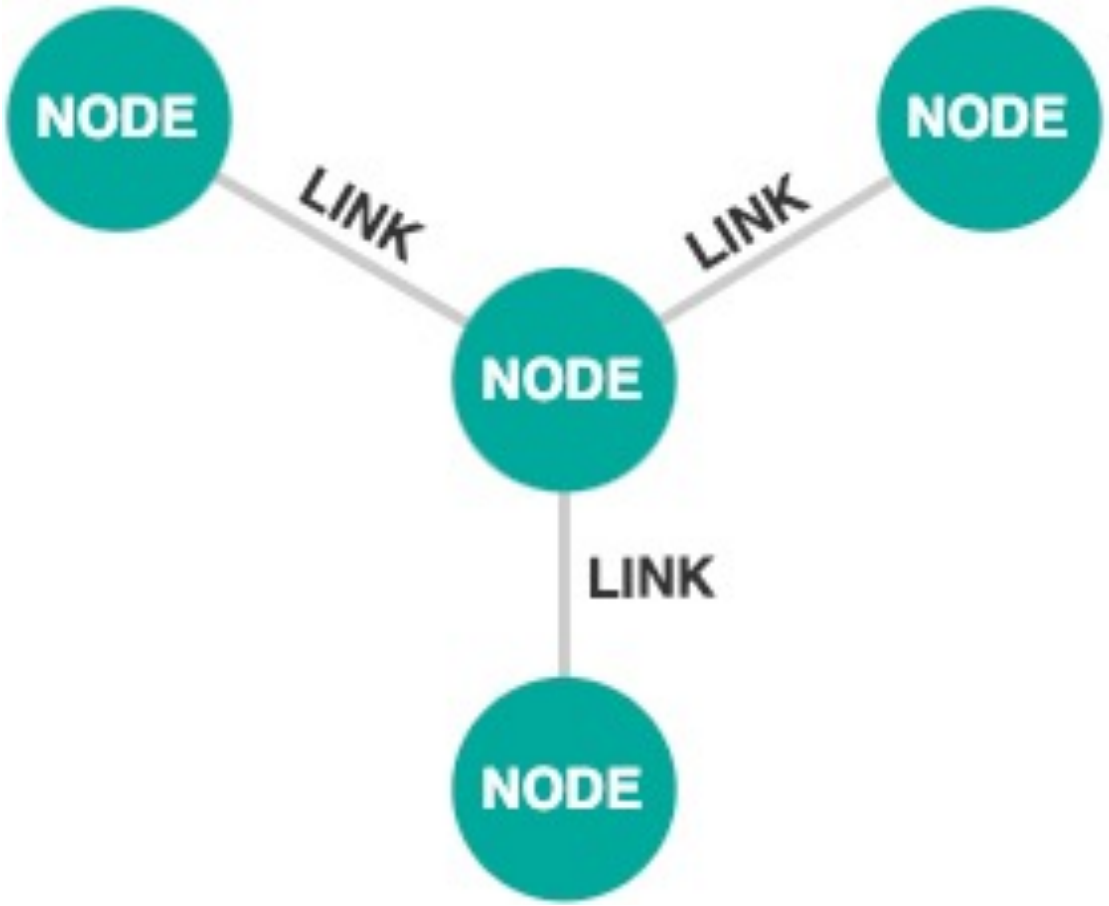


Data Source: International Monetary Fund (IMF) – Direction of Trade Statistics (DOTS), author's calculation.

3.3 Multilateral Trade Integration in the BRICS: A Network Approach

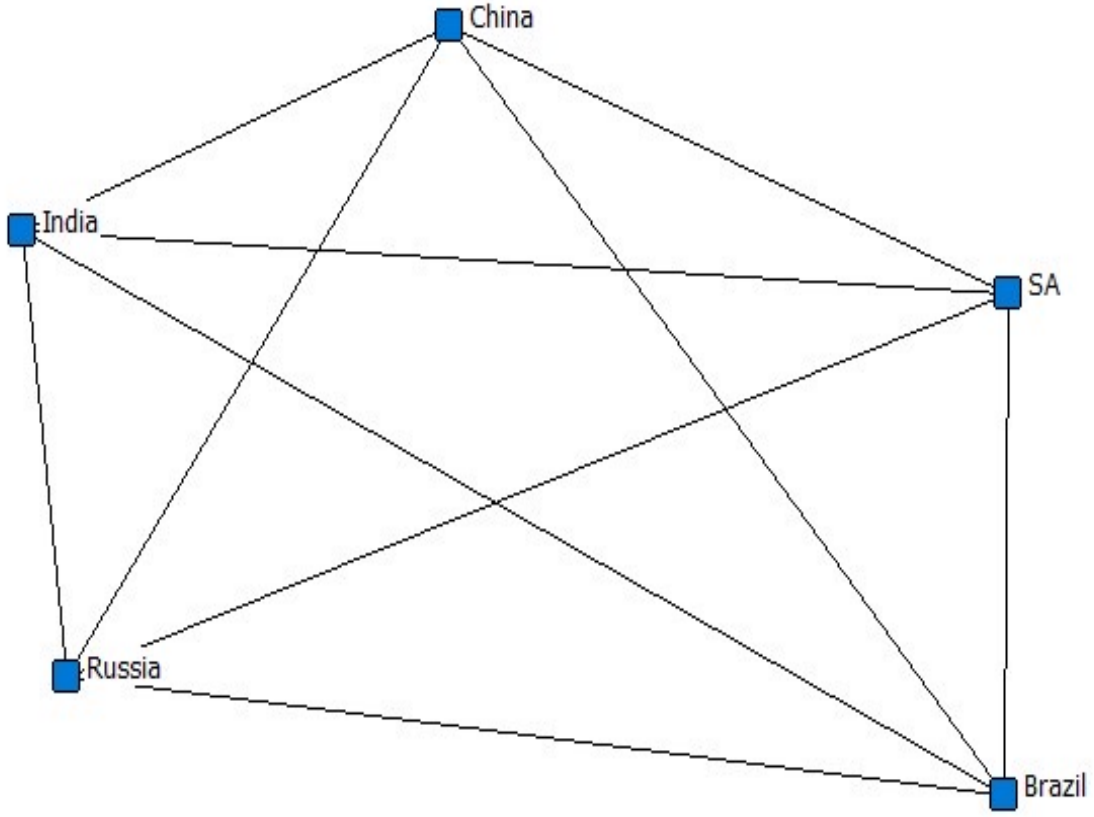
Network Anatomy

- A network is a set of points, called *nodes,*
- with connections between them, called *links*.



BRICS trade network

- Node: 🇧🇷🇷🇺🇮🇳🇨🇳🇿🇦
- Link: bi-lateral trade linkages



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Measuring Multilateral Trade Integration in the BRICS

1) Network Centrality
2) Network Density
3) Network Transitivity

(1) Network Centrality

- In many complex networks, centrality is used as a measure of influence.
- Wasserman and Faust (1994): central nodes must be the most influential, because they have the most ties to other nodes.
- Freeman (1977) proposes a network centralization index:

$$C_I = \frac{\sum_{i=1}^{g}[C_{max}^{d} - C_D(n_i)]}{max\sum_{i=1}^{g}[C_{max} - C_D(n_i)]}$$

- where C_{max}^{d} = the actual maximum degree centrality for an individual node observed in the data,
- C_{max} = the theoretical maximum degree centrality for an individual node in a network with *g* countries;
- *g* is the number of nodes in the network; and $C_D(n_i)$ is the degree centrality of node *i*.

(2) Network Density

- Network density examines the extent of global integration of the network, and measures the proportion of all possible trading relationships that are actually present in the network.
- In Reyes and Kali (2007), the maximum number of links for a network is:

$$E_{max} = \frac{g(g-1)}{2}$$
$$E^{D}_{max} = g(g-1)$$

- The density of a directed network is:

$$\Delta^{D} = \frac{L}{g(g-1)}$$

(3) Network Transitivity / Clustering

- Network transitivity measures the extent of multilateralism.
- A <-> B, B <-> C, => A <-> C
- “The partner of my partner is also my partner.”

- Watts and Strogatz (1998) define a *clustering coefficient*, to measure the proportion of triples that form a triangle out of all the triples present in the network:

$$C = \frac{3 \times number\ of\ triangles}{number\ of\ connected\ triples}$$

- where $0 \leq C \leq 1$.
- A “connected triple” means a single node with links running to an unordered pair of others.
- In effect, the clustering coefficient *C* measures the fraction of triples that have their third link filled in to complete the triangle.

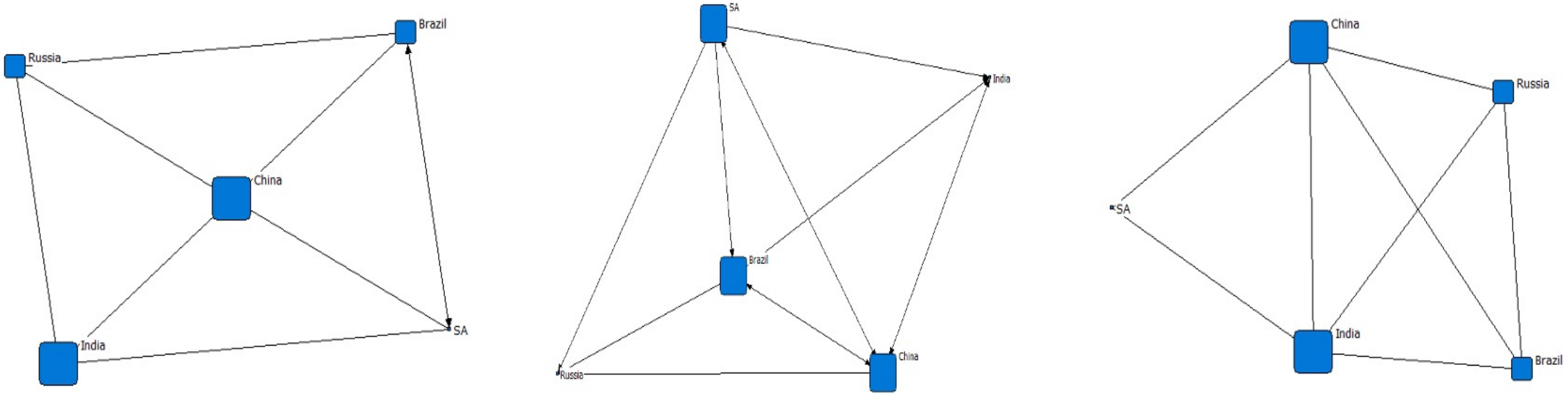
Table 2A. Results Summary: Network Overview (Exports).

	threshold = 0.5%			threshold = 1%			threshold = 1.5%		
	2010	**2015**	**2020**	**2010**	**2015**	**2020**	**2010**	**2015**	**2020**
Network Centralization [12]	26.39%	2.78%	12.50%	8.33%	27.08%	25%	8.33%	25%	33.33%
Network Density	65%	90%	80%	35%	65%	60%	30%	45%	40%
Network Transitivity [13]	0.517	0.875	0.867	0.396	0.767	0.767	0.375	0.717	0.667

Table 2B. Results Summary: Network Overview (Imports).

	threshold = 0.5%			threshold = 1%			threshold = 1.5%		
	2010	**2015**	**2020**	**2010**	**2015**	**2020**	**2010**	**2015**	**2020**
Network Centralization	36.46%	33.33%	33.33%	19.79%	17.71%	36.46%	31.25%	31.25%	17.71%
Network Density	55%	60%	60%	50%	45%	55%	40%	40%	45%
Network Transitivity	0.700	0.650	0.650	0.650	0.600	0.700	0.521	0.521	0.600

BRICS export network structure (threshold = 0.5%: 2010, 2015, 2020)



Source: author's computation.

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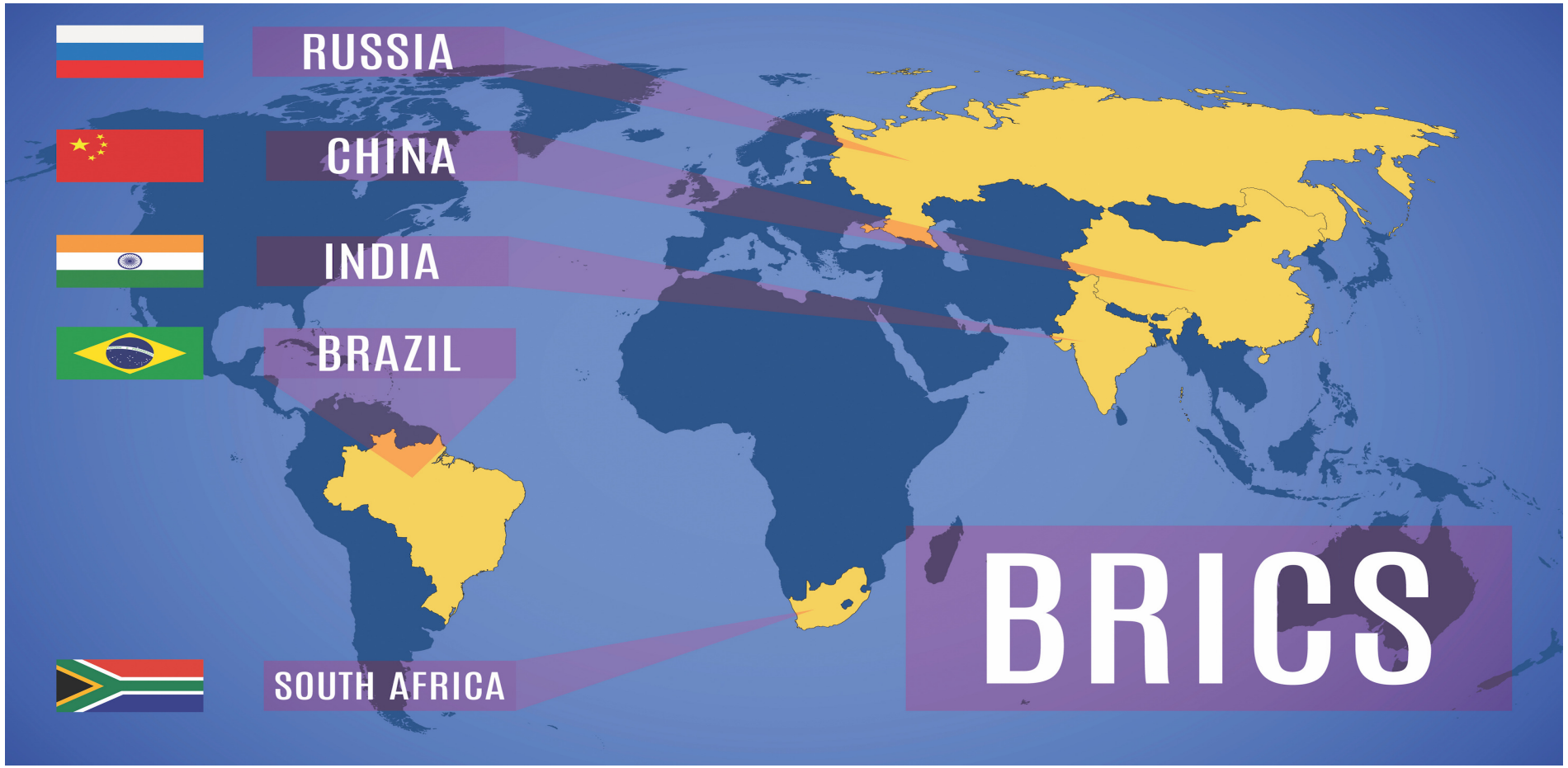
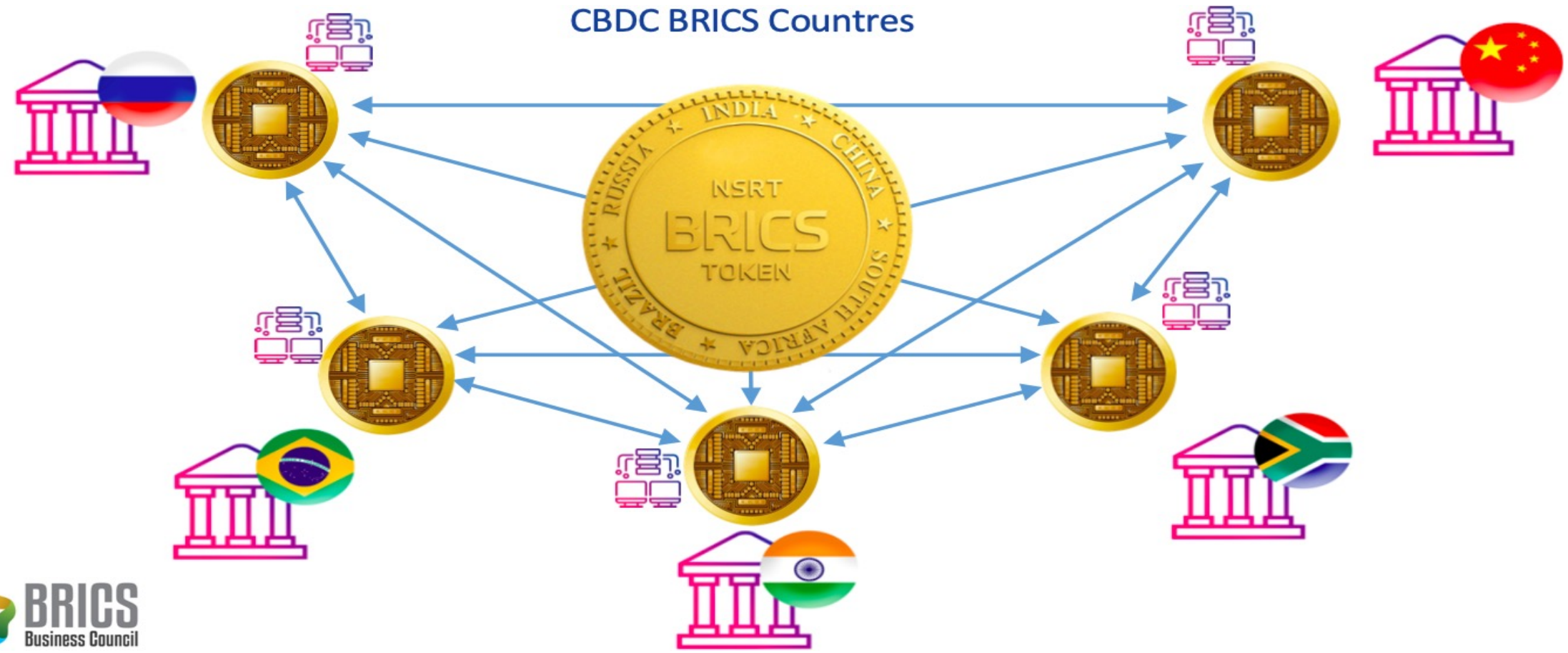
4. Policy Implication

Regional Trade Agreement (RTA)



Central Bank Digital Currency (CBDC)



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