AMERICAN UNIVERSITY OF BEIRUT

FEASIBILITY OF A BRICS COMMON CURRENCY

by
MAYSSAA MOSLEM JAMMOUL

A thesis
submitted in partial fulfillment of the requirements
for the degree of Master of Arts
to the Department of Economics
of the Faculty of Arts and Sciences
at the American University of Beirut

Beirut, Lebanon
April 2024

AMERICAN UNIVERSITY OF BEIRUT

FEASIBILITY OF A BRICS COMMON CURRENCY

by

MAYSSAA MOSLEM JAMMOUL

Approved by:

Dr. Nadine Yamout, Assistant Professor Department of Economics	Advisor
Dr. Ali Abboud, Assistant Professor Department of Economics	Member of Committee
Dr. Simon Neaimi, Professor Department of Economics	Member of Committee

Date of thesis defense: April 23, 2024

ACKNOWLEDGEMENTS

I would like to express my sincere gratitude to several people who have played crucial roles throughout my journey in completing this thesis. First and foremost, my heartfelt thanks go to Dr. Nadine Yamout for her invaluable assistance from the very beginning. Dr. Yamout not only helped me choose an engaging topic but also guided me through writing the proposal. Her continuous encouragement and insightful advice have been a constant source of support for me.

I am equally grateful to Dr. Ali Abboud for his keen interest in my progress. Dr. Abboud made a significant effort to lighten my workload by adjusting my assignments and projects, allowing me to dedicate more time to my thesis. His understanding and flexibility have been incredibly helpful.

I also want to extend a special thank you to my friends. Their unwavering encouragement and reassurance have been my pillars of strength. Their belief in me, even in moments of doubt, has made this journey smoother and more enjoyable.

Lastly, I appreciate the time and effort invested by the committee members-Dr. Nadine Yamout, Dr. Ali Abboud, and Dr. Simon Neaime-in reviewing my thesis and attending my presentation. Their feedback and insights are invaluable, and I am thankful for their contributions to my academic growth.

Thank you all for your support, patience, and guidance. This achievement would not have been possible without you.

ABSTRACT
OF THE THESIS OF

Mayssaa Moslem Jammoul for Master of Arts
Major: Economics

Title: Feasibility of a BRICS Common Currency

In 2006, Brazil, Russia, India, and China created the "BRIC" group. South Africa joined in 2010, making it "BRICS". The group was designed to bring together the world's most important developing countries, to challenge the political and economic power of the wealthier nations of North America and Western Europe. Today, the BRICS countries are exploring ways to reduce their dependence on the US dollar in international trade and finance. By admitting new members into the alliance, they believe that a larger and more diverse group of countries can better challenge the dominance of the US dollar in the global economy. Consequently, the BRICS nations are promoting the use of their national currencies in bilateral and multilateral trade, exploring the potential of digital currencies and other financial instruments. In addition, Brazil's president, affirmed by the Russian prime minister, has called for the creation of a shared currency within the BRICS group.

The purpose of this research is to analyze the feasibility of a monetary union in BRICS through the examination of the extent of the bloc's fulfillment of the OCA criteria. For this purpose, I employed a mixture of qualitative and empirical analysis using descriptive statistics and various econometric models. Results provide evidence of economic symmetry in GDP growth rates, efforts in enhancing labor mobility, technological, educational, and skill-sharing projects. Moreover, the results reveal upward trends in trade, positive development in bilateral trade agreements, and growing financial integration. Furthermore, the establishment of financial institutions such as the NDB and CRA reflect commitment to advance economic consolidation. However, the BRICS countries exhibit diverse economic profiles, political stability variations, discrepancies in economic dynamics and fiscal conditions, and lack of a shared vision.

Therefore, for the monetary union project to be successful, the BRICS countries have to address those challenges and focus on coordinating macroeconomic policies, develop flexible monetary mechanisms, enhance fiscal policy coordination, reform their financial institutions (NDB and CRA), seek convergence across a broader range of macroeconomic indicators, foster legal and political readiness, commit to a shared vision, and most importantly, learn from previous monetary union experiences, mainly the EU.

TABLE OF CONTENTS

ILLUSTRATIONS

Figure

TABLES

Table

CHAPTER 1

INTRODUCTION

According to the International Monetary Authority (IMF), the share of US dollar reserves held by global central banks fell to 59% in 2023, down from 71% in 1999 (Sanghani, 2024). Some expect that the US dollar's share of global reserves will continue to fall as emerging markets and developing economy's central banks seek further diversification of the currency composition of their reserves. More and more countries — from Brazil to Southeast Asian nations — are calling for trade to be carried out in other currencies besides the U.S. dollar.

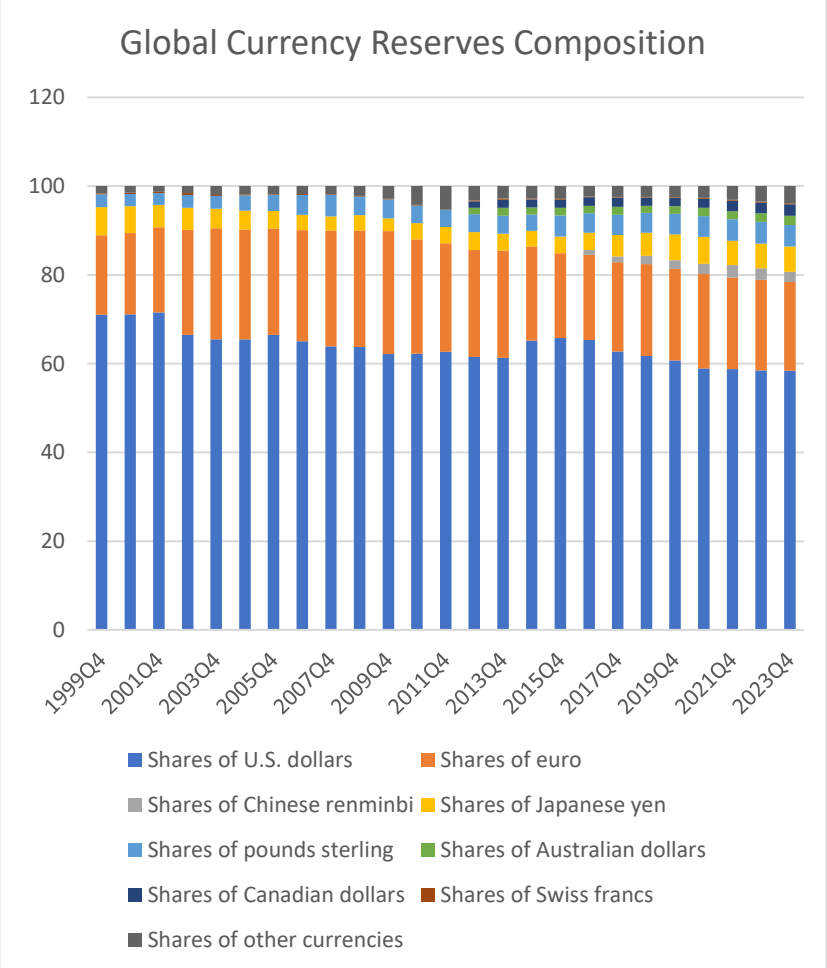


Figure 1: Global Reserves' Composition

The above graph exhibits a decline in the dollar share of international reserves since 1999. This decline reflects active portfolio diversification by central bank reserve managers. Obviously, the shares of the euro, yen and pound sterling have not simultaneously increased. Instead, the shift out of dollars has been in two directions: a quarter into the Chinese renminbi, and three quarters into the currencies of smaller countries that have played a more limited role in reserves. The evolution of the international reserve system in the last 20 years is thus a gradual movement away from the dollar, a modest rise in the role of the renminbi, and changes in market liquidity, relative returns and reserve management enhancing the attractions of nontraditional reserve currencies.

The U.S. dollar's historical dominance, driven by its association with key commodities and the largest economy, faces challenges due to factors like aggressive rate hikes and geopolitical tensions. While the U.S. dollar still holds the majority of global forex reserves, its share has declined, and countries such as China, Brazil, Malaysia, and India are exploring alternatives, including settling trade in local currencies. The trend towards de-dollarization is attributed to changing economic dynamics and geopolitical risks, offering potential benefits for countries seeking to balance risks and gain investment options (Chen, 2023).

Emerging economic and political powers are pushing towards de-dollarization. Among these are the BRICS that have the most potential to affect the global economy. Several factors play a role in this tendency to decrease dependence on the dollar. The most obvious is that there is a growing perception that the dollar and the euro are vulnerable to geopolitical risks linked to expanding U.S. and European economic sanctions. Specifically, policymakers in emerging markets are apprehensive about the

possibility of future sanctions abruptly closing off the primary financial channels denominated in the dollar and euro, which are crucial for transactions with key trading partners. There is also concern that these sanctions could be used to freeze the assets in dollars and euros held by the central bank, major trading partners, or political leaders of a particular emerging market.

These worries are contributing to a shift towards favoring local currencies. Policymakers seem particularly troubled by recent instances, such as unprecedented U.S. and European sanctions that froze half of the Russian central bank's gold and foreign exchange reserves. Additionally, actions taken by the U.S. and European governments, such as disconnecting major Russian banks from the Society for Worldwide Interbank Financial Telecommunication (SWIFT), have heightened these concerns (Greene, 2023).

To understand better the concerns of the BRICS and their demarche towards de-dollarization, learning about the emergence of the BRICS as a bloc and its evolution is a requisite.

Coined by Goldman Sachs in 2001, the acronym BRIC originally represented Brazil, Russia, India, and China, symbolizing a pivotal shift in global economic power towards the developing world. This foresight predicted that their collective GDP could surpass the world’s wealthiest nation’s GDP by 2050, owing to their rapid development (Hathur and Dasgupta, 2013). Initially an informal association, the bloc was established in 2009 to give its members a forum to oppose a global order that was dominated by the United States and its Western allies. Russia initiated this transformative initiative, and in 2011, South Africa’s inclusion transformed BRIC into BRICS. Collectively, these

account for just over 29% of the world land area, approximately 42% of the global population, and nearly 24% of the world's GDP (Acharya et al., 2023).

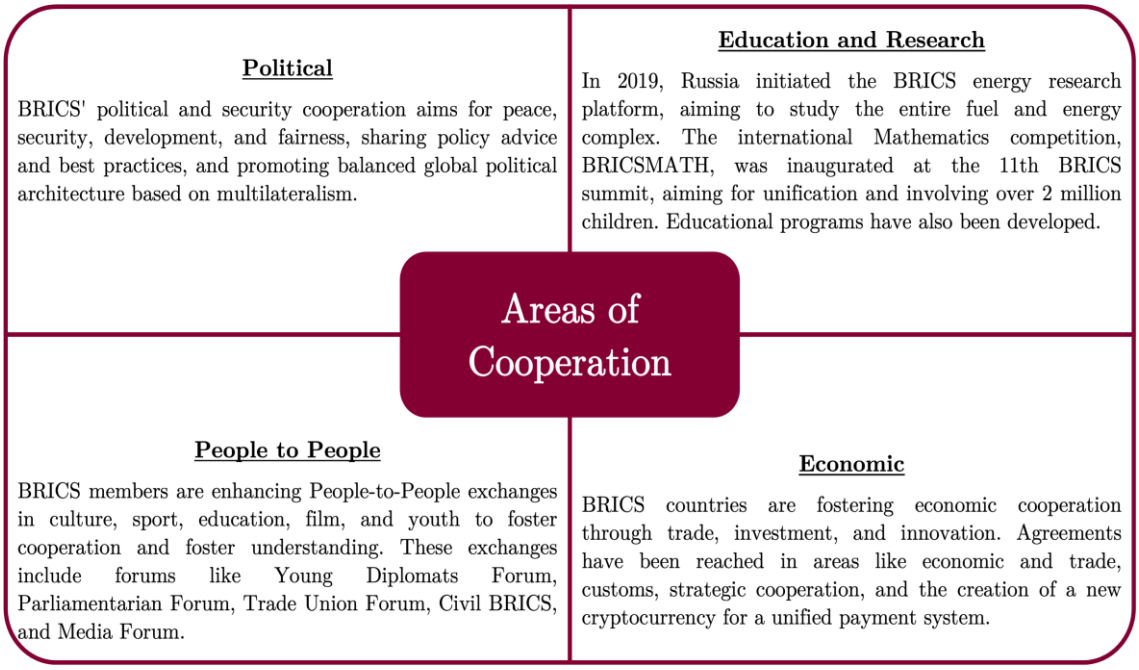


Figure 2: Areas of BRICS Cooperation

Annually, leaders and heads of governments of the member countries convene, with each country taking a turn serving as the group's chairman for a year. The goal of the BRICS is to promote fairer, mutually beneficial, and sustainable development through strengthening, expanding, and escalating collaboration both within the organization and among its member nations in various domains.

Returning to the idea of BRICS' concerns about the US political and economic hegemony, Raghuram Rajan, the former governor of the Indian Reserve Bank, has previously cautioned that the United States' one-sided domestic monetary policy, disregarding its global impact, poses a significant risk to many developing-country

economies due to the dollar's status as the world's reserve currency (Wessel, 2014). A notable instance occurred in 2022 when the US Federal Reserve raised interest rates, leading to adverse effects on developing economies worldwide. The resulting appreciation of the dollar and commodities priced in the currency has thrown numerous developing countries into economic turmoil. In response, BRICS nations have sought alternatives to Western-dominated global financial, trade, and political institutions, aiming to reduce dependence on the US dollar in the global financial system and replace it as the world's reserve currency (Gumede, 2023).

In June 2022, President Vladimir Putin announced that the BRICS nations – Brazil, Russia, India, China, and South Africa – are actively engaged in the establishment of a new global reserve currency. Speaking at the BRICS business forum, he mentioned, "The exploration of creating an international reserve currency based on a basket of currencies from our countries is underway." The Russian president further stated that member states are collaborating on developing robust alternative mechanisms for international payments. Previously, the group had indicated its efforts to create a joint payment network to reduce dependence on the Western financial system. Additionally, the BRICS countries have been promoting the use of local currencies in bilateral trade (Dipanjan Roy Chaudhury, 2022). During the most recent summit that was held on August 23rd, 2023, in Johannesburg, Brazil's President Lula da Silva and Russian Foreign Minister Sergey Lavrov voiced support for the idea of a common currency among BRICS nations. "I am in favor of creating, within the BRICS, a trading currency between our countries, just like the Europeans created the euro," said Lula during his speech. However, other BRICS countries are resisting the common currency narrative. The Indian Foreign Secretary Vinay Mohan Kwatra said that "common

currency discussions have several prerequisites," which would need to be met before discussions about a common currency framework could even begin. "The discussion framework in BRICS and the substance of that discussion framework in BRICS have focused principally on trade within national currencies," he said. Nevertheless, the prospect of a common currency for the bloc continues to generate interest both inside and outside the bloc (Devonshire-Ellis, 2023); Hoffman (2023).

In short, the discussions have been revolving around several options to increase economic integration and resist the dominance of the dollar in the global market, two of which are:

- Creating a monetary union and a common currency similar to the EURO
- Creating a new reserve currency based on a basket of the BRICS currency and backed by gold

1.1. Overview of the Optimum Currency Area Theory (OCA)

Over history, many countries have sought to establish currency unions to facilitate trade, strengthen their economies, and unify previously divided states. For example, in the 19th century, Germany's former custom union helped to unify the disparate states of the German Confederation with the aim of increasing trade. More states joined in 1818, sparking a series of acts to standardize the value of coins transacted in the area (Chen, 2022). Since then, many other monetary and currency unions have been created for similar reasons but, maybe, with a different focus. One such monetary union was the EMU (Economic and Monetary Union) in Europe, the most famous union of the late twentieth century. Nineteen of the twenty-seven European

states adopted a common currency, the euro. So, what is a monetary union, and why are many countries eager to join monetary unions?

A monetary union is an area with a single monetary policy that allows one currency, or perfect substitute currencies, to circulate freely. It's characterized by a single currency or a group of currencies fully convertible at fixed exchange rates, a system in which national autonomy in monetary policy is restricted and monetary policy is decided at the union level, and a single external exchange rate policy (Masson and Pattillo, 2004).

Regarding the motive for countries creating or joining a monetary union, it can be revealed by the Optimum Currency Area (OCA) theory, introduced by the economist Robert Mundel in the 1960s. This theory, further refined by economists Peter Kenen and Paul Krugman, presents the benefits and costs of monetary unions.

To begin with, countries can benefit from monetary unions by reducing transaction costs and eliminating exchange rate volatility, thereby promoting investment, intra-regional trade, and economic growth. Other benefits include access to larger financial markets, reduced borrowing costs, and the ability to apply fiscal and monetary discipline. Moreover, if the member countries decide to adopt a common currency, they would enjoy additional benefits such as facilitating price comparisons, achieving economies of scale, and attracting greater FDI.

However, this comes at the cost of surrendering national monetary policy and control over the exchange rate. The magnitude of these costs depends on how symmetrical economies are in terms of business cycles, how vulnerable they are to shocks, and how easily they adapt to disturbances (Schaechter, 2003). Furthermore, if countries decide on sharing a common currency, they will have to bear even more costs,

which are conversion costs, loss of monetary policy autonomy, lack of fiscal union, and therefore, fiscal discipline, lack of independence, and loss of sovereignty.

In addition to the benefits and costs of monetary unions, the OCA theory posits several criteria for countries contemplating joining or forming a currency union. These criteria can be divided into two categories. The first category focuses on reducing the member countries' exposure to asymmetric shocks. Similarity of economic structure, openness in terms of intraregional trade, and low degree of specialization belong to this category. The second category considers homogeneity of preferences, factor mobility, and transfer payment (Jager and Hafner, 2013).

In light of the discussion above, this thesis delves into the feasibility of the BRICS countries forming a monetary union and adopting a common currency. The following research questions will be addressed:

- What are the key convergence criteria required for the adoption of a common currency, and do the BRICS nations currently measure up to these criteria?
- What lessons can be drawn from existing monetary unions, such as the Eurozone, and how might these lessons be applied to BRICS?

CHAPTER 2

LITERATURE REVIEW ON OCA THEORY, EXISTING MONETARY UNIONS AND BRICS

". . . the issue of optimum currency areas, or, more broadly, that of choosing an exchange rate regime, should be regarded as the central intellectual question of international monetary economics".
Paul Krugman

Interest in Optimum Currency Area theory has grown steadily, particularly since the formation of the Eurozone. Furthermore, globalization and technological advancement are bringing countries closer together: bivariate trade, capital flows, and migration have all increased dramatically. As a result, several areas have begun to investigate monetary union formation. The majority of empirical research shows that members of practically all potential currency unions are not yet sufficiently synchronized to fix their exchange rates. As a result, policymakers must understand the economic factors that can increase synchronization (Stoykova, 2018).

In the early 1950s, most of the debate focused on exchange rate regimes and on the pros and cons of fixed versus flexible exchange rate systems. The prevalent literature revolved around the Bretton Woods exchange rate regime which included pegged but adjustable exchange rates and capital controls imposed by many countries. So, some papers about the choice of the exchange rate regime had already existed, e.g. (Friedman, 1953) and (Meade, 1957) before Mundell used the phrase "optimum currency area" for the first time and published his influential paper titled "A Theory of Optimum Currency Areas" in 1961. (Broz, 2005)

2.1. Traditional Optimum Currency Area Theory

2.1.1. Mundell

According to Mundell (Mundell (1961)), the Optimum Currency Area is the region where no fiscal or monetary intervention is needed to bring the economy back to equilibrium in case two regions, for instance, are facing exogenous country specific shocks. Therefore, while flexible exchange rate regimes allow for different monetary policies and contribute to the restoration of equilibrium in both countries, there exists another adjustment mechanism that can be developed provided that they use a single currency (Stoykova (2018)).

The most important criterion in Mundell's OCA theory is the mobility of capital and labor in a particular region since he believes that a currency area cannot be optimal if high unemployment or inflation is the result of a fixed exchange rate. Mundell argues that capital mobility allows for adjustments to economic shocks, as capital can move freely to regions with better economic prospects. He also contends that for both external and internal adjustment, labor mobility serves as a viable alternative to a flexible exchange rate. Put simply, increased labor mobility enables two regions to operate economically efficiently with a shared monetary policy.

Another relevant criterion for a common currency area is price and wage flexibility. Mundell believes it will help to allocate financial flows to where they are needed most. If those two criteria are not met, then the only case regions should form one currency area is when they don't suffer from asymmetric shocks. The reason behind this is that two regions facing uneven demand shocks encounter the opposite issues of unemployment and inflation regardless of whether they have fixed or flexible exchange rates. However, in a currency union, if regions experience asymmetric economic shocks,

an automatic fiscal transfer mechanism helps in automatically transferring funds from regions with economic surpluses to those facing economic downturns (Ngo (2012)). This transfer of resources acts as an automatic stabilizer, helping to mitigate the impact of economic imbalances and promoting overall stability within the union. In addition, the automatic fiscal transfer mechanism facilitates risk-sharing among member regions, helps avoid pro-cyclical policies, and enhances common monetary policy effectiveness.

Mundell also provided several valuable arguments for large currency areas. Firstly, transaction and information costs increase with a number of currencies; therefore: "…money in its role of medium of exchange is less useful if there are many currencies". Secondly, a huge number of small currency areas makes the foreign exchange market too thin, which, in turn, allows for speculation on the market and makes it easier to affect the prices on the foreign exchange. Hence, it becomes more difficult to conduct monetary policy (Stoykova (2018)).

Mundell adds an important view concerning the feasibility of actual currency reorganization which is that it should be accompanied by profound political changes, since in the real-world currencies are mainly an expression of national sovereignty (Ngo, 2012).

2.1.2. McKennon

Mundell's OCA theory triggered extensive discussion among several economists about its strengths and weaknesses. Others added several criteria to the theory and approached the conditions stated by Mundell differently. R.I.Mckinnon (McKinnon (1963)), for example, questions which further conditions should be fulfilled to consider a region an optimal area in which to introduce a common currency. He highlights the

openness of an economy, measured by the ratio of tradable to non-tradable goods, as a crucial criterion for assessing optimality. He argues that high openness makes it more advantageous for a country to join a monetary union, stating that flexible exchange rates become less effective for external balance and more detrimental to internal price level stability as economies move from closed to open. Other economists have developed McKinnon's idea further and defined openness as the share of economic activity devoted to international trade.

McKinnon also focuses on factors like capital and labor mobility. He introduces the concept of two senses of factor mobility: geographical mobility among regions and mobility among industries. While emphasizing the significance of both, he agrees with Mundell that regions with high factor mobility could form a currency union. Additionally, McKinnon underscores the importance of the size of the economy in his theory. He asserts that small economies are better suited for a currency union compared to larger ones.

2.1.3. Kennen

Another economist who studied Mundell's theory is P.B.Kenen (Kenen, 1967). He disagrees with Mundell's approach to defining an optimum currency area by the criteria of perfect labor mobility because such mobility in reality rarely prevails. He argues that one essential element of an OCA is diversity in a country's products' mix because countries that are well-diversified are more able to withstand abrupt changes in international transactions and stabilize domestic capital formation (Kundera (2013)). In the case of a country that produces only one export commodity, a negative demand shock can lead to a reduction in export earnings, leading to depreciation in a floating

exchange rate system. In a fixed exchange rate regime, an adjustment would imply a fall in price and wage levels, which could lead to increased unemployment. This makes such an area less optimal.

In contrast, a diversified economy with diverse exports will be less sensitive to shocks, because negative impacts in one sector can be offset by positive developments in the other area. However, product differentiation may not protect against macroeconomic disruptions and diverse economies may tend to have lower import turnover. Kenen emphasizes the importance of a similar production mix, suggesting that regions exposed to sector-specific symmetric shocks are better suited to monetary union.

Kenen introduces the concept of regional financial integration as important for a monetary union. Financial integration can effectively reduce the asymmetry of shocks, making regions that benefit from it more suitable for fixed exchange rate regimes or monetary unions (Stoykova, 2018).

Several other researchers contributed to the OCA theory, but the three authors mentioned above are usually considered as most crucial and cited.

2.2. New Optimum Currency Theory

The new "generation" of the OCA theory was inspired by the contradictions and lack of practical implementation of the traditional theory, as well as a number of new macroeconomic developments. The updated Optimum Currency Area (OCA) theory took into account the most recent macroeconomic findings at the time, including expectations-setting, the finite efficacy of monetary policy, credibility issues, time inconsistency, shock nature, business cycle synchronization, and specialization issues.

One significant shift in OCA theory studies since the 1990s has been the increased focus on policy-oriented issues rather than economic criteria. Contemporary OCA theory has acknowledged the significance of political factors. Another way that traditional and new ideas differ from one another is that the latter emphasize the benefits of a fixed exchange rate regime more than the former does. In the OCA theory, contemporary writers first concentrated on economic standards, but this has shifted to policy-oriented considerations.

First of all, modern authors in the OCA field argued about the loss of monetary policy as a huge cost for individual countries. Mélitz[1] emphasized that if economies have distinct initial economic situations, they might require different monetary policies even in the event of symmetric shocks. In Fear of Floating, Calvo and Reinhart[2] stressed that the cost of losing monetary independence will not be high if monetary policy is not used effectively. Another central theme in the new theory is the endogeneity of optimal currency area criteria. It is thought that a currency union removes "borders" between member states, resulting in lower transaction costs and higher trade volumes; De Grauwe and Mongelli[3] concluded that a currency union significantly increases trade between states; high trade can lead to either increased industry specialization with comparative advantage or increased business cycle correlation because of shared demand shocks; Frankel and Rose[4] favored the latter. This is in opposition to the conventional theory, which holds that symmetric shocks are

[1] Mélitz, J. (1991). Brussels on a single money. *Open Economies Review, 2*, 323–336.

[2] Calvo, G., & Reinhart, C. (2002). Fear of floating. *The Quarterly Journal of Economics, 117*(2), 379–408.

[3] De Grauwe, P., & Mongelli, F. (2004). Endogeneities of Optimum Currency Areas. Frankfurt am Main: European Central Bank.

[4] Frankel, J., & Rose, A. (1997). Is EMU more justifiable ex post than ex ante? *European Economic Review, 41*, 753–760.

a necessary condition for a currency union. The business cycle synchronization (BCS) criterion is a key component of the contemporary Optimum Currency Area (OCA) hypothesis. The general consensus is that the cost of giving up independent monetary policies decreases when business cycles are more correlated. Frankel and Rose[5] highlighted that there is evidence to support the hypothesis that the association between business cycles is likely endogenous. They also claimed that trade, and membership in a monetary union, have a significant effect on business cycle synchronization. Moreover, Frankel[6] highlighted the importance of income convergence between potential currency union members. He emphasized that the correlation of income might cause similarities in production and consumption as well as reduction of the possibility of asymmetric shocks. Finally, De Grauwe[7] indicated that different labor market institutions may cause difficulties for currency area members.

This was a satisfactory but not an exhaustive list of researchers and their perspectives on the new OCA criteria since this paper cannot encompass all the details.

2.3. Costs and Benefits of Adopting a Common Currency

One major economic cost of creating a currency union, according to the research on Optimal Currency Areas (OCA), is giving up national authority over monetary policy. The power to independently set monetary policy is forfeited by member nations of a currency union; the significance of this sacrifice depends on how well each nation managed monetary policy prior to joining the union. It is frequently difficult for

[5] Frankel, J., & Rose, A. (1996). A panel project on purchasing power parity: Mean reversion within and between countries. *Journal of International Economics, 40*, 209–224.

[6] Frankel, J. (1999). No single currency regime is right for all countries or at all times. Cambridge: NBER.

[7] De Grauwe, P. (2003). The euro at stake? The monetary union in an enlarged Europe. *CESifo Economic Studies, 49*(1), 103–121.

developing nations, especially those with open capital accounts, to carry out independent monetary policies successfully, especially when there are weak central banking institutions and narrow capital markets. Based on past performance, developing nations have not always been successful in reducing cyclical variations through independent national monetary policy.

Nevertheless, economic literature indicates that developing nations may not suffer a significant economic loss by abandoning their independent monetary policy. Countries with a mixed history of monetary policy implementation before union involvement may be more inclined to commit to macroeconomic stability if they join a currency union, as noted by Barro[8] in 2001.

Shifting focus to the benefits, one big benefit of having a unified currency is that it makes trade and investment amongst union members easier. A shared currency functions as a stimulant for increasing economic activity, which raises income growth in the region by lowering transaction costs in cross-border transactions and decreasing exchange rate fluctuation inside the union. It is suggested that a common currency encourages trade and investment across nations, much like a common language facilitates efficient communication. Different currencies, on the other hand, increase the cost of transactions, which discourages investment, trade, and commerce.

Another dimension of discussion is the context of floating exchange rate regimes that are offered as a substitute for fixed exchange rate regimes in a currency union, but they are known for being more volatile, especially in tiny developing nations with sparse capital markets. So, governments with significant unhedged foreign currency liabilities may be unwilling to permit their currency to float freely due to procyclical

[8]Barro, R. (2001). Currency unions. Unpublished monograph. Harvard University.

monetary policies. It is said that exchange rate volatility creates uncertainty, inhibits investment, discourages commerce, and impedes overall economic progress. A different viewpoint is offered, indicating that some of these negative consequences of fluctuating exchange rates might be mitigated by a single currency. Economically speaking, a group of nations should carefully weigh the advantages of a currency union against the costs of giving up national monetary policy authority before deciding to adopt a common currency. Although putting these costs and advantages into numerical form can be difficult, the OCA literature offers benchmarks for comparison.

These recommendations emphasize that when a number of factors are considered, the advantages of a currency union increase, and the costs decrease. These factors include increased wage and price flexibility among member nations, increased cross-border mobility of labor and capital factors of production, more symmetric shocks, increased openness among the economies within the union, and a larger share of trade among the countries of the region.

In conclusion, it is clear that there are many factors to consider when adopting a single currency. These factors include the advantages of greater economic integration, lower transaction costs, and improved stability, as well as the drawbacks of losing the capacity to control monetary policy. The OCA literature provides a framework for assessing these trade-offs while considering the various policy contexts and economic situations that exist in the various nations that are debating this kind of big economic choice (Madhur (2002)).

2.4. The European Union and the European Monetary Union: The Trailblazing Model

Across history, many regions have attempted forming currency unions. some achieved their goal such as the Eurozone (Euro), East Caribbean Currency Union (XCD: East Caribbean Dollar", and Central Africa Monetary Community (XAF: Central Arican CFA Franc). Other regions still haven't made progress in this domain because of their inability to meet the criteria set by OCA theory. These regions include the South Africa Development Community (SADC), the East African Community (EAC), and the Caribbean Community.

Among the regions that established a common currency, the Eurozone represents one of the most extensive and ambitious examples of a monetary union. It inspired others to explore the possibility of forming currency unions, but none have been able to replicate the Eurozone model on the same scale. The European Union was originally established based on these essential objectives: peace, safety and security, economic and social solidarity, and promotion of the European model of society.

Regarding the first goal, the author Fontaine[9] states that after the two devastating wars, Europe needed to put an end to the regional hatred and rivalry. Regarding the next three objectives, Fontaine expresses:

> "The EU as a unit has much more economic, social, technological, commercial, and political 'clout' than the individual efforts of its member states, even when taken together. There is added value in acting as one and speaking with a single voice as the European Union."

The willingness to encourage regional cooperation and peace among member nations is, thus, the primary source of the idea behind the European Union. There could

[9]Fontaine, P. (2003). Europe in 12 lessons: Documentation. Brussel, Belgium: Office for Official Publications of the European Communities.

not be a European Monetary Union without the European Union. Practically, the Euro has strong political roots (Ngo, 2012).

2.4.1. The Journey of the Euro[10]

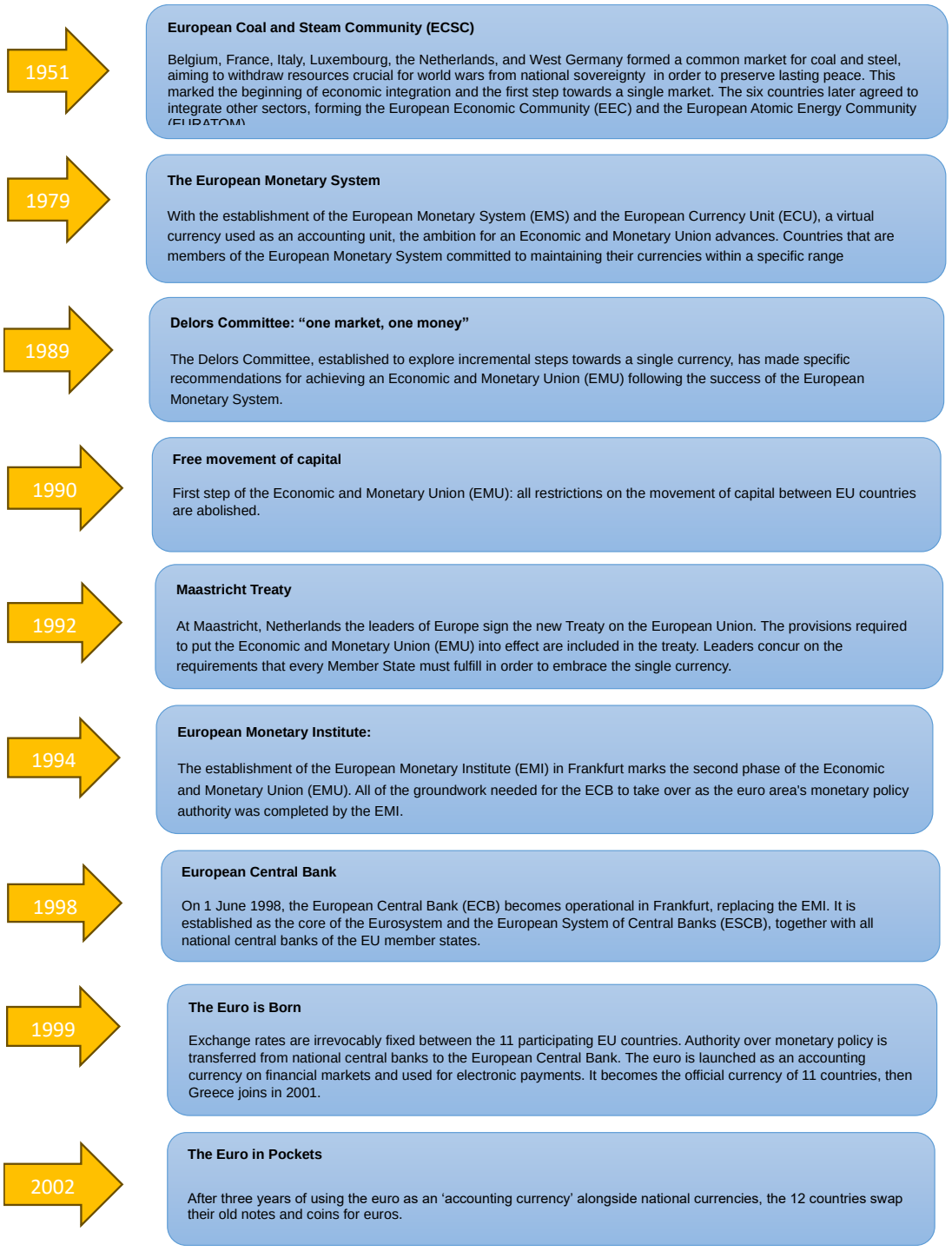


Figure 3: Journey of the Euro

[10] The twelve countries are: Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, and Greece. Between 2007 and 2015, seven new countries joined the Euro area: Slovenia, Cyprus, Malta, Slovakia, Estonia, Latvia, and Lithuania.

2.4.2. Benefits and Costs of Adopting the Euro as a Common Currency

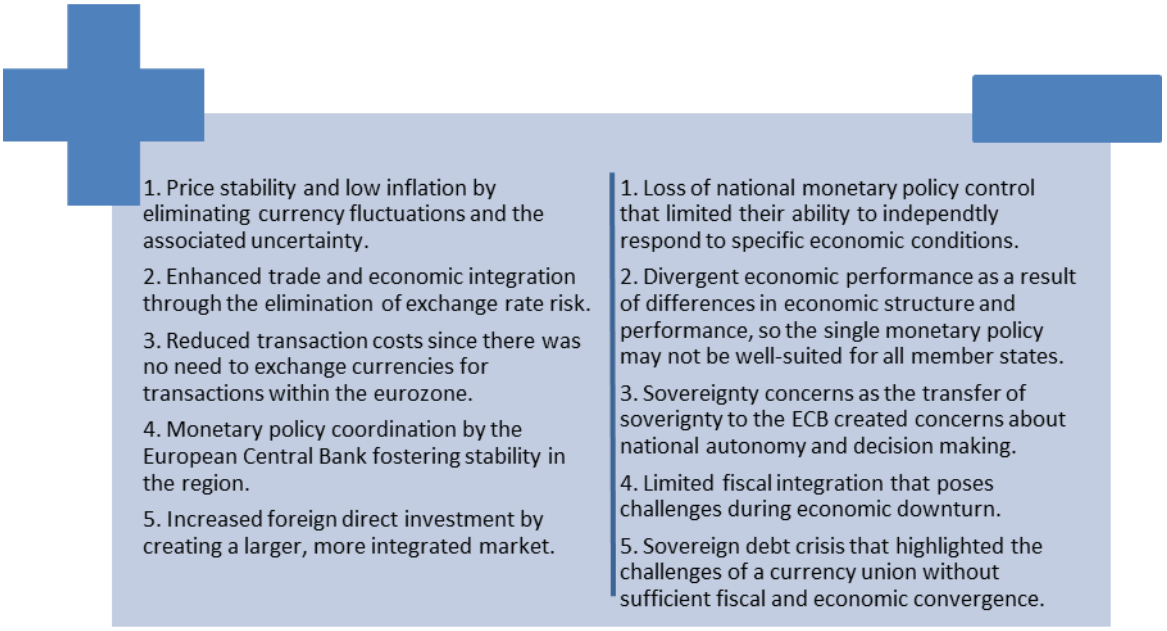


Figure 4: Benefits of Costs of Adopting the Euro

Countries considering establishing a monetary union and adopting a common currency can benefit from the EMU experience through considering the benefits and the costs of the union. This enables them to follow in its steps to reap the benefits and avoid incurring the costs by understanding the flaws in implementing the procedures and meeting the requirements of a successful union. Additionally, further lessons can be drawn from the Maastricht Treaty, encompassing its criteria, implementation, and outcomes.

2.4.3. Maastricht Treaty

The Maastricht criteria acted as an entrance exam for the Eurozone candidates. But before a nation can consider itself eligible for these requirements, it must first become a member of the European Union, which entails meeting various prerequisites.

These include the elimination of trade barriers and tariffs, the removal of passport controls, and the streamlining of customs. Additionally, EU countries must be willing to relinquish some degree of political power to a separate, independent overarching body. Only after meeting these conditions can a nation contemplate entering the Economic and Monetary Union (EMU). To do so, it needs to meet the 'Maastricht criteria,' which stipulate that candidates for the EMU must stabilize and converge in areas such as:

- Price level (inflation): price stability requires that candidate countries have an inflation rate, based on the country's CPI, of no more than 1.5% above the average of the three Euro candidates with the lowest inflation.
- Government budget deficit: Candidate countries must have a ratio of government budget deficit of no more than 3% of GDP. Exceptions were only granted if any of them showed a substantial reduction of the budget deficit level towards the target.
- Total government debt: candidate countries must have a level of government debt no greater than 60% of GDP, unless this figure has been on a consistent decline and is close to 60%.
- Interest rates: the candidates must have a nominal interest rate on long-term government bonds of no more than 2% above that of the three EU members with the lowest such rate.
- Exchange rate: the countries must be members of the European Monetary System and follow the exchange-rate mechanism known as ERM II. A currency in ERM II is allowed to float within a range of ±15% with respect to a central rate against the Euro.

The three criteria for convergence—inflation, interest rates, and exchange rates—are designed to maintain monetary stability and uphold a fixed exchange rate system among member countries. Additionally, the stability of the Euro is ensured by focusing on the government budget deficit and public debt. The main aim of these rules is to safeguard the European Union from the risk of inflation caused by government budget deficits resulting from imprudent spending.

At the time the treaty was signed, many EU members could not meet the strict requirements. Thus, these countries put in place ambitious programs to meet these prerequisites and convinced the European commission that they would be ready to join the common currency area. Consequently, many countries implemented tough austerity programs. They got involved in some legitimate and other questionable practices.

- Legitimate practices:
  - Italy: The government created the Euro tax , a one-off 12 trillion-lira tax, to impact its budget deficit.
  - France: The government increased corporate and value added tax rates on the largest companies.
  - Finland: The government reduced over 45 billion Markka worth of government budget spending between 1991 and 1996.
- Questionable practices:
  - France: The government changed the accounting rules for France Telecom's pension fund, moving 37.5 billion francs into the government budget.
  - Belgium, France, Italy: They practiced "creative accounting" to hide the true level of budget deficit.

In short, the false budget deficit numbers allowed countries like Belgium, France, Italy, and Greece to obtain free passage into the Eurozone. This, according to some researchers, might have catalyzed the debt crisis the EMU suffered from.

The Stability and Growth Pact was issued in Dublin in 1996 to ensure that all members remained fiscally responsible and to strictly enforce the Maastricht criteria. By the Pact, the European Commission could fine countries that run budget deficit above 3% of GDP and distribute the proceeds among other members. The only exception is when a country is in a recession. However, since the establishment of the Pact, no penalties have been imposed under any circumstances since the sanctions would be determined by the number of votes in the Council of Ministers that is often manipulated by large countries such as France and Germany, as they themselves broke the threshold.

Consequently, once some countries became members, they did not bother to prioritize reducing the public debt or managing the excess in budget deficit but focused on maximizing growth even through more debt accumulation.

2.4.4. The Euro: Success, Problems, Progress, and Threats

In January 2019, a document (Whelan, 2019) on the successes, problems, progress, and threats of the Euro was presented during the Monetary Dialogue meeting. This document was requested by the European Parliament's Committee on Economic and Monetary affairs, and it reflected on the first 20 years of the euro project and considered its future. Following are some of the successes and failures of the Euro.

2.4.4.1. Successes

- Inflation Control: Since its founding, the ECB has managed to maintain a period of moderate inflation, which has helped to maintain a low inflation environment within the Eurozone despite occasional variations and worldwide trends.
- Effective Communication: The European Central Bank (ECB) has generally done a good job of informing the public and financial markets about its policies through speeches, press conferences, and high-caliber publications.
- Elimination of Exchange Rate swings: The Eurozone's adoption has eliminated exchange rate swings among its member nations, making transactions easier for both consumers and businesses.
- Payment System Efficiencies: The single currency has made payment systems more efficient, especially when it comes to the real-time settlement of big transactions using the Euro system’s TARGET system.
- Financial Integration: During the financial crisis, worries about default risk in periphery economies caused a brief reversal of the first rises in financial integration, particularly from 2002 onwards. Financial integration has partially recovered in recent years.

2.4.4.2 Problems

2.4.4.2.1 Fiscal Policy and Macroeconomic Adjustment

- Predictable Fiscal Policy Failure: The lack of a sizable federal budget for centralized transfers during asymmetric shocks made it impossible for the

euro to execute a sound fiscal policy.

- Pact for Stability and Growth (SGP) Ineffectiveness: There was doubt over the efficacy of the Stability and Growth Pact due to large economies such as Germany and France breaching its terms, despite the agreement's stated goal of lowering fiscal debt.

2.4.4.2.2. Sovereign Default

- Delayed Recognition of Default Risk: In contrast to forecasts, the likelihood of a sovereign default in the euro region was not recognized right away.
- Confusion and Denial: The risk of sovereign default was not sufficiently communicated by the European Central Bank (ECB) or policymakers. Widespread denial of the possibility of default affected policy reactions.

2.4.4.2.3 Issues with Financial Stability

- Harmonization of Private Borrowing Rates: When the risk of devaluation was removed, private borrowing rates likewise became more uniform, which resulted in a significant rise in private debt in the periphery euro area nations.
- Banking Sector Instability: Systemic banking pressures have a serious negative influence on the economy, making the banking sector unstable. While playing a crucial role, the ECB encountered difficulties while interacting with insolvent banks.

2.4.4.2.4 Economic Performance

- Poor Growth Performance: From 1999 to 2017, the average annual growth rate of the euro area's economy was 1.37 percent, a decrease from 2.17 percent in the preceding ten years. This represents a bad overall performance in terms of economic growth.
- ECB's Role: Even though the ECB helps maintain macroeconomic stability, it was criticized for its tardiness in responding to economic weakness, which may have prevented the economy from growing as much as it could have.

To sum up, the EU's experience with the Euro comprises an invaluable set of lessons that countries considering forming a monetary union and adopting a common currency can learn from. (Ngo (2012))

2.5 BRICS

The global economy is undergoing an ever-changing complex pattern of economic trends and political relationships. Globalization has brought about a shift in economic and political power away from the advanced economies of the West. What remains to be seen is where the new epicenter of the world economy would be.

Several regions around the world have come together for economic cooperation and discussions, but they do not have a formal monetary union. Such regions include the G7, G20, ASEAN, MERCUSOR[11] , and BRICS. These groups aim to facilitate economic, political, security, military, educational, and sociocultural integration among

[11] G7: Canada, France, Germany, Italy, Japan, United Kingdom, United States.
G20: Argentina, Australia, Brazil, Canada, China, France, Germany, India, Indonesia, Italy, Japan, Mexico, Russia, Saudi Arabia, South Africa, South Korea, Turkey, United Kingdom, United States, European Union. ASEAN: Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, Vietnam.
MERCOSUR: Argentina, Brazil, Paraguay, Uruguay (Venezuela is a full member but has been suspended since December 2016).

its members, but they do not involve a shared currency or a formal monetary union. However, several studies were conducted to examine the feasibility of establishing a common currency area within some of these groups including ASEAN, MERCUSOR and BRICS.

2.5.1 Background

In 2003, high-ranking officials from Brazil, India, and South Africa convened in Mexico to discuss their shared interests in the pharmaceutical trade. India, a major global producer of various drugs, particularly those essential for treating HIV-AIDS, sought to provide affordable medications to Brazil and South Africa. However, stringent intellectual property laws established by the World Trade Organization hindered smooth trade among these nations. Prior to this meeting, the three countries had formed the IBSA grouping to address intellectual property and trade issues and to collectively challenge Global North countries regarding inequitable agricultural subsidies. Guided by the principle of South-South cooperation, this collaboration aimed to foster solidarity among developing nations.

The roots of such collaboration can be traced back to the 1940s when the United Nations initiated its first technical aid program to support trade between post-colonial states in Africa, Asia, and Latin America. This spirit of cooperation was formally recognized with the establishment of the United Nations Day for South-South Cooperation in 2004. In 2013, the institution overseeing this cooperation was renamed the United Nations Office for South-South Cooperation. Presently, the pact encompasses 42 member states, collectively representing four billion people and boasting a combined market of $16 trillion, approximately 20% of global merchandise

imports as of 2023. This longstanding agenda to increase trade between Southern countries forms the pre-history of the BRICS (the tricontinental).

Jim O'Neill, a global economist at Goldman Sachs, first proposed the acronym BRICs in 2001. In the early 21st century, Brazil, Russia, India, and China were considered the countries with the greatest potential for growth, but no one anticipated that they would ever work closely together. However, the four BRICs met for the first time in 2009, and South Africa joined them two years later, making the BRICS group a five-member organization (Lowe, 2016).

2.5.2 Objectives

The core objectives of the BRICS are development, influence in international affairs, and cooperation. Among the principal objectives of the BRICS are the following:

- Economic cooperation: promoting growth, trade, and collaboration among members while enhancing the BRICS economies' market accessibility.
- Development finance: Establishing organizations like the NDB(New Development Bank) and the CRA(Contingent Reserve Arrangement) to provide funding for development and infrastructure projects in participating countries.
- Political coordination: Increasing political dialogue and cooperation on global concerns, like adapting global governance institutions to the changing global economy and giving emerging economies more clout and representation.
- Social and cultural exchanges: Encouraging interpersonal connections and respect for each other's cultures while simultaneously fostering exchanges between member countries.

- Technology and innovation: Increasing cross-national cooperation in the domains of science, technology, and innovation to foster international knowledge sharing, capacity building, and technical progress among participating countries.
- Sustainable development is the process of advancing ecologically sound and sustainable development practices while cooperating to meet specific targets.
- Peace and security: Encouraging peace, stability, and security on a national and worldwide level while tackling threats to common security, like terrorism.
- Developing nations should work together more closely, share best practices, and fund projects that advance the Global South's general development. This is known as "South-South" cooperation.

2.5.3 Overview of BRICS Countries (Bajpai, 2023)

Because of the substantial differences among its member nations—Brazil, Russia, India, China, and South Africa—in terms of their political systems, economic frameworks, cultural legacies, and developmental stages, BRICS is seen as a heterogeneous organization.

Table 1: Overview of BRICS Countries

Brazil	Brazil is a relatively new democracy, therefore issues with wealth inequality, corruption, and mounting debt must be addressed. Brazil's strength lies in its broad economy, which includes biofuels, aerospace-related high-tech industry, agricultural exports, and a high level of energy security. It should have the capacity to grow more quickly in the future because of these characteristics.
China	China has become a global economic giant due to its focus on infrastructure projects, attracting inward investment and allowing home-grown companies to

	thrive. This has created a growth gap between China and other BRICS countries. As the world's manufacturing workshop, China has enormous foreign exchange reserves, enabling Chinese companies to develop into TNCs. Despite challenges like the credit boom, Covid 19 crisis, and declining property sales, China has been the biggest contributor to global growth since the 2008 financial crisis, shifting its economy towards services and domestic consumption.
India	India has a strong manufacturing and services sector, with a strong offshoring and outsourcing sector, particularly in IT services and customer call centers. Its youthful population is known for innovation and entrepreneurialism. However, the country faces challenges such as poverty in rural areas, poor transport infrastructure, energy shortages, corruption, and bureaucracy. Despite these challenges, India's youth will ensure a healthy demographic profile for decades, providing potential for rapid economic growth.
Russia	Russia, the world's largest country and the eighth-largest economy in 2022, is actively diversifying its economy to reduce dependence on oil and gas exports. In 2021, it set an ambitious goal to increase non-commodity and non-energy exports by 70% by 2030. However, the ongoing war with Ukraine, weak democracy, high corruption levels, and an uncompetitive manufacturing sector are causing economic shrinkage. Despite these challenges, Russia is classified as an 'upper middle-income' economy by the World Bank, and its strengths in scientific research and technological development could boost future growth.
South Africa	South Africa has made significant progress since the end of apartheid, and its surprise entry into the BRICS alliance is due to geopolitical reasons. It links the original BRIC countries with the most advanced economy on a fast-growing continent, providing new trade and investment opportunities. South Africa has abundant mineral resources, modern infrastructure, and a strong financial sector. However, concerns include low educational attainment, high unemployment, and wildcat strikes. The hope is that its export-led economy will benefit from global demand.

2.5.4 Strengths and Weaknesses of BRICS

BRICS is a grouping of major emerging economies formed with the aim of fostering cooperation, economic growth, and influence among its member nations. BRICS has demonstrated both strengths and weaknesses over the years.

2.5.4.1 Strengths

- BRICS is a group of countries with vast populations and abundant resources that collectively contribute a substantial portion of global GDP. This economic powerhouse allows them to exert influence in international financial institutions and negotiate favorable trade agreements.
- BRICS nations have diversified their trade relationships, reducing dependency on Western markets, and tapping into each other's growing consumer bases.
- BRICS has also provided a platform for member countries to address global issues and push for reforms in international organizations, presenting a united front on global challenges like climate change and poverty.
- The New Development Bank (NDB) was established by BRICS members to support infrastructure and sustainable development projects in emerging economies, promoting economic growth and stability.

2.5.4.2 Weaknesses

- The BRICS group faces challenges due to its diverse economic, political, and social interests, which can hinder cohesive decision-making and potentially dilute its effectiveness.

- The group lacks a well-defined institutional framework similar to that of the EU, which can lead to difficulties in coordinating policies and resolving disputes.
- Economic disparities among members can result in imbalanced benefits, with larger economies like China dominating decision-making.
- Geopolitical tensions, such as border disputes and political rivalries, can also undermine the group's efforts to present a united front and limit its ability to address global challenges.

To accomplish its goals, BRICS must navigate these complexities. To optimize the benefits of this significant geopolitical alliance, member countries of BRICS must confront these issues as the organization develops and adapts.

2.5.5. Achievements and Failures

2.5.5.1. Achievements

- Crafted and projected a non-Western view of the world.
- Strengthened multipolarity, acting as a bridge between the Global North and the Global South.
- Contributed to improving emerging economies' quotas in IMF and World Bank.
- Established the New Development Bank (NDB) and the Contingent Reserve Arrangement (CRA).
- Emphasized deploying "all policy tools" and adopting "innovation-driven development strategies" to enhance economic resilience.
- Perhaps, the most important and comprehensive achievement was the creation of the Trade Ministers Meeting mechanism in 2011, the year South Africa

joined the organization. Since then, the mechanism has concentrated on tackling shared goals and difficulties with the participation of all members, assisting in the progressive improvement of the BRICS economic collaboration, particularly in the areas of commerce and investment. The following are some consequences of this partnership that have been attained at the bloc's summit level since then:

Table 2 Summit Decisions and Recommendations

Summit	**Decisions and Recommendations**
3rd Summit – Sanya, China (2011)	South Africa's official entry. Emphasis on global governance reform, renewable energy use, and commitment to UN Millennium Development Goals.
4th Summit – New Delhi, India (2012)	Discussions began on creating the New Development Bank. An agreement to facilitate credit in local currencies was signed to boost trade and investment.
5th Summit – Durban, South Africa (2013)	Themed around partnership for development and industrialization in Africa. Initiated the "outreach" dialogue for broader cooperation and agreed on the BRICS Trade and Investment Cooperation Framework.
6th Summit – Fortaleza, Brazil (2014)	Theme focused on inclusive growth. The New Development Bank and the Contingent Reserve Arrangement were established, enhancing investment security in member economies. The BRICS Trade and Investment Facilitation Action Plan was agreed upon.
7th Summit – Ufa, Russia (2015)	Signed NDB and CRA agreements, emphasizing the "Strategy for the BRICS Economic Partnership" for diversified trade and investment. A cooperation agreement between BRICS Development Banks and the NBD was signed.
8th Summit – Goa, India (2016)	Discussions on global economic recovery, including fiscal responsibility, development of NDB, and investment attraction for economic growth.
9th Summit – Xiamen, China (2017)	Adoption of multiple action plans and agreements, including the BRICS Action Plan on Economic and Trade Cooperation, aiming to enhance innovation and customs

	cooperation. Endorsed the Outlines for BRICS Investment Facilitation.
10th Summit – Johannesburg, South Africa (2018)	Focused on inclusive growth in the 4th Industrial Revolution. Established the NDB Americas Regional Office and the BRICS Innovation Network (iBRICS).
11th Summit – Brasilia, Brazil (2019)	Committed to transparent international trade and launched several initiatives, including the BRICS Innovation Network and the Women's Business Alliance.
12th Summit – Moscow, Russia (virtual, 2020)	Addressed COVID-19 crisis cooperation, supporting low-income countries and endorsing the expansion of the NDB. Highlighted the bloc's resilience and attractiveness for investments.
13th Summit – New Delhi, India (virtual, 2021)	Advanced BRICS cooperation in customs matters, agricultural cooperation, and green tourism. Emphasized the use of technology for SDGs achievement and advanced investment cooperation through initiatives like PartNIR.
14th Summit –China (2022)	A major development on the summit was discussing the creation of a new, basket type reserve currency. The currency, combines BRICS currencies and is backed by precious metals.
15th Summit – Johannesburg, South Africa (2023)	Several countries have expressed interest in joining the BRICS group. At the summit, Argentina, Egypt, Ethiopia, Iran, Saudi Arabia, and the United Arab Emirates have been invited to join the bloc. Full membership would take effect on 1 January 2024. In addition, the creation of a new BRICS common currency was suggested by Brazil's president and the Russian prime minister. In the "August Statement" , the bloc concluded, "Such a currency increases our payment options and reduces our vulnerabilities." Moreover, "it presents a clear path away from the greenback throughout their trade dealings."

2.5.5.1.1. NDB

The New Development Bank (NDB) is an international financial institution established in 2014 by the BRICS countries: Brazil, Russia, India, China, and South Africa. Originally named the BRICS Development Bank, it was conceptualized in 2012 and officially formed with the signing of the treaty at the 6th BRICS Summit in Fortaleza, Brazil, in 2014. The NDB's primary objective is to finance sustainable development and infrastructure projects within BRICS member countries and other emerging economies. It operates by providing financial support for both public and private projects through various means. Notably, in 2018, the NDB achieved 'Observer' status at the United Nations General Assembly, further solidifying its international recognition.

- Objectives of NDB
  - Primary goal: Financing infrastructure development projects in emerging economies
  - Serves as an alternative to the World Bank and IMF, especially regarding interest rates
  - Aims to enhance financial cooperation among signatory countries
  - Establishes a broad network of global partnerships with other multilateral development institutions
  - Focuses on promoting projects related to infrastructure and sustainable development
  - Strives for a balanced project portfolio, taking into account financial requirements and geographic locations

- Achievements of NDB
  - Local currency financing: Approximately 27% of project approvals in local currencies to mitigate currency volatility risks
  - Positive ratings: Earned positive ratings from agencies, enabling competitive fund-raising and cost savings for member borrowers
  - Operational growth: Demonstrated operational growth despite geopolitical challenges
  - COVID-19 response: Initiated a $10 billion Emergency Assistance Program in response to the pandemic
  - Collaborative partnerships: Engaged in collaborative efforts with development banks like CAF (Development Bank of Latin America), AIIB (Asian Infrastructure Investment Bank), and the World Bank Group
  - Credit rating: Holds a credit rating of AA+
  - Bond issuance: Successfully issued various bonds, including "green bonds" in 2016
  - Approved projects: Over 42 projects approved, showcasing the NDB's active role in infrastructure development and financing.
- Concerns Associated with NDB
  - Loan Approval Discrepancy: Approved over $12 billion in loans, but actual disbursement is notably low, less than $1 billion
  - Impact of Political Tensions: Political tensions in member countries have posed challenges for NDB operations
  - Lack of Clarity in Sustainability Definition: The definition of sustainability lacks clarity in certain projects

- Reliance on Borrowing Country's Standards: NDB currently relies on the socio-environmental standards of the borrowing country
- Need for Internal Compliance Standards: Highlights the necessity for the development of internal compliance standards
- Government-Backed Projects: A substantial portion of NDB projects is government-backed, indicating a need for portfolio diversification
- Attracting Private Investments: Necessitates efforts to attract private investments for greater financial sustainability.

2.5.5.1.2. CRA (Contingent Reserve Arrangements)

- The CRA was Established in 2015 during the 7th BRICS summit in July.
- It is considered a competitor to the International Monetary Fund (IMF) and, alongside the BRICS New Development Bank (NDB), exemplifies increasing South-South cooperation.
- The BRICS CRA aims to provide short-term liquidity support to members through currency swaps, mitigating Balance of Payments (BOP) crisis situations.
- Intends to help signatory countries address short-term liquidity pressures, offering mutual support and reinforcing financial stability.
- Contributes to strengthening the global financial safety net and acts as an additional line of defense, complementing existing international arrangements such as those from the IMF.

2.5.5.2. Failures of BRICS

- Dismay among a majority of members (Brazil, South Africa, and India) regarding the minority view (of Russia and China) on the reform of the UN Security Council.
- Limited tangible action following numerous meetings and documents produced by BRICS.
- Asymmetry in the relationship, with China's contribution to the world GDP surpassing the combined GDP of the other four members.
- Complications arising from China's ambition to become the No.1 power, affecting Asia and causing strain in China-India relations.
- Tensions within BRICS due to different positions taken on the Russia-Ukraine conflict.
- Adverse effects on Brazil and South Africa, facing Western pressure to condemn Russia, highlighting internal imbalances within BRICS.
- Russia and China often acting as a sub-group within the BRICS, impacting overall cohesion.

2.5.6. An Optimistic Perspective

The case of the BRICS has been controversial since its birth with many opposing standpoints on the viability and feasibility of its objectives. It has had many admirers and supporters, as well as skeptics and critics. Nevertheless, 2023 was a highly impactful year for the BRICS group. The significant progress made in joint policy coordination among these major emerging economies, coupled with the growing interest from several other nations eager to join this influential bloc, marked a notable

development in the global economic and geopolitical landscape. Russia and China are already leading the way in offering the world a major counterbalance to Western political unions, such as the G7 (Group of Seven). And with India, Brazil and South Africa all having deep diplomatic and economic ties with either China, Russia or both, the BRICS collective is now becoming increasingly aligned across a number of important issues. Amidst the escalating global polarization observed over the past couple of years, the bloc has intensified its endeavors to promote its economic interests. This proactive approach is contributing to the development of resilient alternative financial systems, gaining swift and widespread recognition on a global scale.

The BRICS nations seem to be actively pursuing a crucial objective: reducing dependence on the US dollar. Even before the conflict in Ukraine, both Russia and China had adopted policies favoring local currencies, diminishing the role of the dollar amid deteriorating relations with the United States. By the first quarter of 2020, the dollar's share in bilateral trade between Russia and China dropped below 50%, a significant decline from nearly 90% just five years earlier. At the 14th BRICS Summit, there was an emphasis on creating a common BRICS payment system (BRICS Pay) for retail transactions among member countries, building on earlier efforts by China and Russia to establish cross-border payment systems as alternatives to the US-led SWIFT system. A notable development is the BRICS bloc seriously exploring the introduction of a reserve currency based on a basket of their domestic currencies (Chinese yuan, Russian ruble, Indian rupee, Brazilian real, and South African rand). This progress has spurred interest in joining BRICS, indicating a growing global appeal for this association.

The intra-BRICS trade relations have a sound positive impact on economic performance in these countries, as well as the potential to create strong economic ties within the member countries. Cooperation between the BRICS countries can have a significant influence on the globalization of the world economy and makes it easy to spread and create trade relationships with other regions of the continent through their participation in international trade relations, international migration of human resources, and international investments (Rahman et al., 2020).

The BRICS alliance, despite sharing some advantages, is seen as a formidable global grouping due to their unique strengths and attributes. They are seen as a counterweight to Western- dominated organizations like the World Trade Organization, World Bank, and IMF. In 2014, the BRICS announced the creation of the New Development Bank (NDB) to finance infrastructure and sustainable development projects. They also proposed establishing a $100 billion fund to stabilize currency markets (Lowe, 2016). At the 14th BRICS summit in June 2022, economic cooperation was discussed, including developing alternative payment systems, a non- dollar financial system, a common payment system (BRICS Pay), and increased trade using domestic currencies (Silk Road Briefing, 2023b).

During BRICS summit 2023, Brazil's President Lula da Silva and Russian Foreign Minister Sergey Lavrov have voiced support for the idea of a common currency among BRICS nations. "I am in favor of creating, within the BRICS, a trading currency between our countries, just like the Europeans created the euro," said Lula during a speech in April.

However, other members such as the Indian Foreign Secretary Vinay Mohan Kwatra has been cautious in public on this matter. He indicated that the grouping's

focus will remain on deepening trade in national currencies and that common currency discussions have several prerequisites before one can even talk about a common currency framework (Silk Road Briefing, 2023a).

The potential BRICS currency union has generated interest both within and outside the bloc. Scholars have studied economic integration, examining BRICS intra-trade development and the feasibility of creating a monetary union. One study reveals that BRICS have the potential to establish international trade among themselves, managing trade costs, taxes, and tariffs (Rahman et al., 2020). However, their strength could be diminished by their individual ambitions, which could create renewed rivalry. Each country represents a different kind of emerging market, and each faces different obstacles and challenges that may prevent its individual global ambitions and ability to significantly change the current world order (Lowe, 2016). Some studies have also examined BRICS potential for monetary integration taking China as the anchor economy against which the other BRICS countries are compared. The discussion resulted in the conclusion that while some BRICS countries have shown economic convergence with China in certain aspects, there are significant variations in trade intensity, exchange rate stability, inflation convergence, and real interest rates. The study also revealed that export diversity is decreasing across BRICS, and labor market flexibilities vary, posing challenges for a unified monetary policy. These factors highlight the complexities and considerations that would need to be addressed in the feasibility of a BRICS Monetary Union with China and Brazil being the most promising contenders to the US. So, China and Brazil can begin monetary integration initiatives first to gain stability in their exchange rates while providing stability and certainty to the rest of BRICS (Quah (2016)).

My research builds upon those two papers by Rahman et al. and Quah. However, my study adopts a more comprehensive, multilateral perspective diverging from the anchor economy framework. This approach does not pick any of the BRICS countries as a comparative baseline, aiming instead at capturing trade and economic convergence dynamics across all member countries equivalently. So, my study offers a contemporary and balanced evaluation of the synergies and economic convergence within BRICS countries gauging their readiness for a unified monetary system in light of evolving trade and policy dynamics.

CHAPTER 3

DATA

The tests in this research use data over a period of 22 years, from 2001 to 2022 with a few exceptions. For the tests of trade integration among the BRICS countries, the data is collected for the period extending from 2008 to 2021. The FDI analysis uses data over a period of eleven years, from 2011 to 2021. Economic indicators' data are sourced from several data sources including World Bank, OECD, and IMF databases. The bilateral trade is obtained from Trade Map ITC, Gravity indices are sourced from CEPII, Minimum Wage Rates are taken form "countryeconomy", and other variables are collected from various other sources including but not limited to "macrotrends" and "landportal.

In addition to the limitations on the availability of data required for testing trade intensity and FDI that necessitated shortening the observed period from 22 to 14 and 10 years respectively, the study of price flexibility was hindered by the complexity of the procedures and lack of some required data for this study. Therefore, I studied wage flexibility and inflation stability instead since a stable and low inflation rate is an essential requirement for a monetary union formation, and its interaction with wage growth rates impacts economic stability in the BRICS nations

CHAPTER 4

METHODOLOGY

4.1 The OCA Criteria Tests

Table 3: OCA Criteria Tests and Econometric Models

OCA Criterion	*Tests and Analysis*
Symmetry of Shocks	Correlation and Fixed Effects Panel Regression with Interaction Terms $Yit=\alpha+\beta Xit+\gamma Zit+\delta(Di\times Zit)+\mu i+\varepsilon it$
Labor Mobility	Descriptive analysis through graphs and qualitative analysis
Price and Wage Flexibility	Descriptive statistics of inflation and minimum wage growth rates and PVAR analysis to study the relationship between wage growth rate and inflation controlling for other economic factors. $\text{inflation}t=\beta 0+\beta 1\times\text{inflation}t-1+\beta 2\times\text{gdpgrrate}t-1+\beta 3\times\text{realint}t-1+\beta 4\times\text{consumption}t-1+\beta 5\times\text{diff\_unemp}t-1+\beta 6\times\text{diff\_indust}t-1+\beta 7\times\text{diff\_exchrate}t-1+\beta 8\times\text{mwmgr}t-1+\epsilon t$ $\text{mwmgr}t=\beta 0+\beta 1\times\text{inflation}t-1+\beta 2\times\text{gdpgrrate}t-1+\beta 3\times\text{realint}t-1+\beta 4\times\text{consumption}t-1+\beta 5\times\text{diff\_unemp}t-1+\beta 6\times\text{diff\_indust}t-1+\beta 7\times\text{diff\_exchrate}t-1+\epsilon t$
Fiscal Transfer Mechanism	Qualitative analysis
Convergence Criteria	Inflation: descriptive analysis Inflation, Public Debt, and Budget Deficit: conditional beta convergence tests with control for major economic factors

	infl_growth=$\beta 0+\beta 1\times$lag_inflation+$\beta 2\times$gdpgrrate+$\beta 3\times$deficitGDP+$\beta 4\times$tradegdp+$\beta 5\times$realint+ϵ debt_growth=$\alpha+\beta 1\times$log_DebtGDP+$\beta 2\times$deficitGDP+$\beta 3\times$inflation+$\beta 4\times$tradeGDP+$\beta 5\times$realint+$\mu i+\epsilon it$ growth_deficit%=$\alpha+\beta 1\times$lag_deficitGDP+$\beta 2\times$DebtGDP+$\beta 3\times$inflation+$\beta 4\times$gdpgrrate+$\beta 5\times$realint+$\beta 6\times$tradebal+$\mu i+\epsilon it$
Trade Integration	Descriptive analysis of trade openness (graphs), descriptive analysis(summary data) of TII, Pooled OLS with Robust Standard Errors to study the economic drivers of TII, qualitative research on latest updates on BRICS trade, and summary statistics of export diversification and concentration (ECE, EDI) of BRICS countries. Pooled OLS: TII=$\beta 0+\beta 1\times$expinflation+$\beta 2\times$impinflation+$\beta 3\times$expgdpgrrate+$\beta 4\times$impgdpgrrate+$\beta 5\times$expexchrate+$\beta 6\times$impexchrate+$\beta 7\times$exprealint+$\beta 8\times$imprealint+$\beta 9\times$expFDI+$\beta 10\times$impFDI+$\beta 11\times$Distkm+ϵ
Financial Integration	Descriptive analysis (summary data) of BRICS FDI, correlation analysis between GDP growth rate and FDI, and qualitative analysis based on previous empirical research that uses data on FDI for the years 2011 through 2021
Political and Legal Readiness	Descriptive analysis of political stability, correlation analysis between political stability, institutional quality, and economic factors, qualitative analysis of political will and commitment of a shared vision, and qualitative research on legal readiness
Monetary Policy Coordination	Qualitative analysis on central banks' independence

The BRICS nations—Brazil, Russia, India, China, and South Africa—are debating a significant proposal to create a single currency similar to the euro in Europe. This might facilitate trade and enable these nations to cope with economic swings together. The primary objective of this research is to determine the feasibility of this project through detecting the BRICS economic, political, and legal conformity with the Optimal Currency Area (OCA) theory criteria (original and expanded).

4.2. The OCA Criteria Analysis

The OCA criteria include the following, which will be examined one by one.

- Symmetry of Economic Shocks: Examines if BRICS economies experience similar types of economic shocks and have similar responses to global shocks.
- Labor Mobility: Assesses the extent of labor mobility within and among the BRICS countries.
- Price and Wage Flexibility: Detects the flexibility of prices and wages as a response to economic changes.
- Fiscal Transfer Mechanism: Determines if there are mechanisms for fiscal transfers between BRICS nations in case of asymmetric shocks.
- Convergence of Economic Indicators: Assesses whether the involved countries are converging or diverging in their main economic indicators, which has significant implications concerning their ability to coordinate their policies in a monetary union.
- Trade Openness and Integration: Measures the openness of the BRICS countries to international trade and the degree to which their economies are interconnected through trade.

- Export Diversification: Measures the extent to which a country's export portfolio is varied across different products and services or across different geographic markets.
- Financial Integration: Determines the degree of cross-border investment inside the bloc and the openness of capital flows.
- Political and Legal Readiness: Assesses political stability and governance, commitment to a shared vision, and harmonization of legal frameworks.
- Monetary Policy Coordination: Involves the collaboration among different countries' central banks or monetary authorities to align their monetary policies, such as interest rates and money supply control.

Some of these criteria will be analyzed quantitatively, while others will be qualitatively analyzed based on the availability of data and the breadth of the idea.

4.2.1. Symmetry of Shocks

4.2.1.1. Correlation Analysis

To obtain an initial glance at the strength and direction of the linear relationship between the GDP growth rates, inflation rates, and exchange rates of the BRICS countries, I ran a correlation analysis test.

4.2.1.1.1. GDP Growth Rate

For the GDP growth rates, I got the following results.

Table 4: Correlation analysis GDP growth rates

GDP Growth Rate	BRAZIL	RUSSIA	INDIA	CHINA	SOUTH AFRICA
BRAZIL	1.00				
RUSSIA	0.67* 0.0007	1.00			
INDIA	0.33 0.14	0.23 0.31	1.00		
CHINA	0.61* 0.0026	0.67* 0.0007	0.51* 0.015	1.00	
SOUTH AFRICA	0.73* 0.0001	0.8* 0.00	0.66* 0.0009	0.75* 0.00	1.00

- Regarding GDP growth rates, the correlation matrix exhibits a combination of symmetry and asymmetry among the BRICS countries. There is a considerable symmetry in South Africa revealed by the country's high and statistically significant positive correlation with the other BRICS nations. In addition, there exists a strong positive connection between Brazil, Russia, and China, indicating a degree of symmetry in their reaction to shocks.
- The low and statistically insignificant correlation coefficients of India suggest asymmetry with Brazil and Russia implying different reactions to economic shocks. However, they show varying degrees of symmetry with the China and South Africa.
- China's strong and positive correlations show varying degrees of symmetry with the other BRICS countries, the strongest being with South Africa, and the weakest being with India.

In general, the existence of statistically significant positive correlations suggest that these countries are reasonably symmetrical in their responses to economic shocks so that they are likely to be similarly affected by economic shocks albeit with different

intensities, which means that this symmetry is not constant throughout all pairs of the BRICS countries.

4.2.1.1.2. Inflation Rate

For inflation, I got the following results.

Table 5: Correlation analysis inflation rates

Inflation	BRAZIL	RUSSIA	INDIA	CHINA	SOUTH AFRICA
BRAZIL	1.00				
RUSSIA	0.53* 0.011	1.00			
INDIA	-0.22 0.32	-0.16 0.47	1.00		
CHINA	-0.28 0.21	-0.24 0.28	0.26 0.24	1.00	
SOUTH AFRICA	0.18 0.43	0.28 0.21	0.26 0.25	-0.1 0.65	1.00

The moderately positive inflation correlation between Brazil and Russia suggests some symmetry in their inflation shocks, and it seems that these are the only two countries with significant coefficients implying less symmetry and the role of country-specific variables rather than similar external shocks or shared economic strategies in affecting the BRICS countries' inflation dynamics.

From a policy perspective, the mix of symmetry and asymmetry among the BRICS nations requires coordinated policy responses. Countries with strong positive correlations may benefit from regional and global integration, while those with weaker correlations such as India, may require policies serving its unique characteristics and prioritizing national policies over regional strategies. Therefore, one-size-fits-all policies may not be effective. Understanding the degree of symmetry in shocks can help

develop suitable risk management tools and balance national interests with collective action.

4.2.1.1.3. Exchange Rates

For the exchange rates, I got the following results.

Table 6: Correlation analysis exchange rates

Exchange rates	BRAZIL	CHINA	INDIA	RUSSIA	SOUTH AFRICA
BRAZIL	1.00				
CHINA	-0.14 0.52	1.00			
INDIA	0.85* 0.00	-0.57* 0.006	1.00		
RUSSIA	0.89* 0.00	-0.46* 0.03	0.95* 0.00	1.00	
SOUTH AFRICA	0.86* 0.00	-0.48* 0.025	0.96* 0.00	0.96* 0.00	1.00

The exchange rates of Brazil, Russia, India, and South Africa show significant positive correlations that suggests symmetry in external shocks. Therefore, it is easier for them to coordinate their monetary and economic policy and establish a monetary union. On the other hand, China shows divergent economic responses, which poses challenges to a unified monetary policy approach. Adaptable policy tools, possible fiscal transfers, and structural modifications would be good means to accommodate these variations and make any prospective monetary union effective.

4.2.1.2 Fixed Effect Panel Regression with Interaction Terms

To allow for a more nuanced examination of relationships, I ran a panel data analysis with interaction terms test.

This method helps identify how different BRICS countries respond to similar shocks, indicating symmetry or asymmetry in their responses.

First, I constructed variables that represent shocks in my analysis. These are *world GDP growth rate*, *global inflation*, and *Fed Funds interest rates* that represent global interest rates. Then, I conducted a fixed effects panel regression where I included interaction terms between the shock variables and country dummy variables. This approach allows me to capture how the impact of shocks differs across countries.

4.2.1.2.1. Model Specification

$$Yit=\alpha+\beta Xit+\gamma Zit+\delta(Di\times Zit)+\mu i+\varepsilon it$$

- *Yit* is the dependent variable (e.g., GDP growth rate, inflation, exchange rates) for country *i* at time *t*.
- *Xit* represents control variables (e.g., trade, government spending, political stability).
- *Zit* is the shock variable.
- *Di*×*Zit* are interaction terms between country-specific dummies (*Di*) and the shock variable (*Zit*), allowing the shock's effect to vary by country.
- μi captures fixed effects for each country.
- εit is the error term.
- The coefficient on *Zit* shows the average effect of the shock for the omitted category against which other categories are compared.
- Coefficients on interaction terms (*Di*×*Zit*) indicate how the shock's effect on the dependent variable for a specific country differs from the that for the omitted country . Significant coefficients suggest asymmetry in shock responses.

4.2.1.2.2. Dependent Variables

For the dependent variables, I chose:

- *GDP Growth Rate:* It is a principal measure of economic performance that reflects the ability of economies to grow in the face of external shocks and is a fundamental indicator of economic convergence.
- *Inflation:* Price stability is one of the main concerns for nations considering adopting a shared currency. It can be evaluated by examining inflation. Alignment in monetary policy requires symmetrical inflation reaction to shocks.
- *Exchange Rate:* Exchange rates represent external competitiveness and can be influenced by global financial circumstances and policy actions; therefore, observing changes in exchange rates is crucial for enhancing economic convergence required for a creation of a single currency.

4.2.1.2.3 Independent Variables

For the Independent Variables, I chose:

- *Trade:* Including trade in the regression equation allows for assessing the effect of higher trade openness on the country's resilience to global shocks and their impacts on economic indicators.
- *Government Spending:* It is a key fiscal policy tool that can affect economic growth, inflation, and exchange rates. Including it as an independent variable can allow for analyzing its role in mitigating or worsening the effects of external shocks, providing insights into how well fiscal policy keeps the economies of the BRICS nations stable.

- *Political Stability:* Political stability has a considerable influence on interest rates, inflation, and GDP growth rates through its role in fostering an atmosphere favorable to investment and economic activity. More investments are drawn to stable nations, which raises GDP growth rates, while instability might result in inconsistent economic policies.

4.2.1.2.4. Results of the Tests

- GDP Growth Rate

R-squared within: 0.73
R-squared between: 0.25
R-squared overall: 0.48

Table 7: Panel Data Analysis (GDP Growth Rates)

GDP Growth Rate	coefficient	Robust std.error	t	P>ItI	[95% conf. interval)	
govsp	-0.335	0.091	-3.66	0.022	-0.588	-0.081
tradegdpg	0.063	0.048	1.33	0.255	-0.069	0.195
politst	0.342	0.027	1.27	0.273	-0.041	0.109
worldgdpg-centered	0.931	0.027	34.65	0.00	0.857	1.006
fedrate-centered	0.104	0.099	1.05	0.354	-0.171	0.378
globinf-centered	0.238	0.086	2.76	0.051	-0.001	0.477
worldgdpgXdummy1-centered	-0.254	0.011	-22.91	0.00	-0.285	-0.223
worldgdpgXdummy2-centered	-0.474	0.046	-10.23	0.001	-0.603	-0.346
worldgdpgXdummy3-centered	0.215	0.042	5.14	0.007	0.099	0.331
worldgdpgXdummy4-centered	0.084	0.025	3.37	0.028	0.015	0.154
worldgdpgXdummy5-centered	0	(omitted)				
fedrateXdummy1-	0.114	0.088	1.3	0.264	-0.13	0.359

centered						
fedrateXdummy2-centered	-0.295	0.165	-1.78	0.149	-0.754	0.164
fedrateXdummy3-centered	-0.186	0.07	-2.67	0.056	-0.38	0.007
fedrateXdummy4-centered	0.389	0.08	4.84	0.008	0.166	0.612
fedrateXdummy5-centered	0	(omitted)				
globinfXdummy1-centered	0.249	0.068	3.69	0.021	0.062	0.437
globinfXdummy2-centered	-0.712	0.074	-9.56	0.001	-0.919	-0.505
globinfXdummy3-centered	-0.627	0.069	-9.13	0.001	-0.818	-0.436
globinfXdummy4-centered	-0.216	0.11	-1.98	0.119	-0.518	0.087
globinfXdummy5-centered	0	(omitted)				
_cons	11.35	4.6	2.46	0.069	-1.436	24.134

- The dependent variable is GDP growth rate.
- The model explains about 72.6% of the variation in GDP growth rate within the countries, about 25% of the variation between countries, and about 47.7% of the variation in the dependent variable overall.
- The coefficients for the control variables show the average effect of these variables on the dependent variable.
- “Worldgdpg-centered” has a positive, high, and significant effect on GDP growth rate. So, as the world GDP growth increases, the GDP growth rate of the omitted country increases too.
- “govsp” has a significant negative effect on GDP growth rate. This means that an increase in government spending contributes to the decrease of GDP growth rates.

- "globinf-centered" has a significant positive effect on GDP growth rate. An increase in global inflation is associated with an increase in GDP growth rate of the base country (omitted).
- The interaction terms worldgdpgXdummyi_centered, *fedrate*Xdummyi_centered, *and globinfXdummyi-centered* show the effect of the shock variables for each country compared to the omitted category.
- Significant interaction terms indicate that the effect of the world GDP growth rate differs for the corresponding country compared to the baseline country.
- The variations in sign and significance of the interaction terms coefficients across countries means that these countries are differently affected by economic shocks. For instance, *worldgdpgXdummy2-centered* has a significant negative coefficient, indicating that the positive effect of the world GDP growth rate on a country's GDP growth rate is less for China than the omitted country, South Africa. Also, *worldgdpgXdummyi-centered* affects GDP growth in India and Russia positively while it has a negative differential effect in Brazil and China, indicating asymmetry. Policymakers should be aware of these differences that suggest the unsuitability of a one-size-fits-all policy response to global economic conditions.
- The variation in the coefficients of the interaction terms, fedrateXdummyi-centered and globinfXdummyi-centered, regarding their signs and significance suggests that the effect of these shock variables differ across the specified countries relative to the omitted country.

Example:

Regarding fedrate: Although fedrate_centered positive effect on GDP growth rate is insignificant, it can still provide some valid insights regarding symmetry of shocks. The significant positive coefficient of the interaction term for Russia suggests that the BRICS countries' GDP growth rates are asymmetrically affected by changes in the federal rate, as compared to the baseline.

Concerning globinf: The notable negative interactions for China and India underscore these economies' vulnerability to global inflation but to a lesser extent than the omitted country (South Africa), hence highlighting the uneven impact of global economic situations on BRICS members.

These results enhance our knowledge of the symmetry/asymmetry of economic shocks among nations. The varying effects highlight how crucial it is to consider the unique economic conditions and craft customized policies rather than use a one-size-fits-all strategy. Policymakers must be aware of these disparities to effectively manage and coordinate economic policies among nations with different economic structures and external sensitivities.

- Inflation and Exchange Rates

Similar tests were conducted where inflation and exchange rates were the dependent variables consecutively.

R-squared within: 0.37
R-squared between: 0.004
R-squared overall: 0.11

Table 8: Panel Data Analysis (inflation rates)

Inflation	coefficient	Robust std.error	t	P>ItI	[95% conf. interval)	
govsp	0.036	0.163	0.22	0.835	0.415	0.487
tradegdpg	0.243	0.069	3.51	0.025	0.051	0.435
Politst	0.004	0.097	0.04	0.969	-0.264	0.272
worldgdpg-centered	-0.276	0.085	-3.25	0.031	-0.511	-0.041
fedrate-centered	-0.199	0.192	-1.03	0.360	-0.733	0.335
globinf-centered	0.06	0.314	0.19	0.859	-0.813	0.932
worldgdpgXdummy1-centered	0.685	0.031	22.07	0.00	0.599	0.77
worldgdpgXdummy2-centered	0.193	0.04	4.77	0.009	0.081	0.305
worldgdpgXdummy3-centered	-0.097	0.036	-2.72	0.053	-0.196	0.002
worldgdpgXdummy4-centered	-0.023	0.048	-0.47	0.66	-0.157	0.111
worldgdpgXdummy5-centered	0	(omitted)				
fedrateXdummy1-centered	-0.341	0.271	-1.26	0.277	-1.092	0.411
fedrateXdummy2-centered	-0.519	0.436	1.19	0.3	-1.73	0.693
fedrateXdummy3-centered	-0.034	0.128	-0.27	0.802	-0.39	0.321
fedrateXdummy4-centered	0.351	0.267	1.31	0.26	-0.391	1.092
fedrateXdummy5-centered	0	(omitted)				
globinfXdummy1-centered	-0.161	0.178	-0.91	0.417	-0.657	0.334
globinfXdummy2-centered	0.278	0.271	1.03	0.363	-0.474	1.029
globinfXdummy3-centered	-0.168	0.338	0.5	0.645	-1.106	0.77
globinfXdummy4-centered	1.194	0.332	3.59	0.023	0.271	2.117
globinfXdummy5-centered	0	(omitted)				
_cons	-6.139	5.167	-1.19	0.301	-20.485	8.208

R-squared within: 0.13
R-squared between: 0.47
R-squared overall: 0.18

Table 9: Panel Data Analysis (exchange rates)

Exchange rates	coefficient	Robust std.error	t	P>ItI	[95% conf. interval)	
govsp	0.481	0.576	0.84	0.451	-1.118	2.08
tradegdpg	-0.083	0.199	-0.42	0.699	-0.634	0.469
politst	0.264	0.359	0.73	0.504	-0.734	1.261
worldgdpg-centered	-0.075	0.311	-0.24	0.822	-0.939	0.789
fedrate-centered	-0.583	0.492	-1.18	0.302	-1.949	0.783
globinf-centered	0.944	0.866	1.09	0.337	-1.46	3.349
worldgdpgXdummy1-centered	0.248	0.0793	3.13	0.035	0.028	0.469
worldgdpgXdummy2-centered	0.282	0.177	1.6	0.186	-0.209	0.774
worldgdpgXdummy3-centered	-0.255	0.183	-1.39	0.236	-0.765	0.254
worldgdpgXdummy4-centered	-0.123	0.174	-0.71	0.518	-0.607	0.36
worldgdpgXdummy5-centered	0	(omitted)				
fedrateXdummy1-centered	0.862	0.801	1.08	0.342	-1.361	3.085
fedrateXdummy2-centered	2.024	1.459	1.39	0.238	-2.026	6.075
fedrateXdummy3-centered	-1.948	0.492	-3.96	0.017	-3.315	-0.582
fedrateXdummy4-centered	-1.58	0.758	-2.09	0.105	-3.685	0.524
fedrateXdummy5-centered	0	(omitted)				
globinfXdummy1-centered	-0.298	0.556	-0.54	0.621	-1.843	1.247
globinfXdummy2-centered	-0.891	0.752	-1.18	0.302	-2.981	1.198
globinfXdummy3-centered	-0.14	1.196	-0.12	0.912	-3.46	3.179
globinfXdummy4-centered	-0.473	0.876	-0.54	0.618	-2.905	1.959
globinfXdummy5-centered	0	(omitted)				
_cons	4.844	19.395	0.25	0.815	-49.005	58.693

The results came out somewhat similar to those regarding GDP growth rates. The significance, asymmetry, and disparities in the countries' responses to global economic shocks show the need to address unique economic factors specific to each

country and the difficulties in coordinating economic policy to achieve the level of integration essential for adopting a shared currency.

4.2.2 Labor Mobility

Labor mobility within and between the BRICS nations is crucial for the formation of a monetary union. It allows for economic integration and alignment, ensuring member countries can resist the strain of sharing a single currency. Labor mobility also allows for the adjustment of labor markets to shifts in demand and supply, facilitating economic stability and convergence. This adjustment mechanism ensures that variations among economies do not weaken the union, contributing to a vital and strong collective economy. Intra-BRICS labor mobility also indicates the capability of these countries to cooperate on economic policies and harmonize their labor markets.

4.2.2.1. Labor Mobility within BRICS

For labor mobility within BRICS, I used two variables, sector (value added as %GDP) and sector employment as %total employment. I produced three graphs per country for each country, each graph showing the two variables, sector value added as %GDP and employment in that sector as %total employment and observed the co-movement of the lines representing the variables across time.

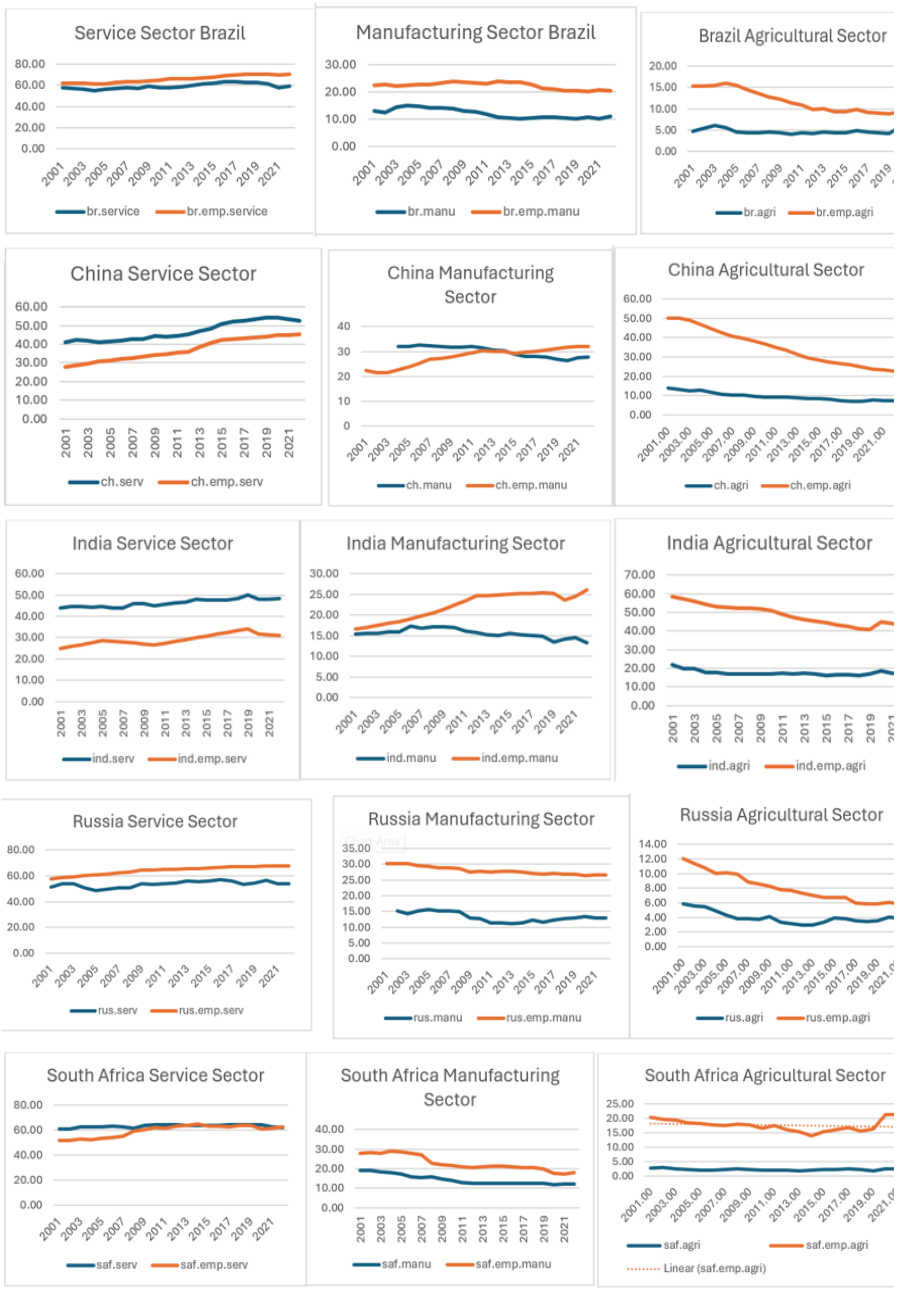


Figure 5: Labor mobility across sectors

It is noted through these graphs that labor mobility of the BRICS countries has given a fair idea about general trends and factors such as the shift toward services, manufacturing variability, and agricultural sector shift. In fact, this trend generally indicates a shift from an economy based on traditional agriculture and manufacturing to services, which is the usual case for developing and emerging economies.

However, the disparities in labor mobility among the BRICS countries might give rise to asymmetric shocks and therefore asymmetric outcomes within the bloc. Although labor mobility will help in absorbing asymmetric shocks across regions or sectors, in the context of the BRICS country, different labor mobility could give rise to asymmetric outcomes.

For a monetary union to be effective, there should be high synchronization in the business cycles of the member countries, and labor mobility can enable economic adjustments to happen without large changes in local monetary conditions. But to cater for the diverse trends of labor mobility and economic structures of BRICS, there might be a need for different monetary policies for every member.

4.2.2.2 Labor Mobility among BRICS Countries (Muresan, 2023)

The BRICS countries are teaming up to change the way countries work together, especially by making it easier for people to move between their countries. They're focusing a lot on making it possible for people to work in different BRICS countries, aiming to achieve similar goals, and trying to stop illegal immigration while also making strong partnerships. Back in 2015, at a big meeting in Russia, they talked about how important it is to have proper regulations for people coming into their countries because it helps the economy grow. They're looking to make getting visas easier, like introducing online visas and making the whole visa process simpler for everyone.

In 2020, they were doing pretty well at letting people get visas quickly when they arrive, depending on the country's relationship. But they've had to make some changes because of the global health crisis. Despite these issues, they've kept on trying to share skills and encourage students and experts to move around within their

countries. This includes working together in areas like technology and education. These efforts are key to keeping smart people within the BRICS countries and making these places appealing to talented people from everywhere.

		Country of destination				
		Brazil	Russia	India	China	South Africa
Country of origin	Brazil		Visa issued on arrival (up to 90 days)	Tourist, business or medical e-visa or digital visa application	Visa application required	Visa issued on arrival (up to 90 days)
	Russia	Visa issued on arrival (up to 90 days)		Tourist, business or medical e-visa or digital visa application	Visa-free travel	Visa issued on arrival (up to 90 days)
	India	Visa application required	Tourist, business or medical e-visa or digital visa application		Tourist, business or medical e-visa or digital visa application	Tourist, business or medical e-visa or digital visa application
	China	Visa application required	Tourist, business or medical e-visa or digital visa application	Tourist, business or medical e-visa or digital visa application	Visa-free travel	Tourist, business or medical e-visa or digital visa application
	South Africa	Visa issued on arrival (up to 90 days)	Visa issued on arrival (up to 90 days)	Consulate application required	Visa application required	

Figure 6: Inter-BRICS visa arrangements

It's noteworthy that the BRICS need to strike a balance between enjoying the benefits of people moving legally between their countries and preventing illegal immigration and human trafficking, as well as solving other migration challenges. They need a common set of rules and best practices that can help each country benefit from this movement and collaborate better in fields like science, technology, and education. How BRICS manage people moving across their borders also connects to bigger issues like safety, jobs, and how different cultures get along. By working together, these countries are showing they want to make a more inclusive world.

In short, for the BRICS to fully integrate their economies, like using a single currency, they need to closely coordinate their economic and financial policies. Talking about making people's movement between BRICS countries easier and visa processes simpler can help their economies become more similar and work more in sync. Allowing people to work across BRICS countries can help their economies adapt to one economic policy. If people can move more freely within the BRICS, it could lead to a stronger united response to global economic shifts, which would be useful if they decide to follow one economic policy for all.

4.2.3 Inflation Stability and Wage Flexibility

Inflation stability and wage flexibility should be considered while assessing the suitability of a BRICS monetary union. Wage flexibility plays a fundamental role in helping different economies adjust to a single currency. In order to adapt to economic shocks and manage variations in economic structures and phases of growth, wage flexibility plays a major role as an adjustment mechanism in economies. Inflation stability also plays a pivotal role in the success of a monetary union. Differences in inflation rate dynamics can create tension in the union and hinder the coordination of monetary policies. That’s because a BRICS country experiencing low inflation rates, for example, will refuse a union’s decision to increase interest rates in order to help another country with high inflation. In addition, dissimilarity in the inflation rates and stability of prices can catalyze asymmetric shocks among the BRICS since when a country suffers a different economic condition than the others in the union, it cannot manage it through currency devaluation as it is constrained by the common currency that limits its

ability to adjust. Finally, a higher inflation might reflect fiscal indiscipline which contradicts a monetary union requirement to maintain fiscal discipline.

4.2.3.1 Descriptive Analysis

To study inflation stability and wage flexibility, I conducted descriptive analysis of two variables, inflation rate and minimum wage rate growth.

Table 10: Minimum wage growth rate

country	mean	stdev	min	max
brazil	9.795714	4.192416	1.81	17.95
china	4.347727	17.02973	-64.11	27.21
india	5.090909	14.10346	-39.38	32
russia	18.69636	38.486	-94.6	109.09
s.africa	6.644211	2.968041	-2.03	12.09

Table 11: Inflation Rates

country(inf)	mean	stdev	min	max
brazil	6.403747	2.671285	3.211768	14.71492
china	2.256761	1.690319	-.7319709	5.925251
india	6.257555	2.603108	3.328173	11.98939
russia	9.60744	4.808735	2.878297	21.47701
s.africa	5.249161	2.29315	-.6920303	10.07458

The summary table on minimum wage growth rates reveals the following data.

- Brazil: it shows positive minimum wage growth rate and relatively low standard deviation, which indicates a somewhat consistent growth in minimum wage growth rates across time.
- China: it has a lower mean min wage growth rate but a very high standard deviation. In addition, the minimum level of wage growth rate

is negative. All this implies that there's a lot of fluctuations in the wage growth rate, and some wages are even decreasing, indicating a high degree of wage flexibility.

- India: with a moderate mean wage growth rate and a high standard deviation along with a negative min wage growth rate, the data demonstrates a lot of variations in the growth trend of min wages, and the negative minimum wage growth rate suggest reduction of wages of some sectors or groups in India. This implies considerable flexibility.
- Russia: the highest mean mini wage growth rates and the highest standard deviation suggest a very high degree of wage flexibility. It also exhibits the lowest minimum and the highest maximum of minimum wage growth rate suggesting significant growth for some but substantial reductions for others.
- South Africa: it has a moderate mean but the lowest standard deviation implying more stability and less variability, thus less flexibility in its min wage growth rate.

*It's important to note that negative minimum wage growth rates reveal the ability of a country's wages to adjust downwards in case of negative economic shocks.

The summary table on inflation reveals the following data on the BRICS countries.

- Brazil: with a moderate average inflation and moderate variability, Brazil demonstrates some level of stability in its inflation rates.

- China: it has the lowest mean and standard deviation, which suggests stable and controlled inflation rates. This favors a monetary union, but the negative minimum reveals periods of deflation.
- India: like Brazil, India has a moderate inflation average and standard deviation indicating some level of stability.
- Russia: it has the highest mean and variability. This degree of volatility could pose a significant barrier to a monetary union due to a less predictable economic environment.
- South Africa: it exhibits moderate mean and variability less than those of Brazil and India. This can provide positive outlook for a potential monetary union.

Based on the collective data, it seems that there are vast differences between the BRICS countries with respect to both inflation and growth rates in minimum wages. Sometimes, there is a very high standard deviation reflecting uneven patterns of inflation and growth, like that of Russia's inflation rate or the growth rate of the minimum wage in China and Russia. Every nation has gone through phases of both increase and decrease in these areas.

This implies that there is variation in how the BRICS countries are experiencing variations affecting inflation and minimum wage growth rates. The sustainability of a monetary union may be threatened by such differences because the union calls on some degree of convergence in economic indicators such as wage growth and inflation.

From a policy perspective, pursuing a monetary union necessitates balancing the objective of coordinating monetary polices with the perception of diverse economic structures. Pivotal points to consider include aligning monetary policies while allowing flexibility in wage policies to integrate these disparities. In add, reinforcing institutional

frameworks, tackling structural imbalances, and enhancing regional cooperation are major steps to promote convergence, sustainability, and resilience within the monetary union.

4.2.3.2 PVAR Analysis

I took a further step and delved into the relationship between the rate of inflation and the rate of growth in minimum wages, since BRICS countries will also have to synchronize their economic cycles if the monetary union is to work. Thus, differences in the inflation-minimum wage link may reflect imbalances within the economies. Further, understanding wage-price dynamics is important in the avoidance of the onset of a spiral in the wage-price mechanism, which may have destabilizing effects in any monetary union. Should the BRICS nations share a common monetary policy, close attention must be given to the relationship existing between the inflation and minimum wage growth rates, so that such results do not trigger inflationary or deflationary pressures.

For this step, I conducted a P-VAR analysis test using the following variables: inflation rates, minimum wage growth rates, real interest rates, GDP growth rates, exchange rates, household consumption/GDP, industrial production growth rates, and unemployment rates.

PVAR Analysis Results:

$$\text{inflation}_t = \beta 0 + \beta 1 \times \text{inflation}_{t-1} + \beta 2 \times \text{gdpgrrate}_{t-1} + \beta 3 \times \text{realint}_{t-1} + \beta 4 \times \text{consumption}_{t-1} + \beta 5 \times \text{diff\_unemp}_{t-1} + \beta 6 \times \text{diff\_indust}_{t-1} + \beta 7 \times \text{diff\_exchrate}_{t-1} + \beta 8 \times \text{mnwgr}_{t-1} + \epsilon t$$

$$mnwgr_t = \beta 0 + \beta 1 \times inflation_{t-1} + \beta 2 \times gdpgrrate_{t-1} + \beta 3 \times realint_{t-1} + \beta 4 \times consumption_{t-1} + \beta 5 \times diff\_unemp_{t-1} + \beta 6 \times diff\_indust_{t-1} + \beta 7 \times diff\_exchrate_{t-1} + \beta 8 \times mnwgr_{t-1} + \epsilon t$$

- gdpgrrate: GDP growth rate
- realint: real interest rate
- consumption: consumption as percentage of GDP
- diff_unemp: differenced unemployment variable (to obtain stationarity necessary for PVAR analysis
- diff_indust: difference industrial production growth rate (to obtain stationarity)
- diff_exchrate: differenced exchange rates (to obtain stationarity)
- mnwgrt: minimum wage growth rate

Table 12: Effect of lagged minimum wage growth rate on inflation

inflation	Coefficient	Std.error	z	p>IzI	[95% conf. interval]	
inflation L1.	0.406	0.114	3.57	0.00	0.183	0.629
gdpgrrate L1.	0.164	0.144	1.14	0.256	-0.119	0.446
realint L1.	-0.084	0.079	-1.07	0.287	-0.239	0.071
consumption L1.	-0.012	0.105	-0.11	0.909	-0.218	0.194
diff-unemp L1.	-0.264	0.286	-0.93	0.354	-0.824	0.295
diff-indust L1.	-0.082	0.222	-0.37	0.713	-0.517	0.353
diff-exchrate L1.	0.035	0.125	0.28	0.779	-0.209	0.279
mnwgr L1.	0.018	0.017	1.05	0.294	-0.015	0.051

Table 13: Effect of lagged inflation on minimum wage growth rate

mnwgr	coefficient	Std.error	z	p>IzI	[95% conf. interval]	
inflation L1.	1.918	0.908	2.11	0.035	0.139	3.697
gdpgrrate L1.	0.840	0.976	0.86	0.389	-1.073	2.753
realint L1.	0.124	0.227	0.55	0.583	-0.32	0.569
consumption L1.	0.733	0.783	0.94	0.349	0.801	2.267
diff-unemp L1.	2.33	2.185	1.07	0.286	-1.954	6.611
diff-indust L1.	-1.138	1.272	-0.89	0.371	-3.632	1.356
diff-exchrate L1.	-1.017	0.478	-2.13	0.033	-1.954	-0.079
mnwgr L1.	-0.168	0.164	-1.03	0.305	-0.49	0.153

The results show a positive relationship between past inflation and future minimum wage growth at a significant level (p=0.035), which means the possibility of wages getting adjusted upwards to past inflation.

However, the positive correlation between past minimum wage growth rate and future inflation is not significant implying some margin of freedom for policy makers in setting and modifying minimum wage policies.

None of the control variables have a significant effect on inflation within this model, while exchange rates have a significant negative effect on minimum wage policies. This suggests that exchange rate fluctuations can have significant effects on wage policies. However, in case of creating a monetary union, the BRICS countries will have to give up their individual exchange rate policies and consequently won't be able to influence wage policies using exchange rates. Thus, they have to find alternative mechanisms to seek convergence in wage policies.

4.2.4. Fiscal Transfer Mechanism

Fiscal transfer mechanism refers to a set of procedures and agreements used to transfer funds from more affluent regions or countries into poorer ones for economic stabilization, redistribution, adjustment to shocks, and fiscal balance in a monetary union. It seeks to provide financial support to member countries or regions affected by economic downturns, thus maintaining overall stability of the economy. They also allow for financial redistribution from surplus to deficit regions and thus favor both social and political stability. Moreover, financial transfers further help economies in the adjustment of asymmetric shocks in a situation where they cannot devalue their currencies. They also support the fiscal balance through supplementary funding of the budgets of deficit regions. Thus, the existence of a financial transfer mechanism is very crucial to the success of a monetary union, as it curbs the economic and social strains brought about by reduced independent fiscal policies.

The BRICS countries do not have a formal fiscal transfer mechanism. However, they have established the New Development Bank (NDB), which functions somewhat similarly to a fiscal transfer mechanism through credit extended for infrastructure and sustainable development projects amongst the BRICS and other emerging economies. The NDB provides financing through loans, guarantees, equity participation, or other financial instruments to public-or private-sector projects. It represents a kind of financial collaboration that would forge the path of balanced growth among the states of the member countries rather than focus on stabilization or redistribution within a monetary union or federal state.

In 2015, the BRICS countries also established the Contingent Reserve Arrangement (CRA) framework, which would stand as an alternative to the financial

system of the West. It boosts the International Monetary Fund's financial safety net. Financially, the CRA assists the BRICS countries during periods of short-term cash constraints or balance of payments challenges. The member countries can also have access to currency swaps and use the pool of the reserves for safeguarding their respective economies during financial turmoil. China contributed the lion's share to this $100 billion foreign exchange reserve to be held by the CRA jointly. It serves as an extra line of defense, supporting foreign exchange reserves and offering defense against shocks to the world's liquidity.

In fact, the two financial organizations, the New Development Bank (NDB) and the Contingent Reserve Arrangement (CRA), may eventually serve as the foundation for more complex financial cooperation mechanisms among the BRICS countries resembling a fiscal transfer system.

However, at the 12th annual meeting of the Valdai discussion club, Paulo Nogueira Batista, Vice President of the New Development Bank (NDB) in 2015–2017, delivered a speech with complaints about the current status of the NDB and the CRA; then he expressed the potential of these organizations if well-managed.

The Contingent Reserve Arrangement (CRA) has been criticized for underutilization and its small size, exclusive membership of only BRICS countries, and numerous operational restrictions. Advocates argue for its expansion, including new members, increased flexibility, a robust surveillance unit, and a gradual reduction in dependency on the IMF.

The New Development Bank (NDB) faces operational challenges, including slow disbursements and project implementation, its primary operation in US dollars,

limited global outreach, poor governance and transparency, and human resource challenges.

However, the foundational agreements of the NDB are considered robust, and the institution benefits from consistent support from its host city and country. These factors suggest that, with concerted efforts to address existing shortcomings, the NDB and CRA can significantly contribute to the BRICS nations' aspirations, including the ambitious goal of establishing a common currency, enhancing their role in the global financial landscape (Jr., 2023).

4.2.5. Convergence Analysis

This method requires testing the convergence of a few important indicators such as inflation rates and fiscal criteria that include public debt and budget deficit as percentages of GDP.

I’m conducting a conditional Beta convergence test that incorporates extra factors into the study acknowledging that economies may converge to distinct steady states depending on their particular structural features, policies, and institutional contexts. It offers a more nuanced understanding of convergence trends than absolute convergence that looks at whether economies with lower initial levels of a particular indicator grow more quickly than those with higher initial levels suggesting a general trend towards a common steady state across all economies, without considering specific traits or policies.

4.2.5.1. Inflation Rates

In order for the monetary union to be feasible, there should be considerable economic coordination and convergence in order for the common currency to work effectively.

4.2.5.1.1. Conditional Beta Convergence Analysis

infl_growth=β0+β1×lag_inflation+β2×gdpgrrate+β3×deficitGDP+β4 ×tradegdp+β5×realint+ϵ

Table 14: Conditional Beta Convergence Analysis (inflation rates)

infl_growth	coefficient	Std. err.	t	p>ItI	[95% conf. interval]	
lag_inflation	-0.594	0.051	-11.68	0.000	-0.735	-0.453
gdpgrrate	-0.18	0.059	-3.03	0.039	-0.345	-0.015
Tradegdp	0.155	0.047	3.31	0.03	0.025	0.286
Realint	-0.049	0.076	-0.65	0.554	-0.26	0.162
deficitGDP	-13.074	7.432	-1.76	0.153	-33.709	7.561
_cons	-2.713	2.518	-1.08	0.342	-9.704	4.277

- Within R-squared: About 43.39% of the variation in inflation growth within countries (accounting for the individual countries' average effects) is explained by the model.
- Between R-squared: 1.8% of the variation between countries is captured by the model. *Overall R-squared*: When considering both within and between variations without accounting for fixed effects, the model explains 18.57% of the total variation in inflation growth.
- lag_inflation: The coefficient is -0.59 with a p-value of 0.000, indicating a statistically significant negative relationship.

- gdpgrrate: The negative coefficient with a p-value of 0.039 suggests that higher GDP growth rates are associated with slower inflation growth, indicating a diminishing effect of economic expansion on inflation.
- tradegdp: The positive coefficient with a p-value of 0.03 implies that greater openness to trade (higher trade-to-GDP ratios) is associated with faster inflation growth.

The findings support the hypothesis of conditional beta convergence for inflation across the BRICS economies, wherein, controlling for fiscal policy, trade openness, and interest rates, greater initial inflation leads to quicker inflation reductions. The significant correlation seen with GDP growth rate and trade implies that inflation dynamics are significantly influenced by economic policy and foreign trade.

The focus on initial circumstances, economic growth, and trade openness as critical components in controlling inflation convergence and overall economic health makes this research particularly important for policymakers concentrating on inflation targeting and macroeconomic stability.

4.2.5.2. Public Debt (%GDP)

$$debt\_growth=\alpha+\beta1\times log\_DebtGDP+\beta2\times deficitGDP+\beta3\times inflation+\beta4\times tradeGDP+\beta5\times realint+\mu i+\epsilon it$$

Table 15: Conditional Beta Convergence Analysis (Public Debt %GDP)

debt_growth	coefficient	Std. error	t	p>ItI	[95% conf. interval]	
log_DebtGDP L1.	-0.736	0.047	-15.57	0.00	-0.83	-0.642
deficitGDP	-2.741	0.953	-2.88	0.005	-4.632	-0.849
Inflation	-0.0125	0.01	-1.26	0.21	-0.032	0.007
gdpgrrate	0.006	0.009	0.67	0.502	-0.011	0.023
Tradegdp	0.01	0.005	2.24	0.028	0.001	0.019
Realint	0.002	0.005	0.41	0.628	-0.008	0.011
_cons	-1.207	0.195	-6.21	0.00	-1.593	-0.821

- R-squared Values: The model explains a significant portion of the variation in public debt growth.
- Both F-tests are significant.
- log_DebtGDP (L1.): The coefficient for lagged log public debt to GDP is -0.7358454, which is statistically significant (p-value = 0.000). It suggests evidence of conditional beta convergence for public debt, which means that countries with initially higher levels of public debt relative to GDP tend to reduce their debt ratios more rapidly than those with lower initial levels, controlling for other factors.
- deficitGDP: A statistically significant coefficient (p-value = 0.005) with a value of -2.740661 has been found. Though this may seem odd, it suggests periods of fiscal consolidation where deficits lead to policy steps that lower debt growth.
- tradegdp: There appears to be a positive and substantial correlation (p-value = 0.028) between the growth rate of public debt and trade as a percentage of GDP. This may reflect the possibility that economies with more trade openness may

become more indebted as a result of increasing borrowing-financed economic activity and investment.

In short, the test provides robust evidence of conditional convergence in public debt-to-GDP ratios among the BRICS countries suggesting that countries with higher initial debt levels are making relative progress in reducing their debt ratios. It also implies that fiscal policy and trade openness are important factors influencing public debt dynamics.

4.2.5.3. Budget Deficit (%GDP)

$$growth\_deficit\% = \alpha + \beta 1 \times lag\_deficitGDP + \beta 2 \times DebtGDP + \beta 3 \times inflation + \beta 4 \times gdpgrrate + \beta 5 \times realint + \beta 6 \times tradebal + \mu i + \epsilon it$$

Table 16: Conditional Beta Convergence analysis (budget deficit %GDP)

growth_deficitGDP	coefficient	Std. error	t	p>ItI	[95% conf. interval]	
lag_deficitGDP	0.0003	7.32e-06	34.71	0.00	0.0002	0.0003
DebtGDP	0.0005	0.0002	2.14	0.099	-0.0002	0.001
inflation	0.00002	3.06e-06	6.44	0.003	0.00001	0.00003
gdpgrrate	-7.67e-06	0.00002	-0.43	0.689	-0.00006	0.00004
Realint	-3.59e-06	2.88e-06	-1.25	0.281	-0.00001	4.41e-06
tradebal	8.70e-14	2.38e-13	0.37	0.733	-5.73e-13	7.48e-13
_cons	-0.0003	0.00009	-3.58	0.023	-0.0006	-0.00007

Based on the provided regression output and considering the context of BRICS convergence and the potential for a monetary union, here's how the findings could be interpreted:

- lag_deficitGDP: The coefficient for the lagged deficit-to-GDP ratio is positive (0.000254) and highly significant (p-value < 0.001). Thus, this result suggests that if the ratio of the deficit/GDP is high at a certain starting point, the rate of growth in this ratio will be high. This is contrary to the beta convergence theory, where a negative coefficient is supposed to show regions with higher initial ratios reducing their deficit/GDP ratios over time at a faster rate. This will probably cause a divergence in fiscal performance between the countries—a challenge for any possible monetary union. Disparities may cause tensions within the bloc.
- DebtGDP: The coefficient of the Debt/GDP ratio carries a positive sign (0.005199) and is statistically significant at the 10% level (p-value = 0.099), implying that an increase in the ratio of Debt/GDP further may instigate higher growth in the deficit/GDP ratio. This could be reflective of countries that have a relatively higher debt relative to their GDP and thus might face higher fiscal pressures or indicative of a countercyclical fiscal policy where countries that have a higher ratio are perhaps less bound to funding their deficits.
- Inflation: The regression has a coefficient that is significant with a positive value (0.000197, p-value = 0.003), suggesting that the higher rate of inflation is associated with a higher rate of growth in the deficit/GDP ratio. This could reflect countries with higher inflation, potentially running higher deficits, possibly because of inflation eroding away the real value of government

revenues or reflecting the use of deficit financing in response to inflationary pressures.

- gdpprgrate and realint: Those two independent variables are insignificant in the model, suggesting that within this model, there isn't strong evidence that these factors are directly associated with changes in the deficit/GDP growth rate within the BRICS nations.
- tradebal*:* The trade balance is not a significant predictor of deficit/GDP ratio growth in this model, which suggests that trade performance does not have a strong or consistent effect on the fiscal measure, namely budget deficit.
- Fixed-effects model: The fixed-effects (within) R-squared value of 0.3145 indicates that around 31.45% of the within-group variance (the variation over time within each country) in the growth rate of the deficit/GDP ratio is explained by the model.

In the context of discussions about the potential for a monetary union among the BRICS nations, these findings suggest several challenges:

Divergence in Fiscal Performance: The lack of convergence in deficit/GDP ratios could pose a remarkable obstacle, as monetary unions usually benefit from alignment in fiscal performance and policy among member nations.

Debt Dynamics: The positive relationship between Debt/GDP and growth in deficit/GDP ratios could hinder the sustainability of fiscal positions within a monetary union framework, where the fiscal policies of the member countries can have considerable spillover effects on others.

Inflationary Pressures: The relationship of higher inflation to higher growth in the deficit/GDP ratio might point to different macroeconomic conditions and policy

responses across BRICS countries, which could complicate the task of policy harmonization within a monetary union. Convergence in the key economic indicators, alignment of the fiscal and monetary policies, and macroeconomic stability often stand out among the necessary conditions towards a potential monetary union. Results suggest that the necessary convergence may really be 'significantly hard to achieve' among the BRICS countries.

In summary, evidence for conditional convergence in certain economic indicators between the BRICS group countries gives some support to the feasibility of a monetary union, while the difference in budget deficits and the difficulty represented by dissimilar fiscal policies suggest that a great deal of work still has to go into the further alignment of policies and conditions between the BRICS nations. Important to the BRICS nations would be to strengthen policy coordination and establish appropriate institutions to ensure there is convergence in a larger set of macroeconomic indicators that would enable monetary integration to be stable and sustainable before they ever think of a monetary union.

4.2.6. Trade Integration

4.2.6.1. Trade Openness

For the study of trade integration, I started by examining trade openness. Trade openness is calculated by dividing the total trade of each country in a given year by its GDP for that year. Upon plotting the line graphs for each country and examining the trend over a period of 21 years, extending from 2001 to 2021, I found that:

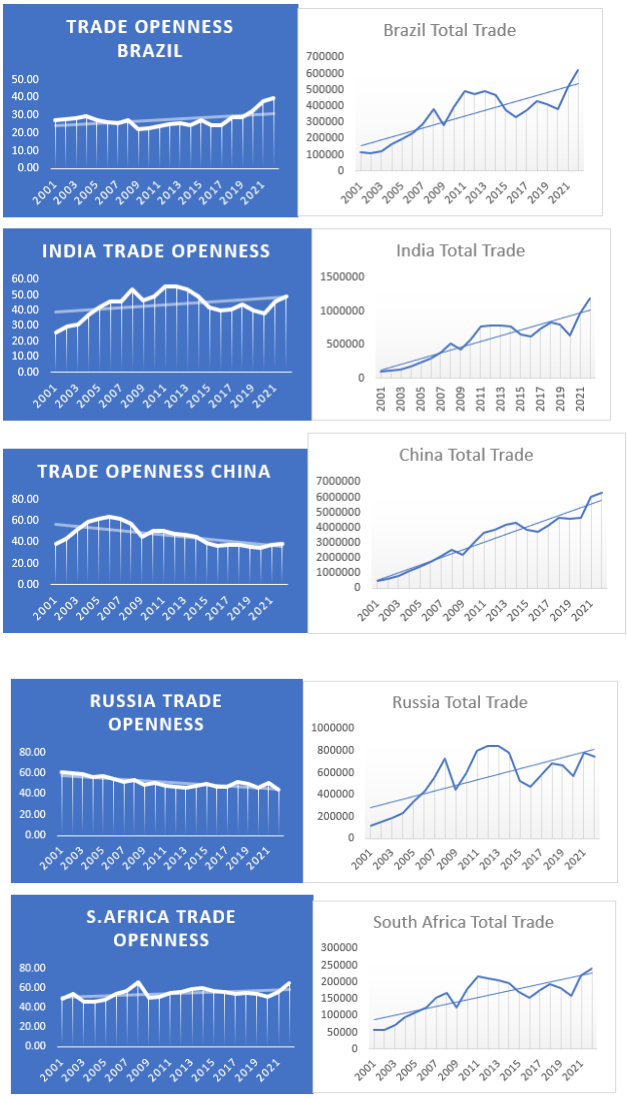


Figure 7. Trade Openness

- Brazil, India, and South Africa showed increasing trends in trade openness over the specified period. The graph for total trade of each country also showed an upward trend. Although many factors affect trade openness and must be examined closely, these trends can give an optimistic outlook on trade integration among BRICS.

- China and Russia, contrarily, exhibited decreasing trends of trade openness, but their total trade volumes' trend over a period of 21 years showed an increasing trend. This can be due to several factors.
- There has been an immense growth in GDP in China from a rural to a globally dominant industrial and service-oriented economy since the late 20th century. This increase has been many times more than the growth in trade volumes. Therefore, with this increase, trade openness has been declining. And under this context of high-tech and high-value business, the Chinese economy diversified. However, this may not necessarily result in increasing trade volumes proportionally with their economic worth. Thus, with such increase, the Chinese focused more on internal market development rather than just following export-led growth.
- Russia's trade openness and overall trade have been impacted by Western nations' economic sanctions and trade policies since its economy is highly dependent on natural resources, mainly gas and oil. This dependence can cause divergent patterns in its trade openness and volume. Economic fluctuations brought on by volatile oil prices rather by the more consistent rise in trade volumes impact GDP growth rates differently year on year. To reduce its need for imports, Russia has been focusing on boosting domestic production and adopting self-sufficiency measures in spite of a robust trade volume.

In conclusion, diverging tendencies indicate complications in achieving trade integrations although growing trade openness for Brazil, India, and South Africa reveal a willingness for more integrated economic policies. Yet, the intricate economic environments of Russia and China highlight the challenges in aligning policies within a unified trade and monetary framework. Trade volumes are

increasing for all BRICS countries, but the varying trends in trade openness reflect varying degrees of economic integration since both internal and external policies impact the trade-GDP link substantially.

4.2.6.2. Intra-BRICS Trade Evolution

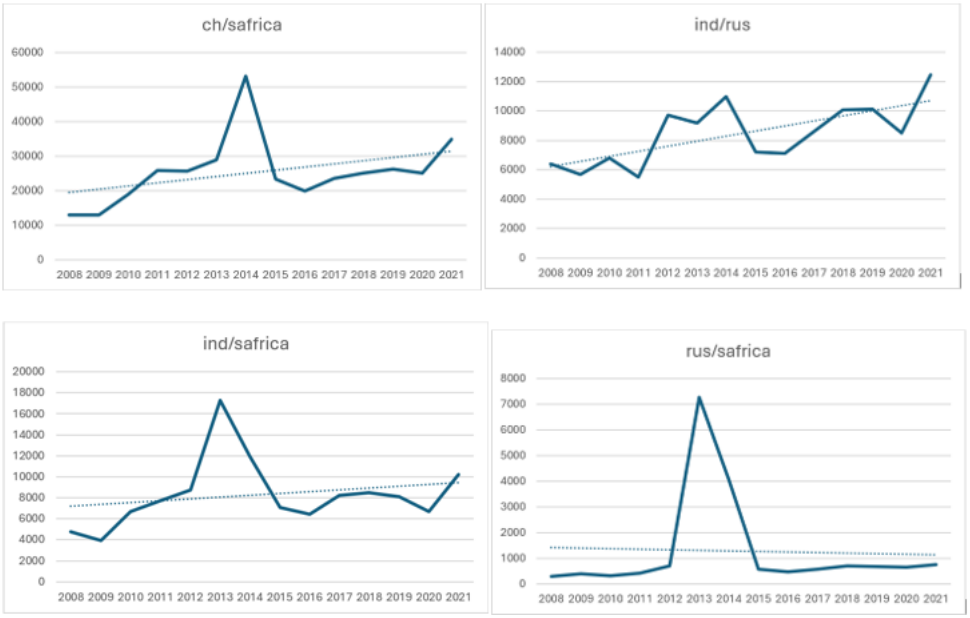


Figure 8: Intra-BRICS bilateral trade

The graphs show an increasing trend in bilateral trade for most of the country pairs except Brazil-Russia, Brazil-South Africa, and Russia-South Africa. This can be due to several factors including economic sanctions and geopolitical tensions, commodity price volatility, currency fluctuations, economic slowdown, supply chain disruptions, and shifts in trade policies.

Moreover, there are visible disparities across the BRICS country pairs regarding the degree of bilateral trade. Many factors can lead to such differences including differences in economic size and capacity, resource endowment, competitiveness and diversification, distance and logistics, bilateral relations and agreements, and domestic economic policies.

The feasibility of a monetary union for BRICS countries is complicated by disparities in bilateral trade volumes. Balanced trade is crucial for the union's stability, but substantial differences could lead to economic tensions and challenges in policy

coordination, increase vulnerability to asymmetric shocks, hamper exchange rate management, and boost capital flow volatility. In addition, a common currency would require a consensus on interest rates and joint reserve management, potentially necessitating fiscal transfers for equilibrium. However, this requires a high degree of fiscal, as well as political integration and solidarity, which may be hard to achieve.

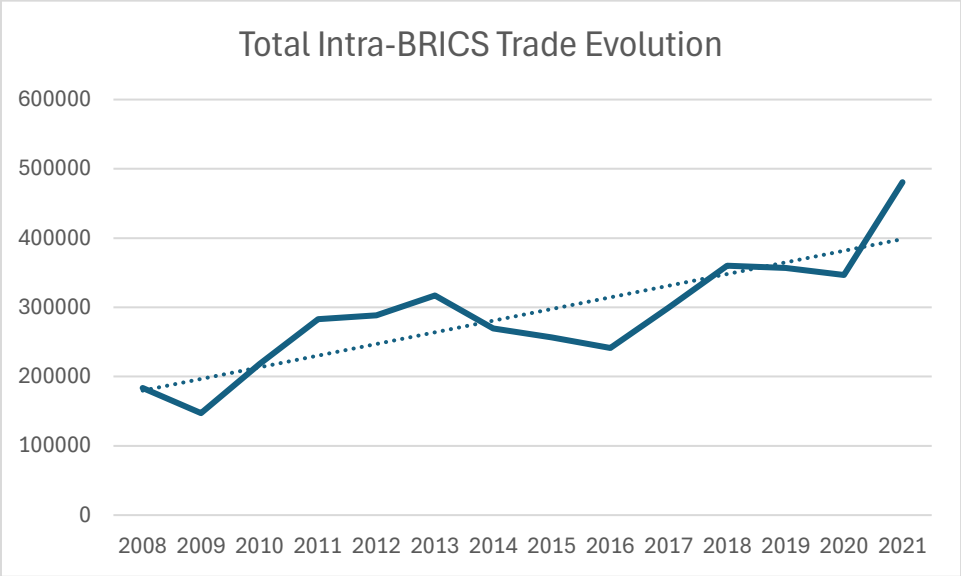


Figure 9: Total intra-BRICS trade evolution

In contrast, total intra-BRICS trade shows an increasing trend with some fluctuations along the period observed. This increase can mitigate the negative effects of disparities in bilateral trade but does not eliminate them completely. So, while it can foster deeper economic integration and convergence over time, lead to trade diversification and economic dependencies among BRICS nations to buffer against bilateral trade imbalances, increase the bargaining power on the global stage, and enhance economic growth and development by providing new market opportunities, it cannot wipe out the negative effects of trade imbalances such as the difficulty of coordinating economic policies, risk of asymmetric shocks, volatility in capital flow, and the challenging need for political will to achieve and deepen integration.

4.2.6.3. Intra-BRICS Trade Relative to their Trade with the World

Table 17: Intra-BRICS trade/ trade with the World

Variable	Obs	Mean	Std. dev.	Min	Max
Intrawimp	22	9.385	2.164	4.952	12.814
Intrawexp	22	8.007	1.852	4.291	10.354

To compare intra-BRICS trade to that of BRICS with the world , I conducted a descriptive analysis of these two variables: intrawimp (intraBRICS imports/total imports from the world), and intrawexp (intraBRICS exports/total exports to the world).

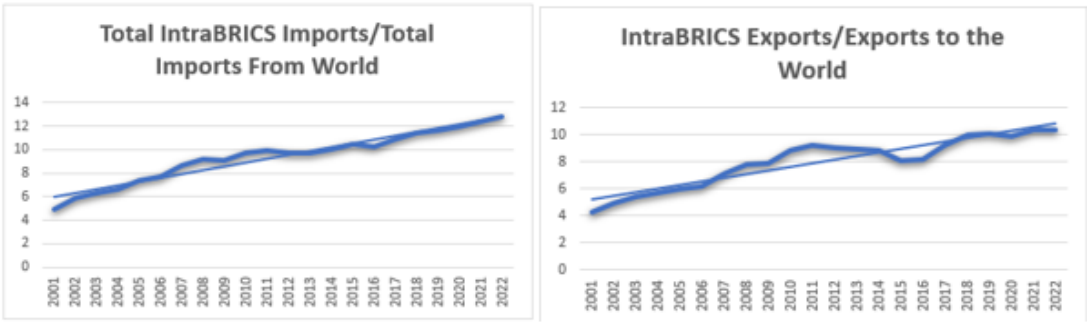


Figure 10. Intra-BRICS trade/ trade with the world (graphs)

These data demonstrate the extent and variety of trade within the BRICS relative to global trade, with exports to the BRICS countries constituting, on average, a somewhat lower percentage of global exports than imports. The fluctuations in both imports and exports over time suggest possible differences in the proportion of each BRICS country's trade with the other to the global total.

The line graphs of the two variables show a generally ascending trend. The graph of intra-BRICS imports relative to world imports reveals that the BRICS

countries have become increasingly integrated in terms of imports, constituting a growing share of the world's total imports.

The graph of intra-BRICS exports relative to their exports with the world shows a similar upward trend for intra-BRICS exports as a percentage of total world exports although there is a slower growth in the export percentage from around 2014 onwards compared to the previous years.

It appears like the BRICS countries are growing more economically integrated and have increasing impact on the world trade dynamics, reflected by a general rise in imports and exports as a share of total world trade although their export integration may have slowed due to trade policy changes, market saturation, or economic difficulties, as seen by the export growth slump that occurred after 2014.

What does this mean for the economic integration of BRICS in the context of a monetary union?

The increase in intra-BRICS trade as a proportion of global trade indicates stronger economic ties, increased interdependence among BRICS countries and a synergetic movement of economies, which could enhance policy attunement and stable economic relations, pivotal for managing a shared monetary policy. In addition, the rise in intra-BRICS trade suggests that the BRICS countries might be diversifying and expanding their trade across various sectors to reduce reliance on external economies and minimize external economic shocks. However, potential trade saturation as indicated by the slump in 2014 suggests a need for policy innovation.

4.2.6.4. Trade Intensity Index (TII)

For the study of Trade Intensity, the data is taken over a period of 14 years, from 2008 to 2021 due to the unavailability of the relevant data before and after this period.

To examine the effects of various economic indicators on trade integration in an attempt to determine how to improve and further enhance the trade relationships among the BRICS countries, I used the TII (Trade Intensity Index).

The Trade Intensity Index is particularly useful for analyzing the dynamics of trade relationships over time, understanding economic dependencies, and assessing the impact of trade policies or economic events on bilateral trade flows. It helps policymakers, economists, and businesses to identify significant trading partnerships and to evaluate the effectiveness of trade agreements or regional trade blocs.

$$TIIAB=(XA/XAB)/(W/XB)$$

- *TIIAB* is the Trade Intensity Index between Country A and Country B.
- *XAB* represents the exports from Country A to Country B.
- *XA* is the total exports of Country A to the world.
- *XB* is the total world exports to Country B.
- *W* represents the total world exports.

Value Greater Than 1: If the index value is greater than 1, it indicates that the trade relationship between the two countries is stronger or more intense than would be expected based on their trade volumes with the world. This suggests a special trading relationship or dependence between the two countries.

Value Less Than 1: Conversely, an index value less than 1 implies that the trade relationship between the two countries is weaker than expected, indicating that they are less important to each other's trade relative to other global trading partners.

4.2.6.4.1. Descriptive Analysis

The data summary of country-pairs on BRICS countries' TII reveal the following:

Table 18: Intra-BRICS trade intensity (TII)

countrypair	mean	variance	lowest	highest
br/ch	2.180136	.4850172	1.303141	3.031965
br/ind	.7526283	.2230503	.3084275	1.179742
br/russ	1.039152	.3901721	.465844	1.60237
br/safrica	1.345568	.1914776	1.035428	1.654802
ch/ind	1.208509	.1364351	.9499129	1.3745
ch/russ	1.54431	.1458392	1.269085	1.723609
ch/safrica	1.400689	.1822438	1.116311	1.878677
ind/russ	.5655878	.1292459	.3920069	.7746466
ind/safrica	2.993811	.434165	2.222824	3.731604
russ/safrica	.1202471	.0606061	.0160511	.219809

- (Brazil-China): a relatively strong and slightly variable trade intensity
- (Brazil-India): a weaker trade intensity with some variation
- (Brazil-Russia): a moderate trade intensity with some variation
- (Brazil-South Africa): a fairly strong and consistent trade intensity
- (China-India): relatively strong and consistent trade relationship
- (China-Russia): a strong and consistent trade intensity
- (China-South Africa): a strong and somewhat consistent trade relationship.
- (India-Russia): a weaker and consistent trade intensity
- (India-South Africa): a very strong and somewhat variable trade relationship.
- (Russia-South Africa): a very weak trade relationship and relatively consistent

Overall, the data reveals disparities in the levels of trade intensity across the BRICS nations, with some having very strong economic ties (such as China-South Africa and India-South Africa) and others having comparatively weak ones (such as

Russia-South Africa). Trade intensity fluctuation, measured by the standard deviation, is often low to moderate, indicating that trade relationships have remained reasonably steady during the observed period.

4.2.6.4.2. Pooled OLS with Robust Standard Errors

To study the effect of economic indicators on TII, I used Pooled OLS with Robust Standard Errors.

I used the following variables:

Dependent: TII (Trade Intensity Index)

Independent:

- Inflation in the exporter country (expinflation)
- Inflation in the importer country(impinflation)
- GDP growth rate in the exporter country(expgdpgrrate)
- GDP growth rate in the importer country(impgdpgrrate)
- Exchange rate against the dollar in exporter country(expexchrate)
- Exchange rate against the dollar in importer country(impexchrate)
- Real interest rate in the exporter country(exprealint)
- Real interest rate in the importer country(imprealint)
- FDI inflows into the exporter country from the world(expFDI)
- FDI inflows into the importer country from the world(impFDI)
- Distance in kilometers between pairs of countries(Distkm)

$$TII=\beta 0+\beta 1\times expinflation+\beta 2\times impinflation+\beta 3\times expgdpgrrate+\beta 4\times impgdpgrrate+\beta 5\times expexchrate+\beta 6\times impexchrate+\beta 7\times exprealint+\beta 8\times imprealint+\beta 9\times expFDI+\beta 10\times impFDI+\beta 11\times Distkm+\epsilon$$

Table 19: Pooled OLS regression of TII on economic and gravity inicators

TII	coefficient	Robust std.error	t	p>ItI	[95% conf. interval]	
expinflation	-0.013	0.036	-0.36	0.721	-0.083	0.058
impinflation	-0.037	0.022	-1.7	0.091	-0.08	0.006
expgdpgrrate	0.043	0.031	1.39	0.167	-0.018	0.104
impgdpgrrate	-0.021	0.019	-1.09	0.278	-0.06	0.017
exprealint	0.027	0.007	3.71	0.00	0.013	0.041
imprealint	0.017	0.012	1.44	0.151	-0.006	0.041
expexchrate	0.011	0.005	2.05	0.043	0.0004	0.021
impexchrate	-0.012	0.002	-5.04	0.00	-0.017	-0.007
expFDI	2.66e-12	1.04e-12	2.54	0.012	5.90e-13	4.72e-12
impFDI	4.20e-12	9.66e-13	4.34	0.00	2.29e-12	6.11e-12
Distkm	-0.00005	0.00001	-3.55	0.001	-0.00007	-0.00002
_cons	1.195	0.410	2.91	0.004	0.383	2.007

The results of the Pooled OLS test are as follows:

- exprealint: The coefficient is positive and statistically significant, suggesting that higher real interest rates in the exporter's country are associated with higher TII.
- expexchrate: positively related to TII and is statistically significant (p-value = 0.043).
- impexchrate: significant negative relationship with TII, indicating that a decrease in exchange rates of the importer country (an appreciation of the importer's currency relative to $ as base currency) is associated with lower TII.
- expFDI: The coefficient is positive and statistically significant, which means that increases in FDI are associated with increases in TII.
- impFDI: a positive and statistically significant effect on TII

- Distkm: The distance between countries has a small but statistically significant negative impact on TII, implying that greater distance is associated with lower trade intensity.

The other variables do not have a clear effect based on this analysis.

What does this mean for BRICS in the context of a potential monetary union?

The regression analysis of trade intensity among the BRICS countries provides insights into augmenting trade integration, a pivotal first step towards a monetary union, by underscoring the significant effects of real interest rates, exchange rates, foreign direct investment (FDI), and geographic distance on trade flows The intensity of trade is influenced by real interest rates, which implies that the BRICS nations should coordinate their monetary policies to create favorable financial environment, which would in turn stimulate trade by lowering interest rates. A stable and predictable exchange rate regime is crucial for lowering transaction costs and minimizing the impact of exchange rate volatility on trade, an essential step towards a monetary union. The positive correlation between trade intensity and FDI provides evidence on the importance of crafting well-defined laws and incentives as a method of creating an advantageous environment to encourage intra-BRICS investments. Furthermore, the negative relationship between geographic distance and trade intensity indicates how important it is to invest in logistics and transportation infrastructure in order to reduce trade costs and time. When combined, these strategies have the potential to considerably increase intra-BRICS trade integration and facilitate the establishment of a sustainable monetary union.

4.2.6.5. Updates on Intra-BRICS Trade (2023) (Bonesh, 2023)

The trade volume of the five BRICS nations is effectively increasing due to several reasons including signing free trade agreements, establishing common standards for products, optimizing business methods, and removing barriers to market entry.

Table 20: Bilateral Trade Size

Country Pairs	**Bilateral Trade Size**
Brazil/China	• According to China General Administration of Customs trade Ch/Br reached US$165.6 billion an increase of 8.1% year-on-year. • April 2023, signed trade agreements resulting in bilateral trade reaching US$13.85 billion in June 2023 • agreements supposed to increase collaboration on a range of issues, from aerospace development to infrastructure investment • main products Brazil exports to China are iron ore, soybeans, and crude petroleum • China exported semiconductors, office machines, and smart phones
Brazil/India	• India now the 5th largest trading partner of Brazil • India exported US$9.72 billion of products during 2022, a significant increase over 2021's US$6.77 billion • Brazil exported US$6.34 billion to India during 2022, an increase from US$$4.9 billion in 2021. • bilateral trade growing at rates of 50% in either direction • Main India exports to Brazil are refined petroleum, pesticides, and packaged medicaments • Main products Brazil exports to India are crude petroleum, soybean oil, and gold
Brazil/Russia	• a huge increase in bilateral activity reaching US$10 billion by the end of 2022 • main products Russia exported to Brazil were mixed mineral and chemical fertilizers, potassic fertilizers, and nitrogenous fertilizers • main products Brazil exported to Russia are soybeans, meats, and coffee. Bilateral trade volumes are fairly

	even
Brazil/South Africa	• Brazil is South Africa's third-largest trading partner within the BRICS • 2022 bilateral trade reached about US$2.3 billion • Brazil exports meats, tractors, and ferroalloys • South Africa exports platinum, raw aluminum, and pesticides.
China/India	• Trade touched an all-time high of US$135.98 billion in 2022 • New Delhi's trade deficit with Beijing crossed the US$100 billion mark for the first time • bilateral trade currently steady despite frosty political relations • main products that China exported are computers, smart phones, and semiconductors • India exported iron ore, refined petroleum, and raw aluminum • vulnerable due to political rivalry and disputed territorial security issues • both leaders expressed their desire to resolve this issue during August 2023
China/Russia	• Volume increased and reached US$190 billion in 2022 • First six months of 2023 became higher by 20% compared to the same period in 2022 • Russia is China's main source of coal, crude oil, and gas imports, and there has been an upward trend in energy exports to China • the scope of agricultural trade and agricultural products is expanding • Exports from Russia to China increased by 84% in the first five months of 2023
China/South Africa	• bilateral trade of US$56.74 billion in 2022 • an increase of 11% over the previous year due in part to rising commodity prices • The main products China exports to South Africa are broadcasting equipment, computers, and coated flat-rolled iron. • The main products that South Africa exports to China are gold, diamonds, and iron ore.
India/Russia	• Russia rapidly moved from 25th to 7th position among India's trading partners since 2021

	• In February 2023 bilateral trade reached a record US$45 billion • A third of the exports of Russia to S.A. are mineral products (including ore and fuel) • India's exports to Russia are mainly chemical products, machinery, equipment and vehicles, food products and agricultural raw materials
India/South Africa	• In 2022, bilateral trade reached just under US$20 billion • well-balanced trade relationship with a small increase over 2021 • main products South Africa exported to India are gold, coal briquettes, and raw copper • main products India exports to South Africa are refined petroleum, autos, and special purpose ships
Russia/South Africa	• Bilateral trade has increased by 16.4% in 2022 compared to the previous year and has reached US$1.3 billion • Exports of S.A. to Russia is very low with exports worth only US$132 million from January to June 2023 • However, direct shipping routes have now be established for the first time in over 30 years

4.2.6.6. Export Diversification

Measuring export diversification is important in determining the feasibility of a common currency. For this criterion, I'm using the EDI (Export Diversification Index) and ECI (Export Concentration Index). Their values range from 0 to 1. The ECI reflects the degree of diversification in a country's export structure. A lower ECI indicates more diversification, while a higher ECI means that exports are concentrated in fewer products.

EDI reflects the spread of export volumes across different markets. Higher values reflect more diversification.

Table 21: Export Concentration Index (ECI)

Variable	Obs	Mean	Std.dev	Min	Max
BRECI	21	0.148	0.099	0.083	0.55
CHECI	21	0.101	0.008	0.08	0.11
INDECI	21	0.141	0.024	0.1	0.184
RUSECI	21	0.332	0.034	0.26	0.382
SAECI	21	0.143	0.028	0.112	0.249

Table 22: Export Diversification Index (EDI)

Variable	Obs	Mean	Std.dev	Min	Max
BREDI	21	0.527	0.051	0.458	0.62
CHEDI	21	0.441	0.029	0.38	0.47
INDEDI	21	0.499	0.044	0.436	0.563
RUSEDI	21	0.637	0.021	0.602	0.672
SAEDI	21	0.557	0.043	0.502	0.716

These tables present the summary of the data on both indicators for the five BRICS countries.

- *ECI:*
  - Russia shows the highest ECI among the BRICS countries reflecting a higher concentration of its exports in a fewer product. This might be due to its high dependence on exports of natural resources such as oil, minerals, and gas.
  - Brazil has the second highest ECI. Its exports are more diversified than Russia's, but still, it might be higher than the other three countries due to its dependence on

natural resources and raw material in its export's portfolio, mainly agricultural products.

- India and South Africa have more moderate ECI that suggest more diversification of exported products.
- China has the lowest ECI that means that it is the most diversified economy among the BRICS regarding exports.

- *EDI:*
  - Russia shows the highest EDI that suggests having the most diversified exports markets among the BRICS.
  - South Africa and Brazil also have a relatively high EDI, which means that their exports are distributed across more markets.
  - The data on China and India's EDI reveals a moderate level of export-market diversification but the lowest among the BRICS.

- *Standard Deviations:*
  - ECI: Brazil shows the highest variability among the BRICS nations suggesting more fluctuation in the diversification of its exported products. China, on the other hand, shows the lowest variability in its ECI. So, it has the highest but the most consistent level of diversification among the BRICS. The other three countries show moderate variability compared to Brazil and China although in varying degrees.
  - EDI: Brazil shows the highest variability in its EDI followed by India and South Africa with moderate levels of variability. China and Russia show the lowest

standard deviation which suggest more stability in the spread of their export volumes across markets.

The above results show considerable variability in exports' diversification and concentration. However, establishing a monetary union would require similarity among the BRICS in their economic structures, including diversification and concentration. This similarity functions like a cushion against sudden economic changes and reduces the probability of asymmetrical shocks among the BRICS countries. Despite the diversity shown in their EDI and ECI, the possibility of a monetary union is not ruled out. But this requires finding mechanisms to manage these disparities in their economic structure and lessen the chances of asymmetric shocks that might occur any time.

4.2.7. Financial Integration

An important step in examining the viability of a monetary union among the BRICS nations is to examine Financial Market Development, with a special emphasis on Financial Integration. This involves evaluating the degree of interdependence between the financial markets of the BRICS countries. The degree of cross-border investment inside the bloc and the openness to capital flows are important considerations. Greater levels of financial integration point to a better chance of a monetary union being successfully implemented inside the BRICS framework.

4.2.7.1. Interbank Cooperation Mechanism

In line with the BRICS' countries' commitment to strengthen cooperation amongst member BRICS development banks, the Framework Agreement on Financial Cooperation within the BRICS Interbank Cooperation Mechanism was signed by

member countries' development banks, committing the member banks, namely the Development Bank of South Africa (DBSA), China Development Bank (CDB), EXIM Bank of India, Russia's Vnesheconombank and Brazil's Banco Nacional de Desenvolvimemto Economico e Social (BNDES).

The system would allow the participating banks to lend money to one another in local currency. Through the reduction of exchange rate risk associated with cross-border commerce and the minimization of currency exposure, the agreements seek to enhance and expand trade and economic links among the financial institutions and companies of the BRICS Member Countries. As a result, the Mechanism would allow the five nations to boost trade and investment flows, lower trading costs, and lessen their reliance on the US currency.

To facilitate the coordination of the member banks' work towards these goals, technical teams communicate and meet periodically to discuss and determine areas of collaboration. The annual Financial Forum, which takes place in conjunction with the BRICS Summit every year and is attended by the chairmen and chief executives of the participating member banks, is responsible for supervising and organizing these events.

4.2.7.2. NDB and CRA

The New Development Bank (NDB) and the Contingent Reserve Arrangement (CRA) say much about the financial integration efforts among the BRICS. Together, they represent structured cooperation in financial affairs, with an aim to support investments in infrastructure (NDB) and provide a safety net for the prevention of balance-of-payment crises through currency swaps (CRA). It is in this endeavor that the BRICS countries seek and represent their aspirations to promote their shared financial

framework, which will improve the economic stability and development and reduce dependency on the prevailing Western financial institutions and mechanisms at the moment.

4.2.7.3 Overview of FDI in BRICS (Joseph Clements, 2023)

4.2.7.3.1. Significance of FDI to BRICS

- Descriptive Analysis

Despite the differences in FDI inflows and outflows within the bloc, it is clear that FDI plays a major and increasing role in economic growth in all of the BRICS, as evidenced by the contribution of FDI to Gross Fixed Capital Formation (GFCF).

Table 23: FDI/GFCF

Variable	Obs	Mean	Std.dev.	Min	Max
Brazil	11	20.054	4.494	14.544	27.009
China	11	5.032	1.691	3.061	8.456
India	11	5.914	1.356	3.927	8.841
Russia	11	8.189	4.252	2.438	13.762
South Afrcia	11	12.482	20.375	2.436	73.408

Brazil traditionally has the highest share of FDI inflows to GFCF (above 10 per cent since the creation of the group and reaching more than 22 per cent in 2019). In 2021, South Africa had an FDI to GFCF ratio of almost 75 per cent, where usually it does not exceed 10 per cent. In India, the share of FDI inflows to GFCF over the years 2019 to 2021 was 6.7 per cent, slightly higher than the world average of 5.7 per cent.

The only BRICS country where the ratio of FDI inflows to GFCF has been consistently below the world average is China. This does not necessarily mean that FDI plays a less important role in China's economy, but rather that domestic investment is relatively more significant. In 2021, for example, China's total GFCF amounted to $7.2 trillion, while in the United States (with the world's second highest GFCF) it totaled $4.9 trillion. As a group, it is clear that FDI in the BRICS plays a very meaningful role not only in GFCF, but also in the GDP growth of the bloc.

- Correlation Analysis

To examine the relationship between FDI inflows and GDP growth rate, I ran a correlation analysis.

Table 24: Correlation analysis (GDP growth rate and FDI)

Correlation	gdpgrate	FDIinflows
gdpgrate	1.00	
FDIinflows	0.3639* 0.0001	1.00

- The correlation coefficient of 0.3639 indicates a positive but moderate correlation between the two variables. This suggests that as FDI inflows increases, the GDP growth rate tends to increase as well, but not strongly.
- A p-value of 0.0001 suggests that the correlation coefficient is highly statistically significant; thus, there is indeed some kind of relationship between FDI inflows and GDP growth rate in the data from these countries.

4.2.7.3.2. FDI in BRICS since 2001

In the BRICS Investment Report that was prepared at the request of the BRICS Trade and Investment Working Group under the China Presidency in 2022, BRICS collaboration in the area of investment for development was discussed deliberately. The following is a summary of the most important and relevant points.

During the first ten years of the 2000s, the BRICS countries (Brazil, Russia, India, China, and South Africa) experienced a strong increase in foreign investment coming in. Each year, on average, the investments grew by 13.5%, which was nearly twice as much as the global average growth rate of 7.6%.

However, from 2011 to 2021, things changed, and the growth of foreign investment in the BRICS nations slowed down significantly to just 1.7% per year. This was a reflection of the worldwide investment scene, which actually saw a slight decrease in investment during this time.

Looking at each BRICS country individually, we see different patterns:

- China's foreign investment inflows grew by more than 10% annually in the first decade, but this rate decreased to 4% annually in the second decade.
- Russia and India had very high growth rates in foreign investment inflows (about 30% and over 20% annually, respectively) from 2001 to 2011. However, in the following decade, their growth rates dropped to just above zero and 2% respectively.
- Brazil had a strong increase in foreign investment inflows in the first decade but then experienced a decline in the second decade, despite a recovery starting in 2015.

- South Africa was the exception; it had a negative growth rate in foreign investment inflows from 2001 to 2011, but then saw a significant increase, with an annual growth rate of over 25% from 2011 to 2021.

Despite a stagnant global investment environment, the BRICS have outperformed global averages, indicating a resilient attractiveness to foreign capital. This sustained FDI growth has contributed to the BRICS' economic development and their increasing influence on the global stage.

Despite slowing and fluctuating growth from 2011 to 2021, the grouping performed better than the world average and its share in global FDI flows posted an increase over the decade.

FDI inflows to the BRICS and share in world inflows, 2011-2021 (billions of dollars and per cent)

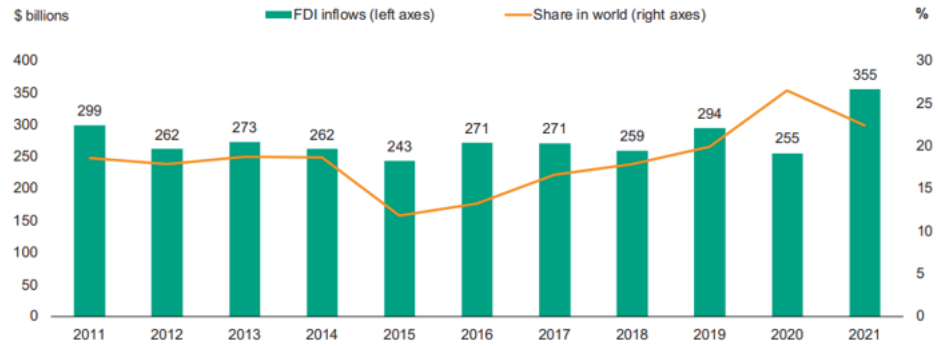


Figure 11. FDI inflow to the BRICS (Source: UNCTAD, FDI/MNE database)

From 2001 to 2010, FDI outflows from the BRICS grew from one per cent of global flows to over 10 per cent. During this period, the annual growth rate of outflows, at 33 per cent, was more than three times larger than the global average. By 2020, the share of BRICS outflows had reached 20 per cent of global flows. Despite having since fallen back, as a share of global outflows, the absolute value of BRICS outflows reached

a historic high, in 2021, at almost $250 billion (figure 3). And, even though the annual growth rate of outflows slowed markedly in the decade 2011-2021, reflecting the global environment for FDI, the annual growth rate of BRICS outflows remained more than 10 times larger than the global average.

FDI outflows from the BRICS and share in world outflows, 2011-2021 (billions of dollars and per cent).

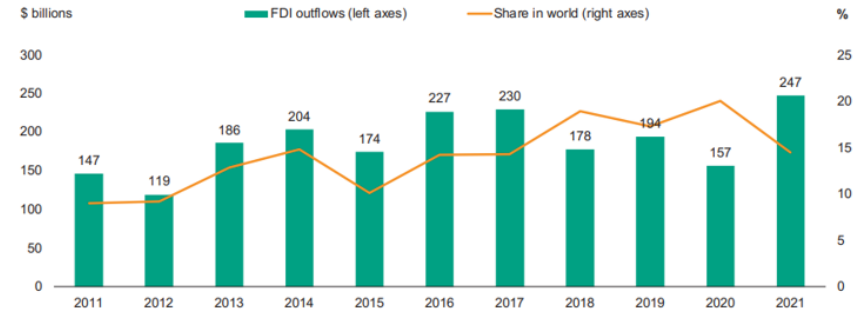


Figure 12. FDI outflows from the BRICS (UNCTAD, FDI/MNE database)

Intra-BRICS investment grew steadily in the 2010s, both in absolute and relative terms. According to UNCTAD data, total inward FDI stock between BRICS countries increased from $27 billion in 2010 to $167 billion in 2020 (table 1), representing a share of 1.3% and 4.7% percent of their total FDI stock as a group respectively. This growth was mainly driven by China, which was by far the largest investor and recipient in intra-BRICS investment. Brazil and India also witnessed strong growth in investment from other BRICS countries, while the Russian Federation experienced tepid growth, and intra-group investment stock in South Africa dropped slightly. It is worth noting that intra-BRICS investment numbers need to be treated with caution, since a significant portion of their outward and inward investment flows are channeled through offshore financial centers, and the investment between the BRICS could be underestimated.

Intra-BRICS inward FDI stock (millions of dollars)

Country	2010	2015	2020
Brazil	791	2 299	1 935
China	14 512	64 430	151 439
India	622	1 218	1 795
Russian Federation	4 187	3 440	4 819
South Africa	7 281	3 978	6 999
Total	**27 393**	**75 365**	**166 987**

Source: UNCTAD FDI database

Figure 13. Intra-BRICS inward FDI stocks

In addition, Intra-BRICS investment has been increasing, with China being the largest investor. BRICS nations are transitioning towards a more investment-friendly policy environment to support foreign investments, implementing policies that facilitate business ease, improve regulatory frameworks, and enhance investor protections and incentives.

The number of investment projects among the BRICS countries has expanded dramatically, especially in the manufacturing sector, demonstrating the group's appeal to investors looking to participate in both local and regional markets. Even with this expansion, there is still a lot of unrealized potential for intra-BRICS investment, particularly in sectors like infrastructure and renewable energy. By fostering capital formation, knowledge transfer, and employment creation, strengthening investment cooperation may promote sustainable economic growth. Prospective areas of focus include promoting manufacturing investments to increase value addition and investigating prospects in renewable energy. Furthermore, long-term growth across the BRICS countries depends on infrastructure investment, which is made possible by advancements in public-private partnership (PPP) frameworks and backed by financial organizations such as the New Development Bank.

Moreover, BRICS countries are revising their International Investment

Agreements (IIAs) to modernize and align them with contemporary standards and sustainable development goals. These reforms aim to balance investor protections with the right to regulate for public interest, reflecting a shift towards more nuanced and development-oriented investment policies within the BRICS bloc.

4.2.8. Political and Legal Readiness

Political readiness in the context of a BRICS potential monetary union encompasses political stability, political will, and commitment to a shared vision.

4.2.8.1. Political Stability

For the analysis of political readiness of the BRICS countries for a monetary union, I'm using the Political Stability and Absence of Violence Index. This index measures the probability of political turmoil or instability that may impede a nation's capacity to establish and uphold a mutually beneficial arrangement, such as a monetary union.

4.2.8.1.1. Descriptive Analysis

Table 25: Political Stability data summary

poltical stability				
country	mean	stdeb	min	max
brazil	37.95141	8.797332	20.75472	57.14286
china	30.15324	4.04839	25.59242	38.57143
india	15.27877	3.977116	9.045226	24.5283
russia	18.42299	5.143832	7.76699	27.35849
safrica	39.38526	7.58258	19.81132	50.72464

- Brazil has a mean political stability score of 37.95 with a standard deviation of 8.79, which indicates some variability, and the highest among the BRICS countries, in its political stability over the period studied.
- China shows more consistency in its political stability with the least variability (a standard deviation of 4.04).
- India has a mean political stability score of 15.27 with a standard deviation of 3.97, showing less variability than Brazil and China. Its minimum score is quite low at 9.04, suggesting significant periods of instability.
- Russia has a mean score of 18.42 with a standard deviation of 5.14, which implies moderate variability in political stability.
- South Africa has a mean score of 39.38 and a standard deviation of 7.58, indicating a relatively high level of variability in political stability.

These results point to large differences in political stability between the BRICS countries, differences that may pose obstacles to the implementation of well-coordinated economic or monetary policy. However, those countries with a higher mean stability score may lead the way in pushing for integration and thus provide for a firmer basis of collaboration. The minimum and maximum values show the range of political stability experiences within each country, and there is no BRICS country at its minimum levels of stability. Consistency in political stability, and consequently, in policymaking is crucial for a monetary union since it allows for not only reliable long-term planning but also sustained economic policies, and China shows a more stable environment with a lower standard deviation. Nevertheless, the closer the mean stability among countries, the more similar the political environments would be and thereby provide an advantage to cooperation. On the other hand, huge differences in scores would most indicate

varied political environments, which makes policy alignment difficult. Overall, the data reveals the importance of taking both factors, political stability, and consistency, into consideration when evaluating the feasibility of a BRICS monetary union.

4.2.8.1.2. Correlation Analysis

The correlation analysis tries to look at how institutional quality and various economic factors affect political stability. This is an important realization for the policymakers while contemplating policies that would enhance economic stability as a necessary condition for improving economic integration among BRICS countries or potentially setting up a monetary union.

Table 26: Correlation analysis (political stability- institutional and economic indicators)

correlation	politest	corruption control	inflation	pppGDP/cap	exchrate	govsp/GDP	debtGDP
politst	1.00						
Corruption control	0.6686* 0.000	1.00					
inflation	-0.2967* 0.0016	-0.3701* 0.0001	1.00				
pppGDP/cap	0.0719 0.4551	-0.3869 0.000	0.0947 0.3253	1.00			
exchrate	-0.697* 0.000	-0.4727* 0.000	0.2299* 0.0157	0.0694 0.4712	1.00		
Govsp/GDP	0.09 0.3496	0.4905* 0.000	-0.2545* 0.0073	-0.5012* 0.000	0.0609 0.5275	1.00	
debtGDP	-0.0851 0.3766	0.0242 0.8021	-0.0597 0.5354	-0.1596 0.0958	0.0947 0.3251	0.1812 0.0582	1.00

Corruption Control: Political stability and corruption control show a strong positive relationship. Thus, governance reforms aiming at lowering corruption may be

necessary to promote political stability and assist in the BRICS countries' integration endeavor.

- Exchange rate and inflation are negatively correlated with political stability, highlighting the importance of prudent monetary policy and exchange rate management. Creating systems to control exchange rate volatility and ensure price stability may be pivotal for a future monetary union.

While not all the economic factors prove to have high correlations with political stability, the overall results do point out that institutions and economic conditions are very much a determinant of the way in which politics are shaped. Coordinated economic policies that tackle key issues like those concerning macroeconomic stability and control of corruption, are, therefore, crucial in the installation of a monetary union.

4.2.8.2. Political Will and Commitment to a Shared Vision

A monetary union within BRICS necessitates strong political will to overcome sovereignty concerns, coordinate fiscal and monetary policies, establish an institutional framework, gain public support, and facilitate negotiations. This is due to the need to give up control over economic policies, align various national interests, and set up effective governance structures. Political commitment is also key for securing public confidence in the union.

Actually, skeptics of the BRICS common currency project rely mostly on this criterion to justify their criticism of the bloc and their belief that such a project is practically farfetched.

But what is the driver of this will to establish a monetary union?

The global economy has long operated under the hegemony of the US dollar and other major western currencies. The proposition of a BRICS currency signals a desire for a seismic shift in economic power dynamics challenging the traditional reliance on western financial systems. At the heart of this movement is a shared motivation among the BRICS nations to insulate their economies from the fluctuations of the dollar exchange rate and to assert a greater economic independence that is known as de-dollarization.

Prior to the proposal of a BRICS currency, the member states had already begun to explore alternative financial mechanisms including currency swap agreements that allowed the BRICS nations to trade in their local currencies bypassing the dollar and reducing transaction costs.

The BRICS common currency is a more ambitious project and is envisioned as a tool to facilitate trade and investment within the bloc minimizing reliance on the US dollar. There's a collective desire among the BRICS countries to establish a more autonomous economic sphere.

However, in the latest summit among the BRICS, there seemed to be a mix of enthusiasm and caution regarding currency's creation.

It's obvious that each of the BRICS countries supports this new initiative for different reasons. Russia and China are at the forefront of the de-dollarization move for their political interests. The Chinese strategic interests are not aligned with those of the other countries. One of China's priorities is finding somewhere to park its external surpluses beyond the reach of the US Office of Foreign Assets Control and finding stores of value other than US treasuries. While none of the other four BRICS members can provide liquid assets, they can provide investment opportunities, especially in raw

materials. So, not only are there practical challenges in a common BRICS currency. In seeking one to challenge the US hegemony in foreign exchange, the non-Chinese members of countries of the group may just increase their dependence on China.

Russia, the energy exporter, prefers to accumulate “rainy day” sovereign wealth funds away from the US. However, the alternative to the US is not a diversified group of growing countries, but essentially one country, China.

On the other hand, India, South Africa, and Brazil have their own pragmatic reasons for supporting the move. Reduced dollar dominance of international transactions will make it easier for these nations facing a dollar crunch to repay their debts owed to international organizations. (Mcnamara, 2023) However, although India is advocating de-dollarization, it is less enthusiastic about creating a common currency and is focused on strengthening the Rupee instead. One reason is that India enjoys good relations with the U.S. and Europe with trade and military deals worth billions of dollars and does not want to risk its trade with Western powers, believing in the yet-to-be-released BRICS currency. In addition, it is wary of China’s power and its prowling nature, and hence wants to remain alert of the possibility of China using BRICS for her self-interest. (Deshpande, 2023) Another challenge is the risk arising from exchange rate volatilities in a BRICS member nation. Given the sharp decline in the value of the South African Rand, for example, it becomes necessary to set a band within which a BRICS member currency ought to fluctuate. However, determining such a fluctuation band is not feasible due to the lack of a defined set of convergence criteria the member countries must follow before joining the BRICS currency union similar to those set by the EU in the Maastricht Treaty.

Among the various opinions about the common currency of the BRICS, one less pessimistic one was expressed by David Woo, a former IMF economist and Wall Street strategist. He identified three objectives in creating a common currency through speeches and interviews with BRICS officials.

- Reducing the hegemony of the US
- Shielding against the US weaponizing the dollar against them
- Promoting economic integration of the block

Although Woo believes that not all these objectives carry the same importance for all the BRICS members, two countries within the BRICS seem to be on the same page about all the three objectives, Russia and China. Russia is already facing western sanctions, and China knows it could be next if a conflict over Taiwan were to break out. Bilateral trade between Russia and China is booming, and the two economies have a good degree of synergy across many areas that makes further economic integration an obvious win-win for both. The fact that they share a common border, their governance systems are not so dissimilar, and both run healthy currency accounts mean a union between them could be sustainable and beneficial for both countries.

During the transition phase, the two countries can adopt a currency like the ECU, the European Currency Unit, the predecessor of the Euro, that will initially be used to price international financial transactions. Such a currency, which would exist alongside the RMB and RUB could also help provide an anchor for the two countries to work towards policy and economic convergence before they decide to tie the knot or not. Eventually, if the experiment is successful, they can consider enlarging the group by adding members that meet their economic criteria.

4.2.8.3. Legal Readiness

Legal readiness analysis necessitates the assessment of the legal frameworks of BRICS countries concerning monetary policy and financial stability

BRICS's institutional and legal structure is essential to its functioning even if it is less formal than those of other international organizations. An organized yet adaptable approach to international collaboration is demonstrated by the bloc's development and evolution, from the first meetings of foreign ministers to the admission of South Africa and the creation of the BRICS Business Council. These initiatives are intended to provide a clearer organizational framework with the potential to develop into an official international organization.

A strategic approach to resolving global financial issues and attaining competitive, balanced growth is reflected in the BRICS countries' emphasis on economic collaboration. The group's long-term ambition for cooperation across many sectors is emphasized in documents such as the Economic Partnership Strategy and the Trade, Economic, and Investment Cooperation Road Map.

- Economic Partnership Strategy: The BRICS Economic Partnership is based on the Economic Partnership Strategy (Ufa, Russia, 2015), which has become the institutional basis for cooperation. The document defines the long-term benchmarks of the sectoral and general conceptual nature, in order to strengthen economic growth and increase the level of competitiveness of the BRICS economies in the international arena.
- In 2015, the BRICS Trade, Economic and Investment Cooperation Road Map for the period up to 2020 was signed with a list of joint major projects in the field of infrastructure, industry, and agriculture.

- Xiamen Declaration (April 9, 2017): It stressed the importance of deepening trade and investment cooperation to tap into the economic potential of BRICS countries. It also called for the improvement of trade and investment mechanisms and the expansion of interaction to enhance economic complementarity and diversification.
- Shanghai Plan for Trade and Economic Cooperation (September 2017):
  It outlined a comprehensive strategy covering trade facilitation, investment promotion, and technical and economic collaboration. It also focused on enhancing cooperation in trade in services, e-commerce, and intellectual property rights to support the modernization and integration of BRICS economies.
- BRICS Strategic Customs Cooperation Program (Signed on September 4, 2017):
  It aimed at simplifying customs procedures to facilitate smoother trade among member countries. In addition, it emphasized mutual exchange of information and the recognition of customs control results to improve efficiency and reduce trade barriers. Also, it encouraged mutual assistance in law enforcement and the adoption of advanced information technologies to modernize customs processes.

These agreements reflect BRICS' commitment to fostering a more integrated and efficient economic partnership by addressing key areas such as trade facilitation, investment, technical cooperation, and customs procedures. The focus on using modern technologies and shared information systems indicates a forward-looking approach to overcoming challenges in international trade and investment.

Summing up, BRICS is an amazing example of trans-regional corporation and integration that has a huge impact on world political and economic dynamics. Each project and strategic relationship represent a collective goal of the organization at a

worldwide level, such as to contribute and enhance economic stability, growth, and competitiveness.

4.2.9. Monetary Policy Coordination: Central Banks' Independence

For the BRICS countries to establish a unified currency, central bank independence is essential because it guarantees that choices about monetary policy are made independently of politics and with an eye on long-term economic stability rather than expedient political advantages. Independent central banks are better able to maintain the credibility of the single currency, regulate exchange rates, and control inflation—all factors that are critical for investor confidence and economic stability in the diverse political contexts among the BRICS nations. In order to effectively manage a single currency that would have to account for a variety of economic situations and policies, this independence is essential.

Table 27: BRICS' central banks' independence

Country's Central Bank	**Status**
Central Bank of Brazil (*Banco Central do Brasil)*	In carrying out its tasks, the Central Bank of Brazil operates independently, with the primary goal of stabilizing the value of the country's currency. The bank is not associated with any ministry. The primary monetary authority of Brazil is the central bank, much like in other nations.
People's Bank of China	It is responsible for carrying out monetary policy and regulation of financial institutions in China. Though operating with some autonomy, the PBC lacks central bank independence, and is required to implement the policies of the Chinese Communist Party under the direction of the party's Central Financial Commission.
Reserve Bank of India (RBI)	It is fully owned by the Ministry of Finance,

	Government of India. Until the Monetary Policy Committee was established in 2016, it also had full control over monetary policy in the country. In 2016, the Government of India amended the RBI Act to establish the Monetary Policy Committee (MPC). This limited the role of the RBI in setting interest rates, as the MPC membership is evenly divided between members of the RBI (including the RBI governor) and independent members appointed by the government. However, in the event of a tie, the vote of the RBI governor is decisive.
Central Bank of Russia	It was declared a legal financial entity later that year. The Central Bank of Russia is independent from the federal and local governments. Among its various duties, the Bank of Russia is responsible for planning and implementing the country's monetary policy, working along with the Russian Government. It sets the short-term interest rates, which is one of the main instruments in implementing its monetary policy.
South African Reserve Bank (SARB)	The independence and autonomy of the Bank are entrenched in the Constitution. The SARB has the independence to use any of the monetary policy instruments at its disposal to achieve its monetary policy goal. However, the selection of a monetary policy goal is the responsibility of government.

The BRICS countries' varying degrees of central bank independence draw attention to possible obstacles and factors to be considered for a monetary union. Attaining agreement on monetary policy within a union would necessitate careful negotiation and compromise, since the central banks of Brazil and Russia operate independently, while the South African Reserve Bank's autonomy is protected by the constitution. In contrast, the central banks of China and India are subject to greater governmental or party influence. This variety emphasizes how crucial it is to have a

clear, cohesive framework that respects the unique operating characteristics of every central bank while pursuing shared monetary objectives.

CHAPTER 5

CONCLUSION

The BRICS started as a group guided by the principle of South-South cooperation and aiming to foster solidarity among developing nations. Then, their goal developed into a strong will to shift economic and political power away from the advanced economies of the west, an aim facilitated by globalization.

In their attempt to foster political, security, military, sociocultural and economic integration, the BRICS are seeking to fortify and sustain relationship by various means including recently conveying their desire to form a monetary union. As a result of the US$ hegemony and weaponization, the BRICS are seeking to de-dollarize. Several options are being discussed, including creating a common currency for their trade and investment.

In this research, qualitative and empirical analysis of the relevant OCA criteria, original and expanded, were conducted to study the feasibility of a BRICS monetary union and adopting a common currency. The results of this study revealed various complexities and few opportunities regarding the potential currency.

The analysis of the symmetry of shocks reveals a discrepancy in the BRICS economic dynamics as related to economic shocks. Although there's evidence of economic symmetry in GDP growth rate and some aspects of the exchange rate, which can be a point in favor of a monetary union, the same correlation analysis uncovers asymmetry regarding India's position and China's distinct exchange rate dynamics compared to the other group members. The panel data analysis also reveals significant asymmetries in the BRICS response to global economic conditions. The complexities

underscored by this analysis make aligning monetary policies challenging. Policymakers have to consider both shared and divergent economic dynamics, in crafting economic policies. So, while there's potential for increased economic coordination, they should approach this issue cautiously by considering flexible monetary mechanisms that can adapt to the diverse economic profiles of the BRICS countries.

Like most of the developing countries, the BRICS are experiencing a shift from industrial and agricultural sectors to the service sector as shown in the analysis of labor mobility within BRICS. However, the variations in the degree of labor mobility across the BRICS nations can make the establishment of a monetary union challenging due to the difficulty in aligning their monetary policies. On the other hand, the analysis of labor mobility among the BRICS has more positive prognosis since the BRICS countries are diligently seeking the implementation of educational, technology, and skill-sharing projects, as well as facilitating labor movement between them by easing visa procedures for the sake of aligning labor market and economic policies among each other. The success of these efforts can be conducive to a deeper economic and social integration, an important milestone in the monetary union project.

The analysis of price and wage flexibility reveal considerable variability in these indicators, which suggests difficulty in attaining the convergence necessary for a monetary union. The results of the PVAR analysis reveal a lack of substantial impact of lagged changes in minimum wage growth rate on inflation. This enables policymakers to craft minimum wage policies with some degree of freedom. However, the significant effect of lagged inflation on minimum wage growth rate can allow for the adjustment of minimum wages in response to changes in inflation. Nevertheless, in order to maintain

consistency and avoid inflationary spirals, coordinated monetary policy is necessary to control inflation expectations and wage-setting processes across the union.

Regarding fiscal transfer mechanism, it is still inexistent in its absolute form among the BRICS countries. However, they have shown dedication to creating alternative financial institutions such as the NDB and CRA, their involvement in sustainable development projects, and offering financial support during liquidity crisis. By addressing obstacles such as the CRA's operating constraints, the NDB's poor disbursement rates, and governance concerns, those financial institutions can become more powerful and supportive of further economic integration of the BRICS.

Concerning the convergence analysis, the results provide evidence of conditional convergence in a few economic indicators among the BRICS countries, which can provide some support for the feasibility of a monetary union. However, the divergence in budget deficit relative to GDP and its positive correlation with public debt and inflation can have adverse consequences that lead to more divergence depending on the individual countries' response to inflation fluctuations and the management of their fiscal policies. Thus, the BRICS countries should consider developing appropriate institutions and ensure convergence across a broader range of macroeconomic indicators to establish a stable and sustainable monetary union.

The analysis of trade reveals an upward trend, and the positive development in bilateral trade agreements and trade volumes in recent years indicate growing economic ties and potential for further integration. However, the variability in trade openness and intensity necessitates careful coordination of trade and macroeconomic policies if a monetary policy is to be successful. In addition, the disparities in exports diversification and concentration have to be managed so as to minimize risks of asymmetric shocks.

So, taking the necessary measures to coordinate policies, facilitate trade through investment in infrastructure, and enhancing exports diversification can support the potential for a common currency.

As for the financial integration, the BRICS countries have shown growing interdependence and cooperation in developing the financial markets, further enhanced by the establishment of the BRICS Interbank Cooperation Mechanism and the Framework Agreement on Financial Cooperation. Moreover, they managed to maintain enduring attractiveness to foreign investors despite the slowdown in global FDI growth rates in recent years. FDI plays a significant role in the development of the BRICS nations, and despite the variations among them, the correlation analysis reinforces the effect of FDI on the bloc's economic activity. In addition, the progress in intra-BRICS investment reflects economic synergies and enhances further economic consolidation and integration. Furthermore, the revision of the International Investment Agreements reflects modern standards and sustainable development goals and promotes a balanced and development-oriented investment environment. If the BRICS keep up these efforts, they will be enhancing the likelihood of a monetary union.

BRICS ought to show political and legal readiness given their will to create a monetary union. The analysis manifests significant variability in political stability among the BRICS countries, which suggests dissimilarity in their political environments and pose challenges for coordinated economic and monetary policies. The correlation analysis between political stability, institutional quality, and economic indicators reveals the influence of institutions and some economic conditions on how politics are shaped. Therefore, coordinated economic policies that mainly tackle macroeconomic stability and corruption control are key for establishing a monetary union. In addition,

political will and commitment to a shared vision are also crucial for creating a monetary union. The analysis reveals that all the BRICS countries aim at avoiding the hegemony of the US$; however, they exhibit different levels of enthusiasm about a common currency and seem to have divergent national agendas. But still some economists see the potential in country pairs, such as China and Russia, to act as the anchor for the remaining countries in their journey towards a monetary union due to their alignment in objectives and the considerable degree of synergy in various domains.

The analysis of the legal frameworks of the BRICS concerning monetary policy and financial stability reveals their collaborative work towards fostering economic growth, competitiveness, and stability through the establishment of various agreements and strategies that aim at enhancing economic integration, investment promotion, trade facilitation, and technical cooperation among its members. Although the legal and institutional structures of the BRICS are less formal than those of other international organization, they have laid the foundation for organized and adaptable international collaboration that has advanced the BRICS as a significant player in the global economy.

Finally, the analysis of the BRICS' monetary policy coordination showed varying degrees of central bank independence implying possible challenges and hurdles to cope with in a monetary union project. This asserts the need for providing a framework that regards the distinct operating characteristics of every central bank while pursuing shared monetary objectives.

In planning to create a monetary union and adopt a common currency, the BRICS bloc can consider and benefit from the experience of the EU. Before a European country could join the European Union, it had to carry out certain measures. These

included the elimination of trade barriers and tariffs, the removal of passport controls, and the streamlining of customs. Additionally, EU countries had to be willing to relinquish some degree of political power to a separate, independent overarching body. In addition, it had to fulfill several criteria that were agreed upon in the Maastricht treaty. However, some countries manipulated their accounts and rushed their entrance into the EU, which had its negative consequences on the union many years later.

Still, the EU countries had many common characteristics. The key eurozone states are all democracies. They are broadly aligned on foreign policy, and all are NATO members. They have a shared legal and commercial Acquis, drafted by a shared parliament and a shared executive, under a shared supreme court, in a union with collective institutions dating back to 1957. Member states have no veto over extensive portions of policy. Yet even this level of integration proved too little for a functional currency. One-size-fits-all interest rates for economies with moderately different structures and trend growth rates led to massive intra-EMU trade and capital imbalances. The bloc swayed from one crisis to another, dividing Europe into antagonistic camps of creditor and debtor nations, all ending in an investment collapse and an economic lost decade (Sanghani, 2024). It's worth noting that, unlike the EU, the BRICS countries have much less in common. They have different political regimes, and there are some political conflicts between China and India over border issues despite their presidents' recent expression of their will to find effective solutions. In addition, there exists much doubt about the BRICS members' willingness to submit to joint laws, joint courts, and joint executive necessary for the management of a common currency. Moreover, the BRICS Joint Statements and Declarations shows various references and pledges to promote trade, investment, and economic cooperation among these countries.

Also, they signed an agreement during GOA summit to facilitate customs cooperation with an eye to reduce non-tariff barriers among the nations (Mishra, 2016); however, one of the issues with BRICS research is that, except for the declarations adopted after the annual summit meetings and some ministerial meetings, they provide "little or no information about the actual outcomes" of the interactions between the parties. This is noticeable in the various BRICS action plans issued after each BRICS summit. These plans "often do not provide much detail" but only generally refer to meetings and consultations among the BRICS parties (Hooijmaaijers, 2021).

As a result, it's undoubtful that the BRICS will probably face more complex challenges and must overcome obstacles that already exist or might emerge during their journey towards a monetary union. Rushing the union before achieving the minimum requirements of convergence, political will, and an aligned agenda would lead to absolute failure.

To sum up, building on their strengths, progress, and effective efforts, especially in trade and investment, and addressing their discrepancies in economic and financial dynamics by coordinating their macroeconomic policies, developing flexible monetary mechanisms, fostering political and legal readiness, and committing to a shared vision among BRICS countries will be crucial in overcoming divergent national agendas and achieving a successful monetary union.

CHAPTER 6

RECOMMENDATIONS

Before the start of its latest annual summit in South Africa, more than forty countries had expressed interest in joining BRICS, and twenty-three formally applied to join. Of these, five countries- Egypt, Ethiopia, Iran, Saudi Arabia, and the UAE- were invited to join, and they actually became full members from January 1, 2024. The bloc says it is seeking to grow a stronger coalition of developing nations who can better put the interests of the Global South on the world's agenda. It wants to see a "greater voice and representation" for emerging economies (Ismail, 2023). The expanded group has a combined population of about 3.5 billion or 45% of the world's inhabitants. Combined, members' economies are worth more than $28.5tn or about 28% of the global economy. With Iran, Saudi Arabia, and UAE as members, BRICS countries produce about 44% of the world's crude oil. (BBC.com)

Iran holds the world's second-largest gas reserves and a quarter of the oil reserves in the Middle east. Saudi Arabia and UAE are the Persian Gulf's biggest political and financial heavyweights and two of the largest energy suppliers (By Farnaz Fassihi, 2023). Egypt's strategic position, coupled with its growing economy, presents a wealth of opportunities for the BRICS nations. Beyond human resources, Egypt's affiliations, being a member of both the Arab League and the Organization of Islamic Cooperation, grant BRICS an extended reach into vital markets and resources (Hamza, 2023). Ethiopia's demonstration of its power in the Horn of Africa and its influence over parts of the Red Sea and Indian Ocean waters, highlights the nation's crucial role in the region. By welcoming Ethiopia, BRICS effectively establishes a foothold in an

area where access to maritime routes and control over the Red Sea and Indian Ocean waters are increasingly becoming points of dispute (Osman, 2023).

The expansion of the BRICS offers various opportunities to the bloc, but at the same time, it poses further challenges in relation to de-dollarization in its various forms discussed by the group including creating a common currency. Freedom from Western economic and political hegemony requires the development of a broad economic and monetary consensus, and it must be backed by a solid political will. Many observers believe that the BRICS bloc faces problems with both sides of this equation. It has been slow to come to a workable economic-monetary consensus, and its members do not share the political will to make that consensus a reality. The expansion of the bloc is likely to further hinder this process, introducing additional competing agendas and conflicts to the group.

Other researchers exhibit a more positive opinion and forecast for the BRICS future economy. They say that despite the complexities and difficulty of the single currency project, the BRICS group can become a platform for closer bilateral relations between members. Local currencies are already being used to settle payments in inter-BRICS bilateral trade, and this practice will undoubtedly become more common. Even if it does not amount to a single-currency regime similar to the dollar or the euro, it is nevertheless a tangible step on the way to liberation from Western monetary-economic domination. Similarly, as the New Development Bank grows stronger following the inclusion of new BRICS members, it can also aid troubled BRICS economies without the detrimental conditions typically imposed by Western-led international financial institutions (Aljazeera, 2023). Therefore, a new study of the feasibility of creating a common currency, a new reserve currency, a currency based on a basket of BRICS'

currencies, or other form of monetary cooperation conducing to de-dollarization by the expanded BRICS bloc can be very interesting and insightful.

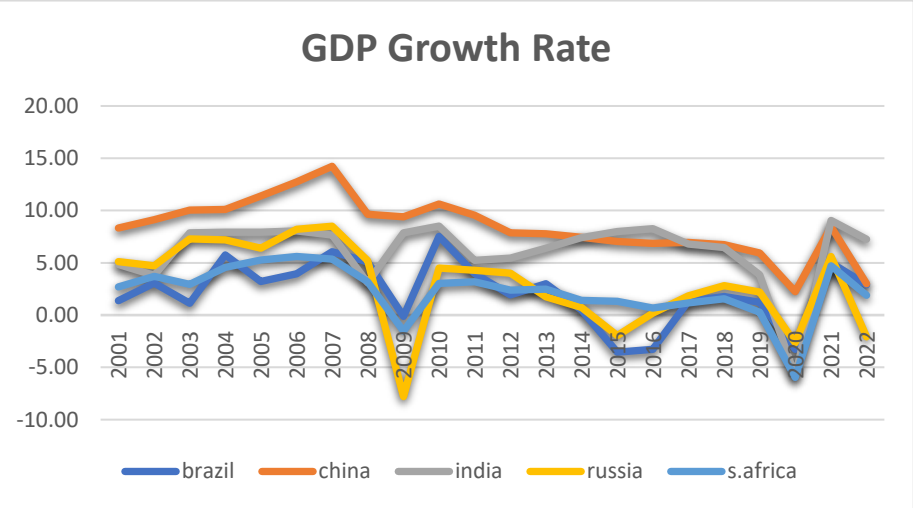
APPENDIX

TABLES AND GRAPHS

1. GDP growth rate data summary

country	mean	stdev	min	max
brazil	2.208972	2.978923	-3.545763	7.528226
china	8.430588	2.765702	2.238638	14.23086
india	6.174027	3.16125	-5.831053	9.050278
russia	3.00267	4.050773	-7.799994	8.499978
s.africa	2.268787	2.565925	-5.963358	5.603806

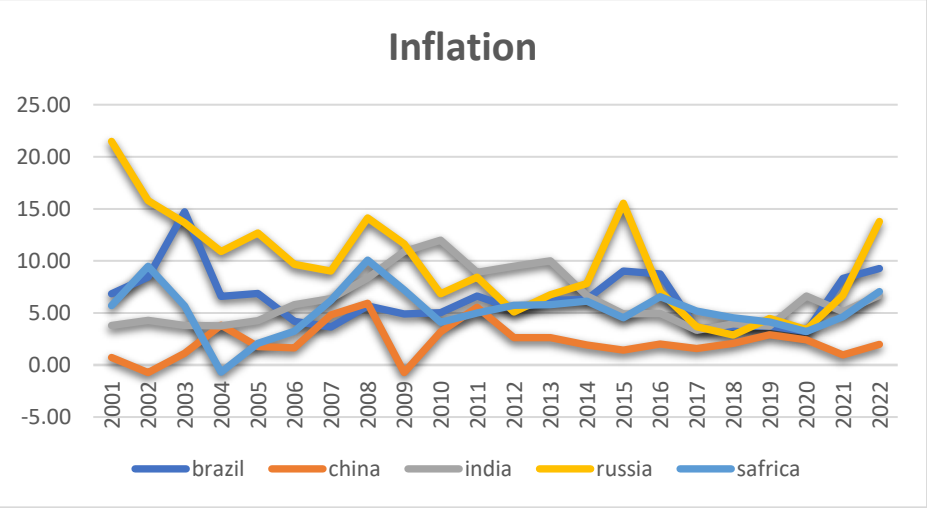
2. GDP growth rate graph



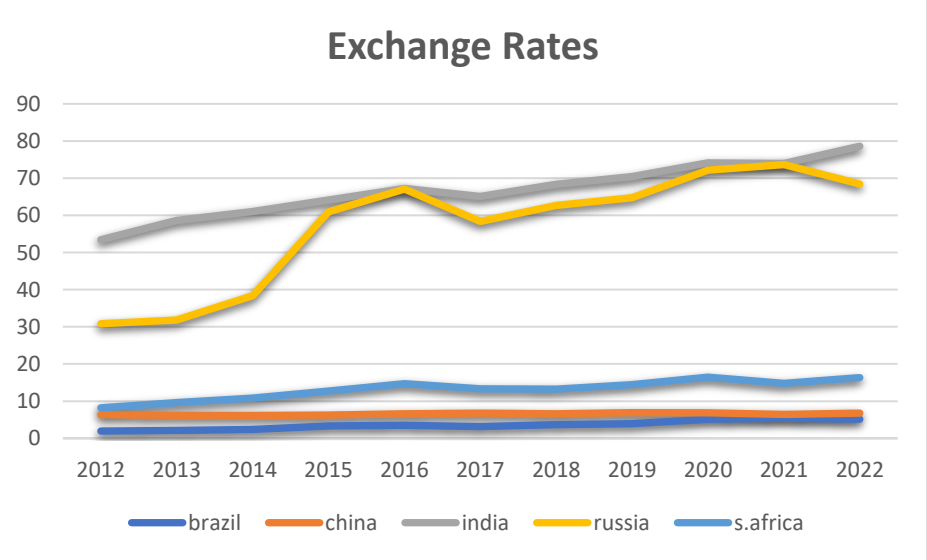
3. Inflation data summary

country	mean	stdev	min	max
brazil	6.403747	2.671285	3.211768	14.71492
china	2.256761	1.690319	-.7319709	5.925251
india	6.257555	2.603108	3.328173	11.98939
russia	9.60744	4.808735	2.878297	21.47701
safrica	5.249161	2.29315	-.6920303	10.07458

4. Inflation rate graph



5. Exchange rate graph



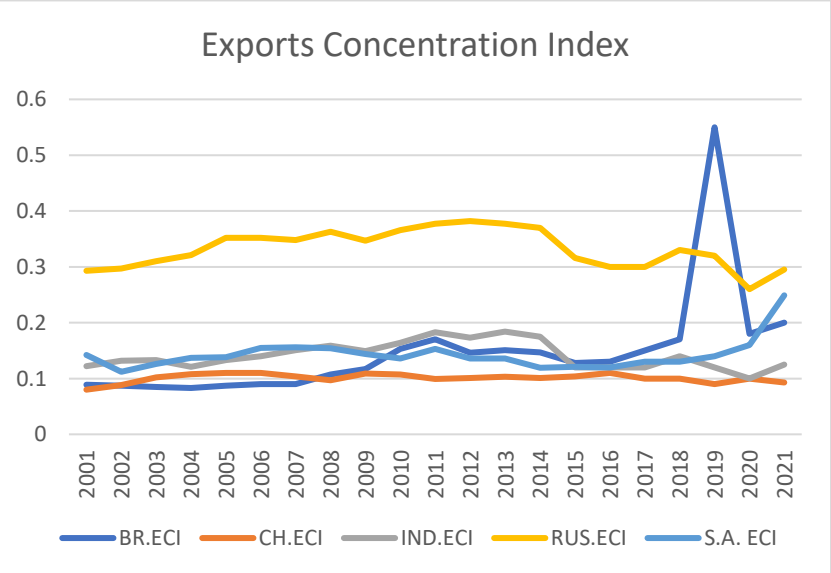
6. Intra-BRICS investment projects

Table 4. The 20 largest intra-BRICS greenfield investments between 2017 and 2021

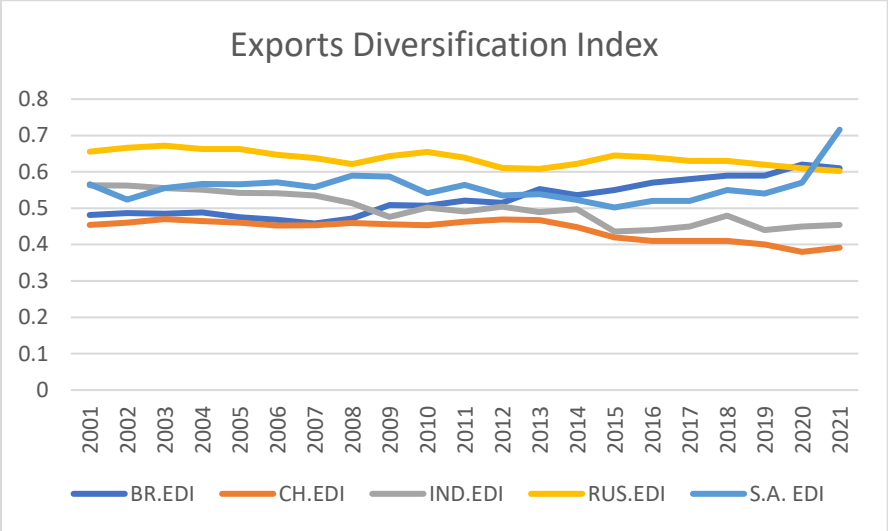
Year	Investor	Source country	Destination country	Investment ($ million)	Sector	Business activity
2019	Sirius Holding	China	Russia	11100	Natural, liquefied and compressed gas	Manufacturing
2017	China Chengtong Holding	China	Russia	1500	Pulp, paper, & paperboard	Manufacturing
2019	Great Wall Motors (GWM)	China	India	975	Light trucks & utility vehicles	Manufacturing
2018	Tsingshan Holding	China	India	926	Iron & steel mills & ferroalloy	Manufacturing
2019	Rosneft	Russia	India	850	Other petroleum & coal products	Manufacturing
2019	Huawei Technologies	China	Brazil	800	Communications equipment	Manufacturing
2021	Jingan	China	Russia	769	Other petroleum & coal products	Manufacturing
2017	Zhongding Dairy Farming	China	Russia	750	Animal production	Manufacturing
2018	Gazprom	Russia	China	740	Fossil fuel electric power	Electricity
2018	Sberbank	Russia	China	730	Commercial & institutional building construction	Construction
2018	Tata Group	India	China	700	Automobiles	Manufacturing
2019	Great Wall Motors (GWM)	China	Russia	656	Automobiles	Manufacturing
2018	Marcopolo	Brazil	China	615	Heavy duty trucks	Manufacturing
2018	Haier Group	China	India	427	Household appliances	Manufacturing
2019	Shanghai Automotive Industry Corporation (SAIC)	China	India	418	Motor vehicle & parts dealers (Automotive OEM)	Maintenance & Servicing
2021	Aditya Birla	India	China	375	Alumina & aluminum production and processing	Manufacturing
2019	China Communications Construction Company	China	Brazil	371	Iron & steel mills & ferroalloy	Manufacturing
2019	Tsaishen	China	Russia	357	Wood products	Manufacturing
2020	Liwei	China	Russia	335	Crop production	Manufacturing
2019	Xiaomi (Beijing Xiaomi Technology)	China	India	332	Communications equipment	Manufacturing

Source: UNCTAD FDI database.

7. Exports Concentration Index



8. Exports Diversification Index



9. Correlation analysis of BRICS' GDP growth rates

```
Time variable: year, 2001 to 2022
        Delta: 1 unit

. pwcorr brazil russia india china safrica, sig star(.05)
```

	brazil	russia	india	china	safrica
brazil	1.0000				
russia	0.6664*	1.0000			
	0.0007				
india	0.3273	0.2278	1.0000		
	0.1371	0.3078			
china	0.6098*	0.6666*	0.5124*	1.0000	
	0.0026	0.0007	0.0148		
safrica	0.7292*	0.8003*	0.6576*	0.7549*	1.0000
	0.0001	0.0000	0.0009	0.0000	

10. Correlation analysis of BRICS' inflation rates

```
Time variable: year, 2001 to 2022
        Delta: 1 unit

. pwcorr brazil russia india china safrica, sig star(.05)
```

	brazil	russia	india	china	safrica
brazil	1.0000				
russia	0.5292*	1.0000			
	0.0113				
india	-0.2246	-0.1633	1.0000		
	0.3150	0.4679			
china	-0.2806	-0.2414	0.2588	1.0000	
	0.2058	0.2790	0.2447		
safrica	0.1788	0.2799	0.2572	-0.1029	1.0000
	0.4260	0.2071	0.2478	0.6486	

11. Correlation analysis of BRICS' exchange rates

	brazil	china	india	russia	safrica
brazil	1.0000				
china	-0.1449	1.0000			
	0.5199				
india	0.8509*	-0.5694*	1.0000		
	0.0000	0.0057			
russia	0.8878*	-0.4633*	0.9519*	1.0000	
	0.0000	0.0299	0.0000		
safrica	0.8592*	-0.4763*	0.9621*	0.9566*	1.0000
	0.0000	0.0250	0.0000	0.0000	

12. Fixed Effects Panel Analysis with interaction terms (GDP growth rate)

Fixed-effects (within) regression
Group variable: ID

R-squared:
Within = 0.7263
Between = 0.2522
Overall = 0.4770

corr(u_i, Xb) = -0.9901

Number of obs = 110
Number of groups = 5

Obs per group:
min = 22
avg = 22.0
max = 22

F(3, 4) = .
Prob > F = .

(Std. err. adjusted for 5 clusters in ID)

gdpgrate	Coefficient	Robust std. err.	t	P>|t|	[95% conf.	interval]
govsp	-.3345411	.0913238	-3.66	0.022	-.5880965	-.0809856
tradegdp	.0629969	.0475089	1.33	0.255	-.0689089	.1949026
politst	.0341822	.0269307	1.27	0.273	-.0405894	.1089539
worldgdpg_centered	.9312157	.0268718	34.65	0.000	.8566077	1.005824
fedrate_centered	.1035511	.0989225	1.05	0.354	-.1711017	.3782039
globinf_centered	.2375591	.0860668	2.76	0.051	-.0014007	.4765189
worldgdpgXdummy1_centered	-.2542841	.0111003	-22.91	0.000	-.2851035	-.2234648
worldgdpgXdummy2_centered	-.4743408	.0463543	-10.23	0.001	-.6030411	-.3456405
worldgdpgXdummy3_centered	.2148747	.0417676	5.14	0.007	.0989093	.3308402
worldgdpgXdummy4_centered	.0844646	.0250563	3.37	0.028	.0148972	.154032
worldgdpgXdummy5_centered	0	(omitted)				
fedrateXdummy1_centered	.1144635	.088185	1.30	0.264	-.1303774	.3593044
fedrateXdummy2_centered	-.2950655	.1653209	-1.78	0.149	-.7540699	.163939
fedrateXdummy3_centered	-.1863331	.0696859	-2.67	0.056	-.3798123	.007146
fedrateXdummy4_centered	.389126	.0804262	4.84	0.008	.1658271	.6124248
fedrateXdummy5_centered	0	(omitted)				
globinfXdummy1_centered	.2491955	.0675387	3.69	0.021	.0616779	.4367131
globinfXdummy2_centered	-.7120799	.0744736	-9.56	0.001	-.9188519	-.505308
globinfXdummy3_centered	-.6270476	.0686712	-9.13	0.001	-.8177094	-.4363858
globinfXdummy4_centered	-.2155679	.1090513	-1.98	0.119	-.5183429	.087207
globinfXdummy5_centered	0	(omitted)				
_cons	11.34905	4.604814	2.46	0.069	-1.435963	24.13406
sigma_u	2.8647945					

13. Fixed Effects Panel Analysis with interaction terms (inflation rates)

R-squared:
Within = 0.3596
Between = 0.0041
Overall = 0.1117

corr(u_i, Xb) = -0.4794

Obs per group:
min = 22
avg = 22.0
max = 22

F(3, 4) = .
Prob > F = .

inflation	Coefficient	Robust std. err.	t	P>|t|	[95% conf.	interval]
govsp	.0361541	.1625014	0.22	0.835	-.4150222	.4873304
tradegdp	.2427145	.0691954	3.51	0.025	.0505971	.4348318
politst	.0039581	.0965083	0.04	0.969	-.263992	.2719082
worldgdpg_centered	-.2760205	.0848048	-3.25	0.031	-.5114763	-.0405647
fedrate_centered	-.1988492	.1924387	-1.03	0.360	-.7331446	.3354463
globinf_centered	.0595584	.3143944	0.19	0.859	-.8133405	.9324572
worldgdpgXdummy1_centered	.684618	.0310142	22.07	0.000	.5985088	.7707272
worldgdpgXdummy2_centered	.1927574	.0404035	4.77	0.009	.0805793	.3049355
worldgdpgXdummy3_centered	-.0970315	.0356997	-2.72	0.053	-.1961499	.0020868
worldgdpgXdummy4_centered	-.0229913	.0484349	-0.47	0.660	-.1574681	.1114854
worldgdpgXdummy5_centered	0	(omitted)				
fedrateXdummy1_centered	-.3407076	.2706395	-1.26	0.277	-1.092123	.4107081
fedrateXdummy2_centered	-.5187152	.4363277	-1.19	0.300	-1.730155	.6927247
fedrateXdummy3_centered	-.0342967	.1281014	-0.27	0.802	-.3899634	.3213699
fedrateXdummy4_centered	.3508313	.2672413	1.31	0.260	-.3911496	1.092812
fedrateXdummy5_centered	0	(omitted)				
globinfXdummy1_centered	-.1614409	.1783759	-0.91	0.417	-.6566919	.3338101
globinfXdummy2_centered	.2776973	.2706404	1.03	0.363	-.4737209	1.029115
globinfXdummy3_centered	-.1680618	.3378739	-0.50	0.645	-1.10615	.7700265
globinfXdummy4_centered	1.194091	.3324682	3.59	0.023	.2710111	2.11717
globinfXdummy5_centered	0	(omitted)				
_cons	-6.138642	5.167193	-1.19	0.301	-20.48507	8.207786
sigma_u	3.3891754					

14. Fixed Effects Panel Analysis with interaction terms (exchange rates)

R-squared:
Within = 0.1346
Between = 0.4655
Overall = 0.1838

corr(u_i, Xb) = -0.6473

Obs per group:
min = 22
avg = 22.0
max = 22

F(3, 4) = .
Prob > F = .

exrate	Coefficient	Robust std. err.	t	P>|t|	[95% conf.	interval]
govsp	.4809027	.5757594	0.84	0.451	-1.117662	2.079467
tradegdp	-.0825788	.198641	-0.42	0.699	-.6340946	.468937
politst	.2635979	.3591407	0.73	0.504	-.7335367	1.260732
worldgdpg_centered	-.0747104	.3111286	-0.24	0.822	-.9385417	.789121
fedrate_centered	-.5829535	.4919968	-1.18	0.302	-1.948956	.7830485
globinf_centered	.9441533	.8660024	1.09	0.337	-1.460255	3.348561
worldgdpgXdummy1_centered	.2484016	.0793452	3.13	0.035	.028104	.4686992
worldgdpgXdummy2_centered	.2824717	.1769372	1.60	0.186	-.2087848	.7737282
worldgdpgXdummy3_centered	-.2554971	.1834591	-1.39	0.236	-.7648612	.2538669
worldgdpgXdummy4_centered	-.123357	.1742643	-0.71	0.518	-.6071922	.3604783
worldgdpgXdummy5_centered	0	(omitted)				
fedrateXdummy1_centered	.8617227	.8006005	1.08	0.342	-1.361101	3.084546
fedrateXdummy2_centered	2.024438	1.458769	1.39	0.238	-2.025752	6.074629
fedrateXdummy3_centered	-1.948368	.4922521	-3.96	0.017	-3.315079	-.581657
fedrateXdummy4_centered	-1.580315	.7579239	-2.09	0.105	-3.684649	.5240194
fedrateXdummy5_centered	0	(omitted)				
globinfXdummy1_centered	-.2979323	.5564132	-0.54	0.621	-1.842783	1.246918
globinfXdummy2_centered	-.8914446	.752464	-1.18	0.302	-2.98062	1.19773
globinfXdummy3_centered	-.140136	1.195571	-0.12	0.912	-3.459574	3.179302
globinfXdummy4_centered	-.4729464	.8760459	-0.54	0.618	-2.90524	1.959347
globinfXdummy5_centered	0	(omitted)				
_cons	4.843952	19.39493	0.25	0.815	-49.005	58.6929
sigma_u	28.344962					
sigma_e	10.127402					

15. PVAR analysis (inflation, minimum wage growth rates)

	Coefficient	Std. err.	z	P>|z|	[95% conf.	interval]
inflation						
inflation						
L1.	.4060932	.1136995	3.57	0.000	.1832463	.6289401
gdpgrrate						
L1.	.1635709	.1439813	1.14	0.256	-.1186273	.4457691
realint						
L1.	-.0843367	.0791578	-1.07	0.287	-.2394832	.0708098
consumption						
L1.	-.0120217	.1049425	-0.11	0.909	-.2177052	.1936618
diff_unemp						
L1.	-.264429	.2855398	-0.93	0.354	-.8240768	.2952187
diff_indust						
L1.	-.0816476	.2218729	-0.37	0.713	-.5165104	.3532153
diff_exchrate						
L1.	.0349076	.1245441	0.28	0.779	-.2091944	.2790096
mnwgr						
L1.	.0176699	.016843	1.05	0.294	-.0153417	.0506815

mnwgr						
inflation						
L1.	1.917809	.9076208	2.11	0.035	.1389052	3.696713
gdpgrrate						
L1.	.8400613	.9760121	0.86	0.389	-1.072887	2.75301
realint						
L1.	.124485	.2267321	0.55	0.583	-.3199018	.5688717
consumption						
L1.	.7331556	.7825487	0.94	0.349	-.8006116	2.266923
diff_unemp						
L1.	2.328821	2.184905	1.07	0.286	-1.953515	6.611157
diff_indust						
L1.	-1.138386	1.272394	-0.89	0.371	-3.632232	1.35546
diff_exchrate						
L1.	-1.016632	.4781664	-2.13	0.033	-1.953821	-.0794428
mnwgr						
L1.	-.1684377	.1641948	-1.03	0.305	-.4902536	.1533781

16. Conditional Beta Convergence analysis (inflation)

```
R-squared:                                      Obs per group:
     Within  = 0.4339                                        min =        21
     Between = 0.0184                                        avg =      21.0
     Overall = 0.1857                                        max =        21

                                                F(4, 4)           =         .
corr(u_i, Xb) = -0.7613                         Prob > F          =         .

                                              (Std. err. adjusted for 5 clusters in ID)
```

infl_growth	Coefficient	Robust std. err.	t	P>|t|	[95% conf.	interval]
lag_inflation	-.5939102	.0508507	-11.68	0.000	-.7350945	-.4527259
gdpgrrate	-.1801382	.0593847	-3.03	0.039	-.3450165	-.01526
tradegdp	.1554385	.0468939	3.31	0.030	.0252401	.2856368
realint	-.0491029	.076085	-0.65	0.554	-.2603488	.1621429
deficitGDP	-13.0741	7.432232	-1.76	0.153	-33.70929	7.561083
_cons	-2.713257	2.517732	-1.08	0.342	-9.703603	4.277089
sigma_u	2.4263529					
sigma_e	2.2176531					
rho	.54484904	(fraction of variance due to u_i)				

17. Conditional Beta Convergence analysis (public debt(%GDP))

```
R-squared:                                      Obs per group:
     Within  = 0.7380                                        min =        21
     Between = 0.4018                                        avg =      21.0
     Overall = 0.4237                                        max =        21

                                                F(6, 94)          =     44.12
corr(u_i, Xb) = -0.7364                         Prob > F          =    0.0000
```

debt_growth	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
log_DebtGDP						
L1.	-.7358454	.0472583	-15.57	0.000	-.8296779	-.642013
deficitGDP	-2.740661	.9527145	-2.88	0.005	-4.632298	-.8490237
inflation	-.0125035	.0099167	-1.26	0.210	-.0321934	.0071863
gdpgrrate	.005811	.0086208	0.67	0.502	-.0113057	.0229278
tradegdp	.0103226	.0046186	2.24	0.028	.0011523	.0194929
realint	.0019676	.0047894	0.41	0.682	-.0075418	.0114771
_cons	-1.207046	.1945244	-6.21	0.000	-1.593278	-.8208129
sigma_u	.42971976					
sigma_e	.24242952					
rho	.75856799	(fraction of variance due to u_i)				

```
F test that all u_i=0: F(4, 94) = 12.90                     Prob > F = 0.0000
```

18. Conditional Beta Convergence analysis (budget deficit (%GDP)

growth_defic~P	Coefficient	Robust std. err.	t	P>|t|	[95% conf.	interval]
lag_deficitGDP	.000254	7.32e-06	34.71	0.000	.0002337	.0002743
DebtGDP	.0005199	.0002424	2.14	0.099	-.0001532	.001193
inflation	.0000197	3.06e-06	6.44	0.003	.0000112	.0000282
gdpgrrate	-7.67e-06	.0000178	-0.43	0.689	-.0000571	.0000418
realint	-3.59e-06	2.88e-06	-1.25	0.281	-.0000116	4.41e-06
tradebal	8.70e-14	2.38e-13	0.37	0.733	-5.73e-13	7.48e-13
_cons	-.0003191	.0000892	-3.58	0.023	-.0005667	-.0000714
sigma_u	.00008244					
sigma_e	.0003853					
rho	.04377342	(fraction of variance due to u_i)				

19. Pooled Ols Regression (TII on institutional and economic indicators)

Linear regression

Number of obs	= 140
F(9, 128)	= .
Prob > F	= .
R-squared	= 0.3256
Root MSE	= .70418

TII	Coefficient	Robust std. err.	t	P>|t|	[95% conf.	interval]
expinflation	-.0127714	.0356356	-0.36	0.721	-.0832825	.0577397
impinflation	-.0369301	.0217098	-1.70	0.091	-.0798866	.0060264
expgdpgrrate	.0428392	.030856	1.39	0.167	-.0182147	.103893
impgdpgrrate	-.021202	.0194705	-1.09	0.278	-.0597277	.0173237
exprealint	.0269865	.0072675	3.71	0.000	.0126064	.0413666
imprealint	.0171245	.011862	1.44	0.151	-.0063464	.0405955
expexchrate	.0108743	.0053077	2.05	0.043	.0003721	.0213765
impexchrate	-.0120418	.0023874	-5.04	0.000	-.0167658	-.0073179
expFDI	2.66e-12	1.04e-12	2.54	0.012	5.90e-13	4.72e-12
impFDI	4.20e-12	9.66e-13	4.34	0.000	2.29e-12	6.11e-12
Distkm	-.0000454	.0000128	-3.55	0.001	-.0000707	-.0000201
_cons	1.195205	.4103657	2.91	0.004	.3832266	2.007184

20. Correlation analysis (political stability and other indicators)

	politst	contro~p	inflat~n	pppGDP~p	exchrate	govspgdp	DebtGDP
politst	1.0000						
controlcor~p	0.6686 0.0000	1.0000					
inflation	-0.2967 0.0016	-0.3701 0.0001	1.0000				
pppGDPcap	0.0719 0.4551	-0.3869 0.0000	0.0947 0.3253	1.0000			
exchrate	-0.6970 0.0000	-0.4727 0.0000	0.2299 0.0157	0.0694 0.4712	1.0000		
govspgdp	0.0900 0.3496	0.4905 0.0000	-0.2545 0.0073	-0.5012 0.0000	0.0609 0.5275	1.0000	
DebtGDP	-0.0851 0.3766	0.0242 0.8021	-0.0597 0.5354	-0.1596 0.0958	0.0947 0.3251	0.1812 0.0582	1.0000

REFERENCES

Acharya, B., Kumwenda-Mtambo, O., and Janowski, T. (2023). What is BRICS, which countries want to join and why?

Broz, T. (2005). The theory of optimum currency areas: A literature review. *Izvorni znanstveni ˇclanak*.

Chen, J. (2022). Currency Union: Overview, History, Criticisms.

Devonshire-Ellis, C. (2023). A Common BRICS Currency Is Sometime Away, But We Do Know Its Name.

Friedman, M. (1953). The case for flexible exchange rates. In Friedman, M., editor, *Essays in Positive Economics*, pages 157–203. University of Chicago Press, Chicago.

Hathur, S. and Dasgupta, M. (2013). *BRICS: Trade policies, institutions and areas for deepening cooperation*. Indian Institute of Foreign Trade.

Hoffman, E. (2023). BRICS kicks off as common currency, de-dollarization steal the spotlight.

Jager, J. and Hafner, K. A. (2013). The optimum currency area theory and the emu: An assessment in the context of the eurozone crisis. *Intereconomics*, 48(5):315–322.

Kenen, P. B. (1967). The theory of optimum currency areas: An eclectic view. In Mundell,

R. and Svoboda, A., editors, *Monetary Problems of International Economy*, pages 41–60. University of Chicago Press.

Koziara, B. (2013). The eurozone: an optimal currency area? Senior honors thesis, The University of Michigan. A Senior Honors Thesis in partial fulfillment of the requirements of a Bachelor of Arts in International Studies. Advisor: Marina von Neumann Whitman.

Kundera, J. (2013). The theory of an ’optimum currency area’. *Open Economic Review*.

Lowe, P. (2016). The rise of the brics in the global economy. *Teaching Geography*, 41(2):50–53. Focus on Making Progress.

Madhur, S. (2002). *Costs and Benefits of a Common Currency for ASEAN*. Asian Development Bank.

Masson, P. R. and Pattillo, C. (2004). *The monetary geography of Africa*. Rowman & Littlefield.

McKinnon, R. I. (1963). Optimum currency areas. *American Economic Review*, 4:717–725.

Meade, J. (1957). The balance of payments problems of a European free trade area. *The Economic Journal*, 67:379–396.

Mundell, R. A. (1961). A theory of optimum currency areas. *American Economic Review*, 4:657–665.

Ngo, K. P. (2012). Benefits, costs, and feasibility of a monetary union for the association of southeast asian nations (ASEAN). *The Michigan Journal of Business*. I. Introduction.

Quah, C.-H. (2016). Economic feasibility of a brics monetary union. *G. L.E.R. (Global Business and Economics Review)*, 20(2).

Rahman, M., Fatima, Z., and Rahman, N. (2020). Quantitative dynamics of intra-brics trade. *BRICS Journal of Economics*, 1(4):6–23.

Schaechter, A. (2003). Iv potential benefits and costs of a common currency for gcc countries. In *Monetary Union Among Member Countries of the Gulf Cooperation Council*. International Monetary Fund.

Silk Road Briefing (2023a). A common brics currency is sometime away, but we do know its name. Accessed on November 28, 2023.

Silk Road Briefing (2023b). Intra-brics trade and analysis 2023. Accessed on November 28, 2023.

Stoykova, O. (2018). Optymalny obszar walutowy. teoria i zastosowanie. *My´sl Ekonomiczna i Polityczna*, 4(63):17–53.

Aljazeera. (2023). *The BRICS Expansion: Challenges for Consensus, Promises of Influence.* Aljazeera Centre of Studies.

Bajpai, P. (2023). *An Economic Overview of the BRICS Countries.* nasdaq.com.

Bonesh, C. D.-E. (2023). *Intra-BRICS Trade and Analysis 2023.* Russia: BRICS Information Portal.

By Farnaz Fassihi, V. Y. (2023). *What to Know About the 6 Nations Invited to Join BRICS.* New York Times.

Chen, P. (2023). *Calls to move away from the U.S. dollar are growing — but the greenback is still king.* New Jersey, US: CNBC.

Deshpande, D. P. (2023). *BRICS's plan to float a common currency & India's reaction to it.* Mumbai: The Times of India.

Dipanjan Roy Chaudhury, E. B. (2022). *BRICS working on new global reserve currency and alternative mechanism for int'l payments: Vladimir Putin.* Mumbai: The Economic Times.

Greene, R. (2023). *The Difficult Realities of the BRICS' Dedollarization Efforts-and Renminbi's Role.* Massachusettes: Carnegie Endowment for International Peace.

Gumede, W. (2023). *Rising De-Dollarization of the World.* Cape Town: Inclusive Society Institute.

Hamza, M. S. (2023). *Egypt on board: what does the new BRICS era hold?* Cairo: The American University of Cairo.

(n.d.). *Interbank Cooperation Mechanism.* Pretoria: National Treasurey: Republic of South Africa.

Ismail, S. (2023). *'A wall of BRICS': The significance of adding six new members to the bloc.* Aljazeera.

Jones, A. (2022). *WHY THE BRICS BLOC WILL PLAY A CRUCIAL GLOBAL ECONOMIC ROLE IN 2023.* International Banker.

Joseph Clements, J. H. (2023). *BRICS Investment Report.* United Nations Conference on Trade and Development.

Jr., P. N. (2023). *BRICS Financial and Monetary Initiatives – the New Development Bank, the Contingent Reserve Arrangement, and a Possible New Currency.* Veliky Novgorod, Russia: Press Service of the Russian Foreign Ministry.

Mcnamara, P. (2023). *Why a Brics currency is a flawed idea.* London: Financial Times.

Mishra, A. R. (2016). *Brics members to sign pact to reduce non-tariff barriers.* bilaterals.org.

Muresan, A. (2023). *BRICS immigration policies and visa regimes, strategic cooperation for a future BRICS African agenda.* Johannesberg: Journal of BRICS Studies.

Osman, I. D. (2023). *BRICS and Ethiopia: A New Frontier in Geopolitical Tug-of-War.* MODERNDIPLOMACY.

Sanghani, N. (2024). *Outlook 2024: The Three Ds of reserve management.* London: The Official Monetary and Financial Institutions Forum (OMFIF) .

T.V. Luzina, E. D. (2018). *The International and Legal Framework for Transregionalization of Trade and Economic Cooperation of The BRICS Countries.* European Research Studies Journal.

(2023). *The BRICS Expansion: Challenges for Consensus, Promises of Influence.* Aljazeera Center of Studies.

Whelan, K. (2019). *The Euro at 20: Successes, Problems, Progress, and Threats.* Dublin.

Wessel, D. (2014). India's Rajan calls for more international monetary cooperation. Brookings. Retrieved from https://www.brookings.edu/

World Bank. (n.d.). Home. Retrieved from https://data.worldbank.org/

OECD. (n.d.). Home. Retrieved from https://data.oecd.org/

Trading Economics. (n.d.). Home. Retrieved from https://tradingeconomics.com/

Statista. (n.d.). Home. Retrieved from https://www.statista.com/

FocusEconomics. (n.d.). Home. Retrieved from https://www.focus-economics.com/

Worldometer. (n.d.). Home. Retrieved from https://www.worldometers.info/

Country Economy. (n.d.). Home. Retrieved from https://countryeconomy.com/

CEPII. (n.d.). Home. Retrieved from http://www.cepii.fr

GlobeFeed. (n.d.). Distance Calculator. Retrieved from https://distancecalculator.globefeed.com

Testbook. (n.d.). Home [New Development Bank]. Retrieved from https://testbook.com

AspireIAS. (n.d.). Home [Contingent Reserve Arrangement]. Retrieved from https://www.aspireias.com

MacroTrends. (n.d.). Home. Retrieved from https://www.macrotrends.net

Land Portal. (n.d.). Home. Retrieved from https://landportal.org

Transparency International. (n.d.). Home. Retrieved from https://www.transparency.org

IMF. (n.d.). Home. Retrieved from https://data.imf.org

WITS. (n.d.). Home. Retrieved from https://wits.worldbank.org

BSE India. (n.d.). Home. Retrieved from https://www.bseindia.com

MacroTrends. (n.d.). Home. Retrieved from https://www.macrotrends.net

Wikipedia. (n.d.). Home. Retrieved from https://en.wikipedia.org

World Bank. (n.d.). Home. Retrieved from https://databank.worldbank.org

Investing.com. (n.d.). Home. Retrieved from https://www.investing.com