# THE IMPACT OF FDI ON TRADE AND GROWTH IN BRICS COUNTRIES A PANEL DATA ANALYSIS

**A Thesis**

**Submitted to the Master's Study Program of Economics and Business at the Faculty of Economics and Business in Partial Fulfillment of the requirements for the Degree of**

**Master of Arts(M.A)**


By:

**Prabhanshu Sharma**

**Student ID: 03232120016**

UNIVERSITAS ISLAM INTERNASIONAL INDONESIA

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# ABSTRACT

Prabhanshu Sharma

03232120016

Prabhanshu.sharma@uiii.ac.id

Study Program of Economics

Universitas Islam Internasional Indonesia

This thesis was conducted to identify the impact of FDI on the trade and growth of BRICS nation economies, to identify the common causes and different factors associated with the common causes that affect intra-trade relationships among BRICS nations, to explain the current developments and challenges that BRICS nations face in the shifting global trade landscape, to provide insight into unexpected impacts of inner related variables that affect the overall trade dynamics while associated, and lastly to provide policy recommendations on the betterment of intra-trade among BRICS nations. Data of the study is from BRICS (Brazil, Russia, India, China, and South Africa) economies constructing 52 years of observations from 1970 to 2022, and 260 numbers of observations, these data were taken from the IMF, The World Bank, BRICS organization, and are secondary data. The research method for the study is panel data analysis with Panel Ordinary Least Square, Random Effects, and Fixed Effects analysis while constructing two different models to first identify the impact of FDI on trade in BRICS countries as well as other major factors contributing to the impacts and then to identify the impact of FDI on growth in BRICS nations. Before the research, an initial pre-estimation analysis consisting of the correlation matrix, summary stats, and stationarity test are performed to reach an optimal model for the analysis. Moreover, the heteroskedasticity test, slope heterogeneity test, and multicollinearity tests are performed to get a conclusive result and to determine an optimal model for analysis which turns out to be random effects model with maximum likelihood option while observing the Langrange Multiplier test and Bruesh-Pagan value for the appropriateness of the model. The estimation results from both models found that FDI indeed impact positively in a significant manner on the trade and growth among BRICS nations with a positive coefficient of 0.67 at a 1% significance level, Economic growth is found to be negatively impacting the trade in BRICS countries due to tackling inflationary pressures because of increased purchasing power parity caused by economic growth for BRICS countries, Interest rate, unemployment, and exchange rates impact negatively on trade and lastly tax on international trade does not have any significant impact on trade among BRICS nations. This study bears importance since post COVID-19 era and its disastrous impacts, specifically on countries with high populations like China, India, and Russia, it was much needed to research to assess the trade prosperity of BRICS countries as the world major economic force, while other factors such as empirical inconsistencies and sectoral composition of trade and similar gaps needed to be addressed.

***Keywords:*** *BRICS, FDI, Maximum Likelihood, Endogeneity, Multicollinearity, PPP, POLS*

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# CHAPTER I
# INTRODUCTION

## 1.1 Background

International trade is crucial for economic growth and development, allowing nations to benefit from the exchange of goods and services.Over the last two decades world's largest economies have experienced significant changes in international trade. Thus, understanding international trade dynamics and challenges from 1970 to 2022 is crucial for comprehending their economic trajectory and informing future policy decisions(Iqbal, 2022).

As for the foundational background of the BRICS group, it is worth mentioning that, Russia, India, and China convened RIC for the first time in St. Petersburg in 2005. When the present BRICS organization was founded in February 2011, Brazil and South Africa became members. Even though BRICS is not an official alliance, and its members have differing views, over the last ten years it has sought shared goals in fortifying procedures through hundreds of summits and talks. Together, the BRICS nations account for around 42% of the world's population and 26% of the planet's land area. Because of their fundamental influence, the BRICS' joint attempts to restructure the world economy and deepen financial and economic cooperation have been embraced by many nations while being met with mistrust in others(ITC, 2023).

In addition, the BRICS have offered substitutes for current international institutions that are thought to be greatly impacted by the actions of the collective West. Established as a partial substitute for the World Bank, the BRICS New Development Bank (NDB) has authorized more than 90 projects totaling US$32 billion to boost the infrastructure of its members. The topic of economic cooperation was also covered at the June 2022 meeting of the 14th BRICS. Smaller and other emerging countries find BRICS attractive because of reasons such as it offers superior interfaces for managing international crises, developing a multipolar economic strategy involves establishing alternative financial and commercial pathways, promoting economic recovery, diversifying the economy, reducing costs, advancing e-commerce, integrating markets, and fostering international cooperation, In practical terms, BRICS is understood as an alliance of powerful emerging nations with a combined currency reserve of roughly US$4 trillion. These nations have already demonstrated their ability to oppose unilateralism and can prove valuable as substitutes for Western-controlled organizations like the World Bank and the International Monetary Fund, as well as Western trade and financial policies generally(Kragas, 2022).

## 1.2 Problem Statement

Research Problem: The dynamics and challenges of international trade in BRICS pose an important research problem that requires in-depth analysis. Despite its significant economic growth and emergence as a major player in the global economy during this period, various complexities and obstacles have influenced its international trade relations. Understanding these challenges and dynamics both are important for formulating effective policies and strategies to improve trade performance and address existing gaps.

The research problem for the study on the dynamics and challenges of international trade is as follows:

As of the most recent data, the BRICS countries account for approximately 25% of the global GDP and 18% of global trade volume, according to the International Trade Centre report. However, despite their significant economic growth and emergence as a major player in the global economy during the specified period, a number of complexities and obstacles have influenced their international trade relations. For the purpose of creating effective policies and methods to enhance trade performance and close current gaps, it is crucial to comprehend these difficulties and their dynamics(ITC Report,2022).

Several major barriers to trade have been found by earlier research, especially when considering the BRICS countries. Trade expenses and regulatory obstacles stand out as important components among these difficulties. The BRICS nations must update their legal systems in order to fully realize the promise of their services trade. These countries may greatly increase their access to high-value-added services and digital commerce markets by simplifying rules and cutting trade costs.On the other hand, the existence of trade restrictions pertaining to services has the potential to inhibit global trade, which can have a negative impact for industries including finance, information technology, and professional services. It is imperative that these challenges be addressed in order to improve the international trade environment and promote economic growth in these industries(Zvonova, Bunich, 2020).

Moreover, Sanctions, especially those levied on Russia, have significantly limited the BRICS coalition's ability to disrupt the global order. These penalties function as exogenous variables that profoundly influence the scope and effectiveness of their joint endeavours. Additionally, the economic dynamics within the BRICS are further complicated by China’s economic downturn. The recent unrest in the real estate industry has made this downturn worse, which has a significant effect on their combined economic power. As a result, the internal economic circumstances of the BRICS alliance's member nations are crucial in defining the alliance's total power and impact internationally. Together, these factors underscore the complex interplay between internal economic health and external political pressures in

shaping the trajectory of the BRICS nations in international trade and cooperation(Yarygina & Zhiglyaeva, 2021).

There is a concern raise regarding the resource exploitation are increasingly prominent since the BRICS countries deepen their trade and economic ties with the less developed counties. Now, this reason raises a concern that these growing partnership can result to the overuse of the natural resources of the poorer countries. Such exploitation could have adverse environmental impacts, be inherently inequitable, and offer minimal benefits to the local communities. Moreover, finding a middle ground between sustainable practices and the pursuit of economic benefits remains a challenging endeavor(Oxfam,2013).

In addition to these concerns, The BRICS nations are negotiating difficult obstacles related to their economic and technological restructuring. To prevent unfair competition, trade wars, and the deterioration of international economic relations, partner states must work together more closely as they go through this transition. In order to guarantee that the reengineering efforts result in fair and advantageous consequences for all parties concerned this cooperative approach is important.

The research explored the factors which has shaped BRICS's trade dynamics, identified the challenges faced in international trade relations, and examined their implications for the country's overall trade performance and economic development.

Furthermore, the study included policy suggestions that can help with the problems found, encourage growth in trade that is sustainable, and bolster BRICS's standing in the international trade arena. This required considering concerns with market access, infrastructure limitations, protectionism, trade imbalances, non-tariff barriers, and the requirement for trade facilitation measures.

By addressing this research problem, the study has contributed to a comprehensive understanding of the dynamics and challenges of international trade among BRICS member countries. The findings will assist policymakers, industry stakeholders, and researchers in formulating evidence-based strategies to enhance trade performance, overcome trade-related obstacles, and foster sustainable economic development.

The purpose of this study is to comprehensively analyze the dynamics and challenges of international trade in BRICS countries from 1970 to 2022. The study aims to understand the factors that have influenced trade performance during this period and identify the challenges faced in international trade relations. Through sector-specific examination and case study analysis, the research has yielded insights into the dynamics and difficulties unique to each industry. Finding policy proposals that can improve trade competitiveness, rectify trade imbalances, encourage export diversification, and fortify trade

facilitation measures is the ultimate objective. The study aims to add to the body of knowledge already available on international commerce and offer insightful information to researchers, industry stakeholders, and policymakers.

Numerous macroeconomic factors influence the intricate process of international trade. For example, trade patterns are mostly influenced by economic progress. A nation's GDP rises as its economy grows, which is reflected in more imports because of rising domestic demand and higher exports because of growing local businesses(Glick, 2016). Another important factor is inflation rates. While lower inflation might have the opposite impact, greater inflation can reduce a nation's exports' competitiveness by making them more expensive for overseas consumers.

Another factor that is determined by central banks to direct monetary policy is interest rate. Increased interest rates have the potential to draw in foreign money and cause a currency appreciation, which might have a negative effect on the trade balance by driving up the cost of exports and driving down the price of imports. Lower interest rates, on the other hand, may cause the value of the currency to decline, which might increase exports by making them more competitively priced on the international market(Glick, 2017).

Exchange rates are crucial because they have a direct impact on the price of transnational trade in products and services. A country's exports are more expensive and its imports are less expensive when its currency is stronger; on the other hand, a weaker currency frequently results in higher export volumes. A country's economic dealings with the rest of the world are reflected in its balance of payments, which is a crucial measure of the health of its commerce. The balance of payments comprises the trade balance, capital flows, and foreign reserves(Bergin, Taylor& Glick, 2006).

Government taxation and spending policies, together known as fiscal policy, have an impact on both the home economy and, therefore, global commerce. In a similar vein, monetary policy may influence commerce by changing interest rates and inflation through measures like changing the money supply. In addition, trade agreements, investor confidence, and economic policies—all of which are vital to trade flows—can be significantly impacted by political stability or instability.

Another important component is technological improvements, which may improve commerce by generating new goods and services, changing manufacturing methods, and enhancing transportation. International supply networks, which unite manufacturing across borders, can also influence how commerce reacts to shifts in the macro economy. A nation's production capacity and consumption habits are influenced by its demographics, which also include labor force composition, population size, and age distribution. These factors have an impact on commerce(Berstein, Kurz& Tesar, 2005).

Foreign Direct Investment (FDI) is a pivotal element in the dynamics of economic growth and international trade, as evidenced by a multitude of studies. One of the primary reasons for choosing FDI is its stable flow of cash. Unlike other forms of foreign capital, FDI represents long-term investments by foreign entities that establish or expand businesses within a host nation. This stability ensures a consistent financial influx that underpins economic progress(Ahmad & Ibrahim,2019).

Moreover, FDI is instrumental in augmenting productive capacity. It involves the acquisition of assets, construction of infrastructure, and establishment of industrial facilities, which collectively enhance the production capabilities of the host nation. This increase in productivity is directly linked to improved living standards, job creation, and broader economic growth(Baiashvili&Gattini, 2020).

Another significant aspect of FDI is the transfer of technology and innovation it facilitates. Best practices, managerial know-how, and cutting-edge technology that increase productivity and competitiveness are brought with foreign investments. As local enterprises incorporate this infusion of knowledge and innovation, the home economy gains momentum(Wang et al.2022).

FDI also plays a crucial role in facilitating commerce. Increased cross-border trade is frequently the result of multinational corporations (MNCs) establishing subsidiaries or joint ventures in a host nation. These multinational corporations serve as import and export hubs, boosting international trade and promoting economic growth. FDI inflows facilitate market expansion and accessibility by allowing enterprises to enter new markets, thereby meeting unmet demand and expanding their customer base. This expansion not only stimulates economic activity and job creation but also fosters innovation and technology transfer, which in turn enhances competitiveness and productivity(Zaman & Yayebi,2022).

An additional benefit of FDI outflows is the acquisition of resources. Businesses obtain access to vital resources like labour, raw materials, and energy, and they frequently use these foreign resources to their advantage. This promotes production procedures and supply linkages, which accelerates economic growth even further.

FDI outflows also encourage learning and information spillovers. Companies that operate globally gain valuable insights from other business cultures and practices, which enhance the knowledge base of local enterprises and promote creativity and productivity. The convergence of concepts and approaches serves as a stimulant for financial progress(Makki & Somwaru, 2004).

Furthermore, FDI outflows enable risk mitigation and portfolio diversification for businesses. Companies lower their reliance on any one market by investing across borders, which lowers the risk of

legislative changes, geopolitical unrest, and economic downturns. An investment portfolio with diversity boosts the economy's overall resilience.

Lastly, it is essential to recognize that FDI outflows are not the sole drivers of growth. Complementary inputs such as infrastructure, financial systems, and human capital are vital. For example, strong banking systems and skilled labor forces can greatly increase the effect of FDI on economic growth. Therefore, while assessing the effects of FDI outflows, these complimentary elements need to be considered(Sohail et al., 2021).

### 1.3 Research Questions

The research questions for the study on the dynamics and challenges of international trade in BRICSfrom 1960 to 2022 are as follows:

- What are the current developments of FDI in trade in BRICS countries?
- What are the factors that influence the dynamics of BRICS international trade?
- What is the impact of FDI on trade and growth in BRICS?

These research questions has guided the study in comprehensively examining the dynamics and challenges of international trade in BRICS during the specified period and generating meaningful insights to address the research problem.

### 1.4 Research Objectives

To analyze the trends, patterns, and changes in BRICS's international trade from 1970 to 2022.

- To identify the current developments of FDI in BRICS countries.
- To determine the factors that influences the BRICS international trade.
- To identify the impact of FDI on trade and growth in BRICS countries

### 1.5 Hypothesis

Based on the dynamics' environment and the dimension's conceptual framework and challenges of international trade in BRICS provided in Chapter 2, the following hypothesizes are proposed:

Hypothesis 1: Foreign direct investment in terms of outflow does contribute to increased international trade.

Hypothesis 2: FDI has an impact on Economic growth.

Hypothesis 3: Tax on international trade leads to a decreased amount of constructive trade.

Hypothesis 4: The exchange rate has a mixed situation of impact on Foreign Direct Investments and subsequently on economic growth.

These hypotheses has guided the research in examining the relationships between different variables, analyzing the impact of various factors on BRICS's international trade dynamics, and assessing the effectiveness of policy measures in addressing the identified challenges. The findings of the study have contributed by validating or rejecting these hypotheses and gave insightful explanations of the workings and obstacles of BRICS foreign commerce throughout the designated time.

### 1.6 Significance of the Research

The benefits of this thesis are attributed to twostakeholders. Firstly, the subject of this research is governments of BRICS countries and direct implications goes to the policymakers in different levels within these countries, as policy makers can develop policies to increase investment, promote trade volume and openness, and strengthen financial markets by having a better grasp of the link between foreign direct investment (FDI), trade, and economic performance. Secondly, Businesses can use this analysis to find possible markets for growth and investment possibilities, by evaluating the stability and development potential of the BRICS economies. Furthermore, the research can assist foreign investors in allocating resources in an educated manner and successfully trade among mentioned countries.

Below are the key points that signifies this study based on the analysis of previous researches which contribute to the better understanding of the gaps that should be addressed and the benefits it will causes to the mentioned stakeholders which are:

Threshold Effects and Non-Linearity: FDI and economic results don't necessarily follow a linear path. Research indicates that the advantages of foreign direct investment (FDI) might differ, and there could be threshold effects where favorable effects appear only once specific requirements are satisfied, such as a specific degree of financial development or institutional quality(Malik, 2024).

Sectoral Disparities: Not every sector is equally affected by foreign direct investment. FDI may lead to greater growth in certain industries and less growth in others. In a more general analysis, this sector-specific volatility is frequently disregarded(Lakshani,2021).

Impact: Short-Term vs. Long-Term: Whether the economic benefits of foreign direct investment (FDI) extend to long-term sustainable growth is a topic of discussion. Some critics contend that long-term economic development may not be assisted by the FDI's transitory character. Institutional Quality: There is much debate about how important institutional quality is in mitigating the

consequences of foreign direct investment. Research that overlooks the robustness and effectiveness of institutions in the host nation may exaggerate the benefits of foreign direct investment(Aflaro,2016).

With the limited data available, this research focuses on major issues addressed specifically about methodology (examining the validity of thresholds and non-linear relationships) through initial statistical assessment and tests), sectoral composition by modeling the Indian context, and incorporating data of the recent event to evaluate the breakpoints established post covid-19 era. Furthermore, this study criticized previous studies over the data chosen for their research; most of the studies are constrained to the data available from 1990 to 2020 and ignore the covid-era and post-COVID calamities reflecting on the macro factor variables.

Economic Implications: International trade is a key economic growth and development driver. Understanding the dynamics and challenges of BRICS's international trade during the specified period will provide insights into the factors that have influenced the country's trade performance. This knowledge can help policymakers formulate appropriate strategies to leverage opportunities and mitigate challenges, thus fostering sustainable economic growth.

Policy Formulation: A complete grasp of the dynamics and difficulties a nation has in its international trade is necessary for effective policymaking. The results of the study will be used to inform evidence-based policy suggestions that will aid in the development of trade-related laws and regulations. These regulations can deal with a variety of problems, including infrastructure limitations, protectionism, trade deficits, non-tariff obstacles, and market diversity.

Trade Competitiveness: A nation must be competitive in international trade in order to engage in the global economy. The study has looked at the dynamics and difficulties of BRICS trading internationally and has illuminated the elements that have affected competitiveness in the global trade sphere. This understanding can guide policymakers in enhancing BRICS's competitive advantage and improving its trade relations with key partners.

Sector-Specific Insights: The research has analyzed specific sectors or industries, such as information technology, agriculture, and automotive, to identify sector-specific dynamics and challenges in international trade. This sectoral analysis has provided insights into the variables affecting the growth and competitiveness of these sectors and will help policymakers devise targeted policies to overcome sector-specific challenges and leverage opportunities.

Future Trade Strategies: The findings of the research will contribute to the development of future trade strategies for BRICS. The study has pinpointed the main issues and developments in international

commerce; it will help decision-makers develop plans that take into account the changing demands of BRICS's trading partners as well as the dynamics of trade globally. This will facilitate the expansion of BRICS's trade networks, the diversification of export markets, and the strengthening of bilateral and regional trade relationships.

## 1.7 Thesis Outline

This thesis is about the impact of Trade and FDI on the BRICS countries by using the panel data analysis.This thesis has five chapters, the introductory chapter provides general information regarding the importance of trade and FDI and eventually it's impact on economic growth. Moreover, it contains the research problem providing the overview of why initially this research is conducted with the prospects and challenges that makes it necessary, with the research objectives of identifying current developments, challenges, and opportunities. Meanwhile, hypothesis in this chapter stresses the importance of certain variables for the study and significance of the research depicts the criticalness of giving unique attributes to this study while lastly in this chapter an outline for readers is provided to grasp a better understanding of the whole work.

Chapter II consists three sections providing general grounded concepts behind the study in the conceptual framework section, the important relevant theories associated with the inner connection among variables of the study in the subchapter of theoretical framework and lastly the relevant previous studies that already construct a relationship between variables within this study with their prior work along with their methods used and results obtained.

Chapter III provides detailed explanation of datasets (variables) used, models that are performed, BLUE assessment pre-estimation tests for the best linear unbiased estimators. Additionally, sampling and data reliability and validity explanations are provided to grasp a better understanding of why specific data with specific time range and number of observations are used for this study.

Chapter IV provides critical information about the current status of the BRICS countries in terms of future prospects and challenges in the current shifting of global trade landscape, while explaining the result of pre-tests (BLUE assessments), models estimation results, and the explanation on why to choose specific model as it is random effects model for the sake of absence of unobserved heterogeneity in this study. Additionally, this chapters provides comprehensive analysis & discussion of the results originated from the estimation by STATA software version 17.

The Final chapter provides conclusion of the study, policy recommendations with the subject being specifically governments and their policy makers, and businesses that are looking for investment scopes in BRICS countries. Moreover, the last subchapter of the final chapter highlights key limitations that during this study I encountered and those that remain critical for more conclusive and perfect research.

# CHAPTER II
# LITERATURE REVIEW

## 2.1 Conceptual Framework

### 2.1.1 Foreign Direct Investments

This subsection has reviewed the key international trade theories, such as comparative advantage, new trade theory, gravity model, and global value chains, and their application to understanding BRICS trade patterns partners during the study period. For example, the comparative advantage theory explains how BRICS's abundant labor resources have contributed to its competitive advantage in labor-intensive industries such as textiles and IT services.

The impact of Foreign Direct Investment (FDI) on economic growth has been explained by the Neo-Classical theory in the context of international commerce and FDI. According to early Neo-Classical views, industrialized economies would invest foreign direct investment (FDI) in less developed nations due to domestic rivalry decreasing their profit rates. This was explained by the labor shortage brought on by industrialization in industrialized nations (Hoffman, 2012).

Additionally, Robert Solow and Trevor Swan initially proposed the Neo-Classical growth hypothesis in 1956. In 1957, Solow improved the model even further by including technical development, which led to a breakthrough in our knowledge of economic growth. According to the model, three components contribute to economic growth: labor, capital, and technology. The production function's fluctuating labor and capital quantities determine the short-term equilibrium. But none of these three variables need to change for long-term equilibrium, which is the theory's main focus.

Overall, The paradigm known as Neo-Classical growth theory in economics looks at how a mix of labor, capital, and technology may lead to a consistent pace of economic development. It makes the argument that although labor and capital resources are finite in an economy, technology has the ability to contribute infinitely to growth. The idea highlights how population expansion, capital accumulation, and technology advancements propel economic growth(Nguyen, 2022).

Comparative Advantage Theory: David Ricardo’s theory of comparative advantage suggests that countries should specialize in producing goods where they have the lowest opportunity cost and exporting goods and services in which they have a comparative advantage, i.e., the ability to produce at a lower opportunity cost compared to other countries. This theory helps explain the patterns of trade and specialization observed in international trade. By identifying sectors where BRICS has a comparative

advantage, the study can analyze how these sectors have contributed to BRICS export growth and trade performance(Ruffin, 2002).

The relationship between Interest rate and net exports is commonly believed among scholars and has practically proven to be adverse relationship. Two approaches have been taken so far to explain this phenomenon; firstly, in case of higher real interest rates, while observing a key concept in international economics as the relationship between real interest rates (r) and net exports (NX), Investors often find domestic assets, like bonds, more appealing when the real interest rate rises in this case foreign investors move their capital to the nation with the higher interest rates in search of bigger returns.Net capital inflows (KI) rise as foreign money pours in, but it also means that the value of the home currency increases in relation to other currencies and for international buyers, exports are more expensive due to the rise of the home currency which results in net exports fall (Romer, 2017).

On the other hand, in the case of lower interest rates, international investors find domestic assets less attractive when the real interest rate declines as the lower net capital inflows results from capital flowing out of the nation while net exports increase because of the home currency's depreciation, which increases export competitiveness. In conclusion, changes in real interest rates have an impact on currency rates, capital flows, and eventually net exports.

### 2.1.2 International Trade

International Trade: Involves the exchange of goods, services, and capital across national borders. It encompasses both exports (goods and services sold to other countries) and imports (goods and services purchased from other countries). International trade is governed by various economic, legal, and policy frameworks(Sethi & Kaur, 2016).

International Trade Theories: Different international trade theories, such as the Heckscher-Ohlin theory and the new trade theory, provide insights into the determinants and patterns of international trade. The Heckscher-Ohlin theory emphasizes the role of factor endowments (such as labor, capital, and natural resources) in determining trade patterns. The new trade theory focuses on economies of scale, product differentiation, and technological advancements as drivers of international trade. Applying these theories can help analyze the factors that have influenced BRICS trade patterns, such as the role of labor-intensive industries, capital-intensive industries, and the impact of technology on trade flows(Leamer, 1995; Yantu, 2004).

Institutional and Policy Framework: The institutional and policy framework within which international trade operates is crucial to understanding trade dynamics and challenges. The laws and

practices controlling international trade are shaped by ideas like trade agreements, trade policies, and institutional arrangements like the World Trade Organization. The study has looked at how trade agreements and policies affect BRICS's trade performance, evaluated how well institutional arrangements work, and analyzed the difficulties presented by protectionist and non-tariff barriers (De Castro, 2013).

Globalization and Global Value Chains: The concept of globalization and the emergence of global value chains (GVCs) have transformed international trade. GVCs involve the fragmentation of production processes across countries, with each country specializing in specific tasks. The study has examined BRICS involvement in GVCs, the potential and problems associated with GVC integration, and the contribution of GVCs to the country's export expansion. Examining problems with supply chain interruptions, improving GVC capabilities, and the effect of technology improvements on GVC participation are some examples of this (Ye & Voigt, 2014).

Trade and Development: The relationship between international trade and economic development is a crucial aspect to consider. The study hasdraw on theories of trade and development to understand how BRICS international trade dynamics have influenced its economic growth, employment generation, poverty reduction, and overall development outcomes. This has involve analyzing the sectoral composition of trade and its impact on employment, income distribution, and inclusive growth(Iqbal, 2022).

By utilizing these theoretical perspectives and concepts, the study has provided a solid foundation for analyzing the dynamics and challenges of international trade in India. These theories and concepts have helped frame the research, guide the data analysis, and provide a theoretical lens through which the findings can be interpreted and discussed.

### 2.1.3 Economic Growth

Although it is more frequent for economic growth and net exports to be positively correlated, some theories contend that there may be a negative link under some circumstances, as stipulated above following are the main arguments of the negative relationship.

Dutch Disease: According to this hypothesis, a country's currency might increase in value in response to a spike in exports, especially those of natural resources as a result other industries, such as manufacturing, are less competitive on the world market. As a result, resources may be overlooked in favor of other businesses that could spur overall economic growth in favor of the expanding export industry. The Dutch disease hypothesis was named after the 1960s recessions in Netherlands and was mainly consisting of currency appreciation issues because a stronger currency may result from high

export revenue, and it would lower the competitiveness of the nation's other exports—manufactured goods and may impede their growth by making them more expensive in foreign markets.

One of the essentials of the Dutch disease was Resource Dependency neglecting other economic sectors (such as manufacturing or agriculture) which might result from a heavy concentration on exporting a particular resource. Falling resource prices make the economy more susceptible to outside shocks, while another essential point is crowding out Effect and as a result of the export industry's rise, other sectors may see a decrease in overall growth and productivity as labor and capital are drawn away from them.

Additionally, Inflationary pressures play a vital role on the negative relationship of Economic growth and exports, as the cost of production rises in tandem with prices. Businesses, consumers, and the economy are all impacted by this. Demand-side pressures and supply shocks (such natural disasters or rising production costs) are two factors that drive inflation as when prices increase demand side pressures require more attention on domestic demands rather than fulfilling export demands for other countries. Therefore, countries tend to first fulfill domestic demands and then go to exports which decrease exports. (Smith, 2008).

Moreover, as an outcome of inflationary pressures, a nation’s exports lose their competitiveness when its inflation rate is comparatively greater than that of its trade partners. Why? Because businesses' manufacturing costs rise in response to greater inflation and particularly small businesses encounter difficulties since their profit margins are narrower than those of larger companies. These rising expenses (wages, energy, and raw materials) can reduce profit margins and force businesses to make difficult choices about whether to absorb or pass costs through to clients(Smith, 2008).Meanwhile, rapid economic growth leads to inflationary causes and central banks to combat inflation may decide to hike interest rates and Increased interest rates have the potential to draw in foreign capital, which strengthens the value of the home currency as for overseas buyers, exports are more expensive when the currency is stronger(Johnson, 2012).

Compositions of exports, some nation’s exports are mostly made of primary items, like raw resources and their prices may fluctuate if these basic items make up most of the export basket growth in the economy might not help these industries, which would hurt exports. Therefore, if the economy grows then it would primarily shift from primary resources to luxury goods and the quantity of exports will decline as other countries would still seek for the raw materials and the rich will no longer be able to fulfill the amount of trade required as before they could, and it would enormously hurt exports (Lee, 2015).

### 2.1.4 Exchange rate

The exchange rate specifically as of the measure of real effective exchange rate(REER) is a pivotal element of determining exports within a nation, it is either depreciation where price of goods and services fell down or appreciation where prices go up, but what is here more important is depreciation that can have more long-term negative effects on exports. Exporters may face difficulties due to currency devaluation. Although exports may initially cost less to overseas consumers, there are a few factors that may offset this advantage.

First off, over time, depreciation may reduce export competitiveness. Foreign purchasers may become less interested in a country's products if their price increases because of the weaker currency, which would reduce the amount of exports. Secondly, exporters may experience pressure on their profit margins. Depreciation drives up the cost of imported inputs (such raw materials) in tandem with rising export prices which profitability may be greatly impacted by this. Thirdly, there may be strain in supply systems as the cost of imported materials is higher for industries that depend on imports, which could limit their capacity to meet export demand and possibly interrupt production. Fourthly, there may be a paradoxical circumstance in which import dependence really rises. Businesses may depend even more on foreign inputs as a result of rising domestic production costs brought on by a pricey import dependency, which would hurt export-oriented industries. Finally, exporters face uncertainty due to frequent currency swings. Exchange rate volatility can pose a challenge to long-term planning and investment decisions, hence increasing the likelihood that risk-averse enterprises will delay export expansion(Stojanov & Varela & Engel, 2024).

### 2.1.5 Tax on International Trade

Providing the basis for the inner connection between taxes and, net exports, export taxes which are imposed on items that are leaving a nation, have a big influence on trade, when enforced, they result in a price difference between the local price of exported goods, which is lower, and its overseas price, which is higher. As a result, exports become less common and are discouraged and economists examine export taxes from a few angles, such as influence on state budgets, efficiency, and justice. These tariffs, however, may not always encourage exports or competitiveness and may even alter the distribution of resources(Baldwin & Krugman, 1979).If there is little harm done to domestic industry and renewable resources, export tariffs may be a triple win for nations that export resources. On the other hand, countries that import resources and levy import duties may suffer a triple loss. Meanwhile, Refunds for Value Added Tax (VAT) also have an impact on export margins (value, quantity, and price). Lowering VAT rebate rates may result in a decline in export value and volume, even if this decline may

not be fully reflected in the export price. These consequences are comparable to those brought about by alterations to tariffs and exchange rates(Devarajan & Lewis & Robinson, 1990).

### 2.1.6 Definition of Terms

BRICS's International Trade: Specifically refers to the trade activities conducted by BRICS member countries, including both exports and imports, with other countries during the specified period. It includes the identification of major trading partners, the sectoral composition of trade, and the analysis of trade performance and trends (Chatterjee & Naka, 2022).

Challenges of International Trade: Refers to the obstacles, barriers, and complexities that affect the conduct and outcomes of international trade. These challenges can include trade deficits, protectionism, non-tariff barriers, market access issues, infrastructure constraints, trade disputes, and regulatory hurdles.

Dynamics of International Trade: Refers to the patterns, trends, and changes in the flow of goods, services, and capital across borders. It encompasses factors such as growth rates, market share, sectoral composition, geographical distribution, and shifts in trade patterns over time.

Economic Reforms: Refers to policy changes and measures implemented to promote economic liberalization, deregulation, and market-oriented reforms. In the context of BRICS countries, it includes initiatives such as trade liberalization, reduction of trade barriers, privatization, and reforms aimed at enhancing the ease of doing business.

Infrastructure Constraints: Refers to limitations or deficiencies in physical infrastructure, such as transportation networks, ports, logistics facilities, and power supply that can impede efficient trade flows and increase transaction costs. By defining these key terms, the study will establish a common understanding and ensure clarity in analyzing and discussing the dynamics and challenges of international trade in BRICS from 1970 to 2022

Market Access: Refers to the ability of a country's firms to enter and compete in foreign markets. It encompasses the removal of trade barriers, including tariffs and non-tariff barriers, to facilitate trade and enable businesses to access foreign markets on fair terms.

Non-tariff Barriers: Refers to various measures and regulations, other than tariffs, that hinder or restrict international trade. Non-tariff barriers can include technical standards, sanitary and phytosanitary regulations, licensing requirements, customs procedures, and bureaucratic hurdles.

Protectionism: Refers to policies and measures implemented by countries to protect domestic industries and markets from foreign competition. Protectionist measures can include tariffs, quotas, subsidies, and other trade barriers, aimed at shielding domestic industries from international competition.

Trade Deficits: This represents a situation where the value of a country's imports exceeds the value of its exports. It indicates a negative balance of trade and can impact a country's overall trade performance, current account balance, and foreign exchange reserves.

## 2.2. Theoretical Framework

### 2.2.1 Theories related to FDI

The initial relationship between FDI and net exports is built around many theories some of which are iterated here for the sake of clearing as why particularly FDI in terms of outflow has been choosing as well as net exports for the study. Furthermore, in the following chapter reasons are provided as why the net exports have been chosen for the dependent variable in the first model which could make the logical sequence of research questions, objectives, and hypothesis.

Firstly, the Backward Linkage theory postulates that foreign direct investment (FDI) strengthens a nation's export potential by establishing connections between foreign investors and domestic suppliers. Multinational businesses (MNCs) frequently source intermediate items locally when they make investments in a nation, which boosts exports(Lakshani, 2023). Secondly, the hypothesis known as the Export Platform holds that foreign direct investment facilitates exports. Production facilities are established by multinational corporations (MNCs) in their host countries to cater to domestic and global markets. These establishments started focusing on exports, which helps NE(Sanudarwan, 2023).

Thirdly, the 1970s saw a rise in interest in trade, foreign direct investment, and knowledge spillovers. Outward-oriented economies, those that are accessible to outside investment and trade—consistently outperformed inward-oriented ones; Curiosity about the reasons underlying this performance disparity was piqued by this empirical evidence. Meanwhile, long-term per capita income development is largely dependent on knowledge spillovers, a theory further codified by endogenous growth theory. Additional knowledge flows were advantageous to economies that engaged with foreign agents through trade and foreign direct investment. These exchanges promoted organizational improvements, alternative management techniques, and the transfer of skills, all of which improved economic performance. These historically led to the Knowledge transfer theory asserting that FDI provides the host nation with technology, managerial know-how, and knowledge. Local businesses benefit NE by being more competitive and export focused as they pick up skills from MNCs(Fernando,2023).

Fourthly, according to the substitutability theory, trade and foreign direct investment (FDI) can either enhance or replace one another. It specifically says that FDI could take the place of exports in situations when trade restrictions are present. This viewpoint isn't shared by everyone, though. Meanwhile, mixed findings have been obtained from empirical investigations. While some studies show that FDI replaces trade flows, others find that the two have a complementing effect1. Researchers such as Blonigen (1997), for example, discovered compelling evidence of the complementarily between trade and FDI. However, variables like freight expenses and tariff obstacles may have an impact on the relationship(Blonigen & Robert, 1997).

This notion was first proposed by Mundell (1957), who believed that FDI and commerce has eventually replaced one another. The complexity of the relationship between foreign direct investment (FDI) and international commerce has been highlighted by previous research on this topic, which is still up for debate. In conclusion, studies on the intricate connections between trade and foreign direct investment in a variety of contexts and historical periods are being conducted by scholars who are still investigating the substitutability hypothesis(Mundell,1957).

Fifthly, is the labor costs theory where Discussions about how relative labor costs influence FDI decisions date back to the 1800s. Prominent proponents of the labor theory of value comprise of economists including Karl Marx, David Ricardo, and Adam Smith and the foundation for comprehending how labor affects economic value and investment decisions was established by these intellectuals. Even though mainstream economists no longer support the labor theory of value, its historical importance is nevertheless important when talking about production, trade, and investment. Moreover, according to the relative labor cost theory, labor costs have an impact on decisions about foreign direct investment (FDI).

Multinational corporations (MNCs) are more willing to invest in a host nation that has cheaper labor expenses and the host nation's exports may rise because of this investment. The labor theory of value, which contends that the quantity of labor required to produce an economic good determines its value, forms the basis of the theory. In this case, a natural price based on labor inputs explains relative pricing between items and tends toward it(Caves,1971).

Lastly, theory of Imperfect Capital Markets asserting that FDI can correct flaws in the capital market. MNCs make investments to increase local production and exports in areas where capital markets are inefficient. Financial contracting is expensive and investor protection is inadequate in imperfect capital markets. Businesses encounter difficulties when deploying technology overseas in these circumstances. According to the idea, financial frictions and non-verifiable monitoring are the main reasons why

multinational corporations (MNCs) participate in FDI and cross-border activities. C. Fritz Foley initially proposed this hypothesis in 2007,and he looked at how flaws in the capital market affect MNC conduct and FDI choices(Antràs & Desai, 2007).

### 2.2.2 Theories related to Interest Rate

Explaining this relationship between interest rate and net exports involves a transmission mechanism consisting of the interest rates, exchange rate, aggregate demand, and their impact on net exports and consequently on economic growth. Monetary policy is how central banks set interest rates and central banks can draw in foreign capital seeking higher returns by hiking its policy rate, when foreign investors purchase domestic assets, net capital inflows (government bonds, for example) the value of the home currency increases in relation to foreign currencies as demand for it increases. For international buyers, exports are more expensive due to the rise of the home currency that is why net exports fall; on the other hand, a lower interest rate promotes net exports, weakens the currency, and discourages capital inflows. Therefore, this whole transmission mechanism advocates for adverse and negative relationship between interest rate and net exports and supports the POLS and RE estimation of constructing negative relationship (Krugman, 2018).

### 2.2.3 Theories related to Economic Growth

There are three hypothesizes explaining the relationship between economic growth and net exports, firstly the export-led growth hypothesis asserts the positive relationship and impact of economic growth on net exports, secondly the aggregate demand, lastly the currency effects theory indicating negative relationship among them and for the study in hand as the estimates showcase there is a negative relationship between them as one point increase in economic growth decreases net exports by -3.250602 units indicating the adverse effect.

According to the ELGH, a rise in exports propels economic development and national growth, when a country has a surplus reinvesting can boost production and create jobs in domestic industries. The ELGH essentially contends that commerce increases production, which fuels economic expansion as a whole but it's important to understand that rapid expansion may also result in inflationary pressures, which would reduce the competitiveness of exports. On the other hand, Higher growth may also lead to higher interest rates, which could cause the exchange rate to appreciate and reduce the competitiveness of exports(Smith, 1937). This theory was first proposed and developed in classical economics by Adam Smith, David Ricardo, and later on in the modern economics Krugman (1984) and Lancaster (1980) emphasized on the

importance of export-led growth hypothesis as well as the growth-led export hypothesis considering both as substitutes (Krugman, 1984) (Lancaster, 1980).

Another theory and reason is the issue of the redundancy of natural resources as the countries with a wealth of natural resources, such as those in the Gulf Cooperation Council, may see economic growth as a result of resource extraction. It's possible, though, that this increase won't be sustainable or advantageous for other industries, like exportsbecause diversification may be hampered by an over reliance on resource exports. These nations become more susceptible to changes in the market and price volatility because resource sectors frequently demand specialized expertise; there aren't many job options available to the public. Long-term economic resilience can be hampered by neglecting other industries, such as manufacturing, services, or agriculture(Petrov, 2010).

### 2.2.4 Theories related to Exchange rate

The exchange rate specifically as of the measure of real effective exchange rate(REER) is a pivotal element of determining exports within a nation, it is either depreciation where price of goods and services fell down or appreciation where prices go up, but what is here more important is depreciation that can have more long-term negative effects on exports. Exporters may face difficulties due to currency devaluation. Although exports may initially cost less to overseas consumers, there are a few factors that may offset this advantage.

First off, over time, depreciation may reduce export competitiveness. Foreign purchasers may become less interested in a country's products if their price increases because of the weaker currency, which would reduce the amount of exports. Secondly, exporters may experience pressure on their profit margins. Depreciation drives up the cost of imported inputs (such raw materials) in tandem with rising export prices which profitability may be greatly impacted by this. Thirdly, there may be strain in supply systemsas the cost of imported materials is higher for industries that depend on imports, which could limit their capacity to meet export demand and possibly interrupt production. Fourthly, there may be a paradoxical circumstance in which import dependence really rises. Businesses may depend even more on foreign inputs as a result of rising domestic production costs brought on by a pricey import dependency, which would hurt export-oriented industries. Finally, exporters face uncertainty due to frequent currency swings. Exchange rate volatility can pose a challenge to long-term planning and investment decisions, hence increasing the likelihood that risk-averse enterprises will delay export expansion(Stojanov & Varela & Engel, 2024).

In conclusion, while there may be some short-term benefits to exports from currency depreciation, its long-term effects—such as decreased competitiveness, tightened margins, and supply constraints—need to be carefully considered. Policymakers and companies alike should consider the possible consequences before depending exclusively on a depreciating currency to increase exports. The estimation within this study have resulted in a negative relationship between net exports and exchange rate as one unit increase in exchange rate will decrease exports by -0.678433 which is solely based on the condition that if exchange rate leads to depreciation then will cause reduced exports.

### 2.2.5 Theories related to Unemployment

The striking relationship between exports and unemployment is suggested by the Ricardian Comparative Advantage hypothesisand it implies that nations can gain from trade even in the absence of an absolute advantage whichis the ability to produce a good more efficiently than anyone else. It is crucial to instead concentrate on their comparative advantage, which allows them to provide a good at a comparatively lower opportunity cost.

There are intriguing ramifications for unemployment from this viewpoint as the high unemployment rates are an indicator of unused labor in a country. According to the Ricardian viewpoint, this excess labor can be used to produce items that can be exported. With labor expenses accounting for a large portion of manufacturing costs, this increasing emphasis on exports may turn into a tactic to make use of idle resources because underutilized labor is directed toward export-oriented production. The theory suggests a counterintuitive relationship, in the short run, higher unemployment may be linked to increased export activity but it's crucial to keep in mind that this is an oversimplification that ignores the long-term effects of high unemployment as well as the complexity of contemporary economies(Dutt & Mitra & Ranjan, 2009).

## 2.3 Previous Studies

### 2.3.1 Foreign Direct Investments

To gain insights into the dynamics and challenges of international trade in BRICS from 1970 to 2022, an empirical review of relevant studies, research papers, and data sources has been conducted. This review aimed to provide a comprehensive overview of the existing empirical literature on the subject, highlighting key findings and identifying research gaps.

The authors suggest that policymakers in developing countries should encourage FDI outflows to promote export growth. They argue that policies that promote FDI outflows can help to create a more favorable environment for exports by providing access to new technologies, markets, and capital.

Banday, U. J., Murugan, S., & Maryam, J. (2021) examined the causal relationship between FDI, Trade Openness, and Economic growth in BRICS countries from year 1990 – 2018. The authors used the Pooled Mean Group Auto Regressive Distributed Lag Model and Dumitrescu-HurlinGranger Causality tests and found that trade openness and foreign direct investment have a positive impact on long-term economic growth, and there is a unidirectional causation between trade openness and FDI and bidirectional causation between FDI and economic growth. Moreover, the study concludes that FDI and trade openness policies are essential for boosting economic growth in the BRICS countries.

The authors in the mentioned study used the trade openness ratio (Export + Imports / GDP) as the main proxy to which is quite justifiable, however, what the current study focuses on is the volume of trade and not the degree of trade openness in BRICS nations. Therefore, the difference and gap that this study addresses while bearing the similarities is the concept of trade volume vs. trade openness.

Trade openness evaluates a country's tendency to participate in global trade, and is frequently linked to economic growth. It reflects the degree to which a country allows free trade with other nations, without restrictive tariffs, quotas, or other trade barriers.. Although trade openness can increase economic efficiency, empirical data indicates that it may not always have a favorable impact, particularly in less developed economies ( Silajdzic, S., & Mehic, E, 2018) (Banday, Murugan & Maryam, 2021).

Adversely, trade volume denotes the total number of shares or contracts exchanged for a given securities over a given time frame. With larger transaction volumes indicating more active trading and better order execution, it is an important measure of market activity and liquidity. Increased trading volume frequently denotes a positive feeling and a probable price increase. Trading volume can also be used to confirm trends and indicate the strength of price swings. On the other hand, a decline in trading volume could indicate a lack of interest in the market and possible price reversals. The prominence of index funds and high-frequency traders in the market's trading volume statistics emphasizes how crucial it is to comprehend trade volume to make wise investment selections(Nguyen, 2021).

Concluding, the current study does not intend to showcase BRICS countries' willingness to trade but it rather focuses on the actual number and volume of trades that happened throughout the years of evaluation which makes it a distinct point of difference. As per the proxy in my study the net exports as an indicator of the balance of trade (trade surplus) and the ability to export more and import less and more importantly trade volume which is consistent with the research done by several scholars like (Goldberg, L. S., & Klein, M. W., 1999), (Raffo, 2006), (Belloumi, 2014), (Yazawa, 2023) (Lakshani & Fernando, 2023). Therefore, this study also uses the net export as the main proxy to showcase trade volume for BRICS nations similar tothe mentioned studies.

Lakshani & Fernando (2023) investigated the connection between net exports (NE) and foreign direct investment (FDI) to comprehend the dynamics of global commerce and the evolution of the economy in various geographic areas. The study is important because it sheds light on how FDI inflows might improve a host nation's export potential and support economic growth. These inflows are impacted by ideas like knowledge transfer, export platforms, and backward linkage. The authors collected panel data from 110 different nations from 2002 to 2020. Their objective was to determine the connection or dynamic causation between FDI and Net Exports in every location.

According to the study, FDI and Net Exports have a substantial correlation in many locations, and this correlation is bidirectional across all continents. This implies that FDI can affect NE, but that Net Export's success can also draw in additional FDI. This link between FDI and NE at various frequencies and time periods was examined by the researchers using the Wavelet coherence technique. By using this technique, the time-frequency space may be analyzed to find similar power and relative phase, which can help in comprehending the correlation and possible causal relationship between the two variables.

They also performed called the Granger causality test to see if one time series may predict another. This test can indicate if changes in one variable are consistently followed by changes in another, but it is not always a conclusive demonstration of causation. Due to export-intensive businesses that prioritize exports, there was a favorable correlation between FDI and exports over the long term as well as a short-term boost in exports. These results imply that FDI inflows boost a host nation's export potential and promote economic growth since they are motivated by notions like knowledge transfer, export platforms, and backward linkage.

While this study mainly contributes into supporting the first hypothesis (FDI increasing international trades), there are many differences that it has with current study in hand. Firstly, my study focuses specifically on BRICS countries for high volume of trades, secondly granger causality test does not fit to the current study due to the ADF tests performed showing stationary being at first difference which makes it invalid to use granger causality and the outcome could get scrutinized. Lastly, this study works on sectoral composition of trades and trend specification for the included countries which provides new insights.

Khosla (2022)Using data from 1991 to 2019, this research employs a descriptive and analytical method to examine the trends and patterns of FDI inflows in India and their effects on different economic sectors. It concludes that FDI has significantly boosted India's economy by fostering company growth, raising exports, enhancing the nation's balance of payments, and increasing tax revenue for the government. It also outlines the difficulties and possibilities for increasing FDI in India, including

developing human capital, reducing regulations, building up the infrastructure, and encouraging innovation.

Kalai (2024) addressing the impact of FDI on economic growth and trade have examined the relationship in BRICS countries from 1990 to 2020. However, there are some points to be scrutinized for a thorough and precise conclusion. The study discovered a non-linear connection between economic growth and foreign direct investment (FDI) using the Panel Threshold Autoregressive (PTAR) and Panel Smooth Transition Autoregressive (PSTAR) models. The thresholds of FDI to GDP ratios are found to be -1.294 (1.42% of GDP) and -1.283 (1.43% of GDP), respectively.

According to the researchTrade, domestic investment, and human resources have a greater beneficial impact on economic growth above these limits than they do below. This suggests that the BRICS countries need to draw in more FDI in order to further their economic development. In order to attract foreign direct investment (FDI), the research emphasizes how important it is to create policies that support business, enhance the quality of the infrastructure, and strengthen the legal and regulatory environment.

The study offers fresh proof that foreign direct investment (FDI) boosts economic growth in the BRICS nations, but only when it surpasses thresholds in relation to GDP. This suggests that achieving the good impacts of FDI on economic growth requires more than just attracting FDI; rather, the quantity of FDI in relation to the GDP of the host nation is critical. To fully realize the potential of foreign direct investment (FDI) for economic growth, the authors advise the BRICS nations to concentrate on establishing an atmosphere that encourages increased FDI levels.

Baiashvili & Gattini (2020) on data for 111 countries from 1980 to 2017, this research employs a panel data analysis with fixed effects and system GMM estimators to investigate the effect of FDI on economic growth. It concludes that FDI advantages rely on income levels and institutional quality rather than accruing automatically and uniformly across countries. It finds an inverted-U relationship between countries' income levels and the magnitude of FDI's impact on growth, indicating that FDI has a greater impact in middle-income nations than in low- or high-income nations. Additionally, it discovers that institutional robustness, particularly in low- and middle-income nations, strengthens the beneficial effects of FDI on growth.

Liu & Wang (2011) using firm-level data from 1998 to 2005 investigated the relationship between foreign direct investment (FDI) and export performance in China. The gravity model, a popular empirical model in international trade, is based on the notion that trade flows between two countries are proportionate to their economic size and inversely proportional to their distance from one another. The

authors used this model to find that FDI has a positive effect on export performance in China. Using this approach, the authors estimated how FDI affected China's export performance.

The authors additionally account for variables including business size, ownership structure, and industry characteristics that could influence export performance. Even after adjusting for these variables, they discover that foreign direct investment (FDI) positively impacts China's export performance.

Zamani & Tayebi (2022) examined the effects of trade and FDI on economic growth in 15 Asian nations using panel data from 1990 to 2018 and dynamic ordinary least squares (DOLS) and fully modified ordinary least squares (FMOLS) methodologies. It concludes that trade and FDI enhance environmental degradation but have positive and significant effects on economic growth. To attain the aims of sustainable development, it is suggested that trade and FDI policies should be in line with environmental policies.

### 2.3.2 Economic Growth

Mwakabungu (2023) researched the link between Tanzania's economic development and foreign direct investment (FDI) between 1990 and 2020. The study used Granger causality tests and the autoregressive distributed lag (ARDL) model to examine the connection between FDI and economic growth. Since financial development and commerce play an intermediary role in the relationship, the ARDL model is utilized to ascertain if a long-term link exists between the variables. The direction of causation between the variables is determined using the Granger causality test.

The research concludes that there is a long-run relationship among FDI outflows, financial development, trade, and economic growth in Tanzania. It also reveals a positive and statistically significant unidirectional causality running from FDI to economic growth in both the long and short run. The study supports the neoclassical growth theories, which claim that FDI enhances economic growth by augmenting capital stock and technology.

Comparatively, the subject of this study is only one country, while my study focuses on BRICS for the provided reasons and specifically the high volume of trade. Furthermore, the survey by Mwakabungu supports both the second hypothesis ( FDI increases economic growth) and neo-classical growth theories. Therefore, throughout the study, the methods used specifically ARDL, and associated findings are highly essential for the current study.

### 2.3.3 International Trade

Shome(2021)throughout his study seems to be examining customs laws and regulations from a historical and analytical standpoint, especially while considering the World Trade Organization (WTO) and its member nations. To demonstrate changes in tariff structure and their effects on trade competitiveness, the research makes use of information on customs tariffs, trade volumes, and economic growth rates from reputable international databases and reports, in addition to case studies of nations like India. It examines how customs tariffs are used to generate money in developing nations, how customs duties are being reduced in the industrial sector, and how customs are becoming less of a source of revenue overall.

The study concludes that the economies of the nations with the lowest average tariffs grew the fastest. It emphasizes how more international competitiveness is fostered by reduced trade tariffs, which strengthens economic ties, transfers technology, and diversifies exports. On the other hand, it has been discovered that protectionist laws and higher taxes have a negative impact on a nation's ability to compete internationally and expand economically.

Based on this study and similar ones provided, the third hypothesis (taxes reduce trade volume) is proposed. However, this study is qualitative research with content analysis being the main method of research and my study uses quantitative research due to the multifaceted relationship between taxes and international trade, and it cannot be constrained to just examining literature and doing content analysis. Therefore, it is much needed to construct a well-established statistical relationship between variables within the study to come up with new and hopefully unique conclusion.

### 2.3.4 Exchange & Interest rate

Oskooee & Ratha (2004) provided a literature review of the J-curve phenomenon in international trade. The J-This shows the relationship between an exchange rate and a nation's trade balance graphically. After reviewing the research, the authors conclude that there is proof of the J-curve effect in numerous nations. A summary of the empirical research done on the subject is given by the theoretical foundations of the J-curve. They come to the conclusion that the J-curve is a strong occurrence in global commerce and that decision-makers should consider it when developing trade regulations.

Kumar &Singh (2019) examined the causal link between export performance and exchange rate volatility across different monetary policy regimes within the co integrated VAR framework using the implied conditional variance decomposition approach. The authors found that exchange rate volatility has a negative impact on export performance in India; they used monthly data from April 1993 to March 2017 for India’s exports to 25 major trading partners.

Kandil and Mirzaei(2017) evaluated the relationship between unemployment and net trade in the Gulf Cooperation Council (GCC) countries, a vector autoregression (VAR) model was used to estimate the dynamic relationship between unemployment and net trade and it was found that there is a negative relationship between unemployment and net trade in the GCC countries, which suggests that higher unemployment rates lead to lower levels of net trade.

### 2.3.5 Research Gap

Despite the existing empirical literature, certain research gaps need to be addressed. These include:

Quantitative Analysis: While some studies have employed quantitative analysis, there is a scope for more rigorous econometric modeling to examine the determinants of trade and assess the impact of various factors on BRICS trade performance.

Impact of Recent Events: The empirical literature predominantly covers trade dynamics until 2021. There is a need to incorporate the impact of recent occurrences like the COVID-19 pandemic, geopolitical developments, and changes in global trade policies to provide a more comprehensive understanding.

Empirical Inconsistencies, the primary issue is that there isn't enough evidence to consistently back up the benefits of foreign direct investment (FDI) on trade and GDP. Some research confirms a positive influence, while others discover no effect at all or even adverse results. This disparity calls into question whether foreign direct investment (FDI) can be used as a tool to boost the economy everywhere.

Methodological flaws in FDI studies are frequently brought up by critics. Concerns include the possibility of drawing false conclusions regarding the effects of FDI due to poor control for confounding factors and the neglect of endogeneity (Kalai, 2024).

Country-Specific Factors: previous studies have come under scrutiny for failing to take into consideration the various political, social, and economic environments that exist in the host nations. Such oversight may result in conclusions that are overly broad and may not apply to various country contexts(Šimić,2019).

# CHAPTER III
# DATA AND RESEARCH METHODOLOGY

## 3.1 Data & Methodology

Data for the researchhasbeen taken from the International Monetary Fund, and the World Bank, to evaluate the impact of macroeconomic variables of Foreign Direct Investment (inflows), economic growth, tax on international trade as a percentage of revenue, and unemployment rate on the net export which defines trade surplus or deficit situation for BRICS (Brazil, Russia, India, China, and South Africa) countries from 1970 to 2022 through panel data analysis. The time frame constructs 52 years of observation, and the method briefly consists of these points:

- Pre-estimation analysis of the data
- Panel Unit root Tests (IPS)
- Slope heterogeneity test to determine Endogeneity within the model.
- Heteroskedasticity test
- Pooled OLS, Random, and Fixed Effects Estimations
- Lagrange Multiplier Test to identify between Pooled OLS and Random effect model.
- The Hausman Test to identify appropriateness between Random and Fixed Effects model.

*Table 3.1 Variable Description*

| Variables | Description | Source |
|---|---|---|
| Net Exports | Exports of goods and services as percentage of GDP minus Imports of goods and services for respective countries | International Monetary Fund, Government Finance Statistics Yearbook and data files, and World Bank. |
| Foreign Direct Investments %GDP | Net inflow of investments within an economy<br>10% or higher voting stock in an enterprise<br>Sum of equity capital, reinvestment of earnings, and other long or short-term capital shown in BOP | World Bank national accounts data, and OECD National Accounts data files. |
| Interest Rate | Lending Interest rate, usually meeting the short and long-term needs of financing.<br>Real lending interest rate adjusted for Inflation | International Monetary Fund, International Financial Statistics, and |

| | | |
|---|---|---|
| | | data files. |
| GDP growth rate | The percentage change in the total value added by all resident producers. | World Bank national accounts data, and OECD National Accounts data files. |
| Tax on International Trade | Import tariffs, export duties, export or import monopoly profits, exchange earnings, and exchange taxes are among the levies imposed on international trade | World Bank national accounts data, and OECD National Accounts data files. |
| Unemployment Rate | Unemployment refers to the share of the labor force that is without work but available for and seeking employment. | ILO |

*1*

### 3.2 Why Net Exports is appropriate

For the first model, net export is used as the primary and dependent variable to examine the impact of FDI in terms of outflow on the international trade for BRICS countries. However, justifications below are provided as why to choose net exports for the study as there are many other indicators that can be used for this purpose.

Firstly, net export is all inclusive trade performance measure; net exports include both the import and export aspects of a nation's trade activity. Net exports, as opposed to exports alone, show the entire trade balance and give a more accurate view of a country's place in the world economy. A trade surplus is shown by a positive net export value, which means the nation is exporting more goods than it is importing. A negative value, on the other hand, denotes a trade deficit. With this comprehensive approach, it is possible to examine how different elements affect a nation's capacity to export its products and services while considering its reliance on imports from outside(Lakshani, 2023).

Secondly, the inner connection and impact of net exports on employment and economic growth, a country's employment and economic health are closely related to net exports. Economic growth is frequently attributed to higher net exportsand an increase in exports encourages domestic manufacturing, which raises wages and creates more jobs. On the other hand, a sustained trade deficit may impede economic expansion by exerting downward pressure on homegrown sectors of the economy and even result in job losses. Researchers can look at the connection between trade and important economic metrics like GDP and unemployment by looking at net exports(Stock & Watson, 2011).

Thirdly, net export is a good indicator for evaluating the effectiveness of policies, Different policies are put in place by governments to affect trade patterns and an accurate indicator of trade performance is necessary to assess the effects of these measures. For this, net exports are a useful indicator, and researchers can examine, for example, the effects of trade agreements, export subsidies, and currency exchange rate manipulation on a nation's net export position. Researchers may evaluate how well these policies work to achieve their intended aims by tracking changes in net exports following policy implementation(Bahmani-Oskooee, 2000).

Fourthly, net export is beneficial for comparative analysis between countries; net exports make it easier to compare the trade performance of other nations. Scholars can compare levels among countries or look at trends in net exports over time. A better grasp of how a nation's trading position in the international market is influenced by variables such as its degree of development, resource endowments, and trade policies, which are made possible by this comparative study(Johnson & Nogues, 2013).

Lastly, net export is beneficial for determining trade specialization; a nation's trade specialization may be ascertained by looking at the makeup of its net exports. A country that has a positive net export in a particular industry, such as manufactured products, is said to have a competitive advantage in that industry. On the other hand, a sector with a negative net export indicates a comparative disadvantage and a need on imports. Researchers may learn more about a nation's manufacturing strengths and weaknesses and how they affect its trade dynamics by breaking down net exports by sector(Clarida & Gali & Gertler, 2008).

Concluding, along with the five provided reasons for the selection of net export as the dependent variable and indicator for demonstrating dynamics of a country’s trade in international era. Meanwhile, similarly previous researches have used this indicator for the same purpose and provided reasons in the similar context of research which justifies use of this indicator. Some of these researches include (Lakshani, 2023), (Stock & Watson, 2011), (Bahmani-Oskooee, 2000), (Johnson & Nogues, 2013), (Clarida & Gali & Gertler, 2008), (Baldassini & De Fiore & Pagano, 2012),(Rodriguez & Rodrik, 2004),and (Irwin, 2007) and many more other researches with the same purpose and similarities in the context of study.

### 3.3 Data Sampling

Data for the research has been taken from the International Monetary Fund, and the World Bank, to evaluate the impact of macroeconomic variables of Foreign Direct Investment (inflows), economic growth, tax on international trade as a percentage of revenue, and unemployment rate on the net export which defines trade surplus or deficit situation for BRICS (Brazil, Russia, India, China, and South Africa) countries from 1970 to 2022 through panel data analysis. The time frame constructs 52 years of observation, with the 5 cross sections (countries), when multiplied constructs 260 number of observations for the study.

With the 260 number of observations, the data of this study are secondary data obtained from the IMF and other mentioned organizations, secondary data sampling involves utilizing pre-existing data collected by other researches or organizations. Once the dataset is aligned with research objectives, the extraction of 260 observations for the analysis was performed which included filtering the data based on certain variables and criteria to ensure the sample is representative of the population being studies. By leveraging secondary data, both resources and time are saved while still obtaining valuable insights for the study.

While the criteria of reliability and validity of the data depict the importance of ensuring that there will be clear definition of variables, standardized procedures like using consistent methods (test-retest reliability, inter-rater reliability, internal consistency reliability), andpilot testing for potential issues. Moreover, content validity, construct validity to ensure theoretical construct, criterion validity for the correlation, and face validity on the level that data appears to measure are also important. For the study in hand all these criteria of validity or fulfilled as it does construct theoretical construct, content validity, etc. However as set forth by Higgins et al. (2012), the reliability tests mentioned above are not mandatory to be performed if the data are from:

Dependable Sources: If the information has previously undergone validation and reliability testing and originates from extremely reliable and trustworthy sources (such as government databases or renowned research institutes, UN agencies, the World Bank, The International Monetary Fund), it is considered dependable (Johnston, 2014).

Existing Validation: If the data has undergone thorough testing and validation in earlier research, and the outcomes are thoroughly recorded. As the previous studies have used the same datasets from reputable sources as mentioned above.

In-built reliability: datasets mostly from the World Bank and IMF are in-built reliable, as the world bank utilizes accepted standards, sources, definitions, and classifications to acquire high quality data, while adhering the (GDDS) General Data Dissemination System collaborated with IMF. Same thing is true in case of IMG which employs the Data Quality Assessment Framework (DQAF), ensuring the conclusiveness, comprehensiveness, and quality of the datasets provided in their website (World Bank, 2012), (IMF, 2012).

Concludingly, although the sampling of this study ensures all the criteria of validity, for the reasons of obtained data from trusted sources with pre-existing validation and in-built reliability as explained above it is deemed not necessary to perform reliability tests for the current study.

## 3.4 Pre-estimation Analysis

### 3.4.1 Correlation Matrix and Summary Statistics

It is critical to provide an overall vision of common descriptive statistics involved to explain the data and their variation. Therefore, to do this first a summary statistic is provided along with a correlation matrix to test whether there is multicollinearity among variables or not which is vital for the estimation.

Table 3.2 Summary Statistics

| Variables | Net Exports | Interest Rate | Growth rate | FDI | Exchange rate | Tax on International trade | Unemployment |
|---|---|---|---|---|---|---|---|
| Obs | 246 | 192 | 243 | 234 | 240 | 147 | 181 |
| Mean | 2.427214 | 5.712571 | 3.554110 | 1.777116 | 21.71004 | 8.758695 | 11.58388 |
| Median | 1.082035 | 4.437690 | 3.921277 | 1.517802 | 9.680070 | 4.333392 | 8.309500 |
| Maximum | 20.02698 | 41.71381 | 18.28660 | 9.855513 | 73.65435 | 29.17573 | 28.77000 |
| Minimum | -6.724860 | -18.95155 | -8.855650 | -0.702215 | 0.778834 | -15.84169 | 4.310000 |
| Std. Dev. | 4.879696 | 9.575868 | 4.342948 | 1.540459 | 21.00776 | 8.243918 | 6.678131 |
| Skewness | 0.877409 | 1.523911 | -0.318938 | 1.475582 | 0.903429 | 0.763809 | 0.727170 |
| Kurtosis | 3.828105 | 6.834481 | 3.894057 | 7.670919 | 2.551313 | 3.066557 | 2.074328 |
| Jarque-Bera | 19.13948 | 121.9617 | 6.131631 | 155.1782 | 17.61913 | 11.88506 | 15.10752 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Probability | 0.000070 | 0.000000 | 0.046616 | 0.000000 | 0.000149 | 0.002625 | 0.000524 |
| Sum | 296.1202 | 696.9336 | 433.6014 | 216.8081 | 2648.625 | 1068.561 | 1413.233 |
| Sum Sq. Dev. | 2881.184 | 11095.37 | 2282.205 | 287.1346 | 53400.43 | 8223.423 | 5396.290 |

The standard deviation for most of the variables showcases the extreme variation for the data. Therefore, it requires more tests to be done prior reaching to a conclusive estimation.

Table 3.3 Correlation Matrix

| Variables | Net export | Interest rate | GR | FDI | Exchange rate | Tax on international trade | unemployment |
|---|---|---|---|---|---|---|---|
| Net export | 1.0000 | -0.4446 | 0.0200 | 0.0786 | -0.0612 | 0.1276 | -0.1087 |
| Interest rate | -0.4446 | 1.0000 | -0.3441 | 0.2172 | -0.2178 | -0.2711 | 0.0440 |
| Growth rate | 0.0200 | -0.3441 | 1.0000 | 0.2118 | 0.0869 | 0.0587 | -0.2997 |
| FDI | 0.0786 | 0.2172 | 0.2118 | 1.0000 | -0.0717 | -0.0831 | -0.1973 |
| Exchange rate | -0.0612 | -0.2178 | 0.0869 | -0.0717 | 1.0000 | 0.5511 | -0.4457 |
| Tax on Int. trade | 0.1276 | -0.2711 | 0.0587 | -0.0831 | 0.5511 | 1.0000 | -0.4168 |
| Unemployment | -0.1087 | 0.0440 | -0.2997 | -0.1973 | -0.4457 | -0.4168 | 1.0000 |

The correlation matrix in Table 3.2 demonstrates that there is no significant correlation across variables that might alter another variable's effect on the dependent variable, hence avoiding the multicollinearity issue for optimal outcomes. According to (Fabrycy, 1973) (Gujarati, 2003), a weak correlation has no effect on the coefficients in the regression but does alter standard errors. Depending on how strong the correlation is (Mild or Severe), mild collinearity affects the model's interpretability but has no effect on the model's forecasting capacity. Using Daoud's (2017) criteria, which states that values greater than 0.5 demonstrate high collinearity, one can assess the degree of mild or severe collinearity. It solely influences the p-Values and the variance of coefficient estimations and when it is mild then estimation can be trusted(Chennamaneni et al., 2016; Johnston et al., 2018).

### 3.4.2 Stationarity of Variables

The stationarity test is essential to determine the order of Integration of data which would make it possible to determine the optimal analysis model with the given time series dimension for the data. For this purpose, the ADF test is performed to see if the variance, covariance, and mean for the variables are constant so that it would enable establishing a relation between them which is based on this regression equation,

$$\Delta y_t = \alpha + \beta t + \gamma y_{t-1} + \delta_1 \Delta y_{t-1} + \cdots + \delta_p \Delta y_{t-p} + \varepsilon_t \quad (1)$$

$$\Delta y_t = \beta_0 + \beta_1 t + \sum \beta_2 y_{t-1} + \sum_{i=1}^{k} \alpha_1 \Delta y_{t-i} + \varepsilon_t \quad (2)$$

Where Y is the series with t as time, Δ is the difference operator, $\beta_0$, $\beta_1$, $\beta_2$, and $\alpha 1$ are the coefficients that are estimated, $\varepsilon_t$ is the error term. For the tests which are meant to be tests of nonstationary, the H0 is that series are not stationary which gets to be rejected once the value of the t-stat is lower than critical values at 1%, 5%, and 10% with p-value lower than 0.05 significance level.

*Table 3.4 Stationarity Tests* UNIT ROOT TEST TABLE (PP)

| | | | | At Level | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Net export | Interest rate | Growth rate | FDI | Exchange rate | tax on international trade | unemployment |
| With Constant | t-Statistic | 0.1444 | 0.0009 | 0.0000 | 0.4795 | 0.9977 | 0.9859 | 0.0051 |
| | *Prob.* | *0.1712* | *0.0038* | *0.0000* | *0.3564* | *0.6927* | *0.0000* | *0.5064* |
| | | n0 | *** | *** | n0 | n0 | *** | n0 |
| With Constant & Trend | t-Statistic | 0.3802 | 0.0029 | 0.0001 | 0.0941 | 0.5777 | 0.9281 | 0.0084 |
| | *Prob.* | *0.1704* | *0.0203* | *0.0000* | *0.8640* | *0.9216* | *0.0001* | *0.0016* |
| | | n0 | ** | *** | n0 | n0 | *** | *** |
| Without Constant &Trend | t-Statistic | 0.1405 | 0.0457 | 0.0001 | 0.4162 | 0.9999 | 0.2655 | 0.7109 |
| | *Prob.* | *0.1150* | *0.0022* | *0.0385* | *0.3495* | *0.7870* | *0.0004* | *0.5308* |
| | | n0 | *** | ** | n0 | n0 | *** | n0 |
| | | | | At First Difference | | | | |
| | | d(Net export) | d(Interest rate) | d(Growth rate) | d(FDI) | d(Exchange rate) | d(Tax on international trade) | d(Unemployment) |
| With Constant | t-Statistic | 0.0000 | 0.0000 | 0.0001 | 0.0000 | 0.0000 | 0.0001 | 0.0000 |
| | *Prob.* | *0.0000* | *0.0000* | *0.0000* | *0.0002* | *0.0000* | *0.0001* | *0.0001* |
| | | *** | *** | *** | *** | *** | *** | *** |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| With Constant & Trend | t-Statistic | 0.0000 | 0.0000 | 0.0001 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| | *Prob.* | *0.0000* | *0.0000* | *0.0000* | *0.0004* | *0.0000* | *0.0001* | *0.0016* |
| | | *** | *** | *** | *** | *** | *** | *** |
| Without Constant & Trend | t-Statistic | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| | *Prob.* | *0.0000* | *0.0000* | *0.0000* | *0.0000* | *0.0000* | *0.0001* | *0.0000* |
| | | *** | *** | *** | *** | *** | *** | *** |

UNIT ROOT TEST TABLE (ADF)

At Level

| | | Net export | Interest rate | Grpwth rate | FDI | Exchange rate | tax on international trade | unemployment |
|---|---|---|---|---|---|---|---|---|
| With Constant | t-Statistic | 0.1386 | 0.0017 | 0.0000 | 0.4135 | 0.9994 | 0.9859 | 0.0052 |
| | *Prob.* | *0.1695* | *0.0039* | *0.0000* | *0.4087* | *0.7323* | *0.7836* | *0.7294* |
| | | n0 | *** | *** | n0 | n0 | n0 | n0 |
| With Constant & Trend | t-Statistic | 0.4024 | 0.0040 | 0.0001 | 0.0909 | 0.7046 | 0.5695 | 0.0147 |
| | *Prob.* | *0.2044* | *0.0208* | *0.0001* | *0.8703* | *0.9658* | *0.0001* | *0.0001* |
| | | n0 | ** | *** | n0 | n0 | *** | *** |
| Without Constant & Trend | t-Statistic | 0.1101 | 0.0364 | 0.0000 | 0.2956 | 1.0000 | 0.2472 | 0.9252 |
| | *Prob.* | *0.0859* | *0.0022* | *0.3207* | *0.3717* | *0.8557* | *0.0001* | *0.5769* |
| | | * | *** | n0 | n0 | n0 | *** | n0 |

At First Difference

| | | d(Net export) | d(Interest rate) | d(Growth rate) | d(FDI) | d(Exchange rate) | d(Tax on international trade) | d(Unemployment) |
|---|---|---|---|---|---|---|---|---|
| With Constant | t-Statistic | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0001 | 0.0000 |
| | *Prob.* | *0.0000* | *0.0000* | *0.0000* | *0.0001* | *0.0000* | *0.0001* | *0.0002* |
| | | *** | *** | *** | *** | *** | *** | *** |
| With Constant & Trend | t-Statistic | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| | *Prob.* | *0.0000* | *0.0000* | *0.0000* | *0.0003* | *0.0000* | *0.0001* | *0.0018* |
| | | *** | *** | *** | *** | *** | *** | *** |
| Without Constant & Trend | t-Statistic | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.1057 | 0.0000 | 0.0000 |
| | *Prob.* | *0.0000* | *0.0000* | *0.0000* | *0.0000* | *0.0000* | *0.0885* | *0.0000* |

| | | | | | | |
|---|---|---|---|---|---|---|
| *** | *** | *** | *** | *** | * | *** |

Notes: (*)Significant at the 10%; (**)Significant at the 5%; (***) Significant at the 1%. and (no) Not Significant

### 3.5 Pooled/Panel Ordinary Least Square Method

$$NXPT_{it} = \beta_0 + \beta_1 FDI_{it} + \beta_2 GDPPC_{it} + \beta_3 IR_{it} + \beta_4 Grate_{it} + \beta_5 Tax\_INT_{it} + \beta_6 Unemp_{it} + u_{it} \quad (1)$$

$\beta_0$ = Intercept for each unit of cross-section

$\beta_{1.10}$= Coefficients of the independent variables

$FDI_{it}$ = FDI for each country over time

$GDPPC_{it}$= GDP per capita overtime per observation.

$IR_{it}$ = Interest Rate for each country over time

$Grate_{it}$ = GDP growth rate for each country over time

$Tax\_INT_{it}$= Tax on International Trade as a percentage of revenue

$U_{it}$ = Error term with (i) unit of cross section and (t) time

The countries within the study construct 5 cross-section observations from 1970 to 2022 for 52 years and the equation shows that it is intended to use pooled or panel least square regression for the estimation while assuming that the intercept for all the countries to be similar and included in β0. While possible that it would be otherwise, therefore, to confirm the estimation the test of Lagrange multiplier is used while observing the Bruesh-pagan value to match with the criteria set for it if more than 5% it means that the initial model of Pooled least square regression is sufficient to estimate the relationship accurately. If the BP value is less than 5% then the estimate will not be correct since it implies that the intercept for the countries are different and assuming otherwise makes specification error as defined by Gujarati, that the result would show high significance for all independent variables, and a high R-square that cannot be justified. Therefore, in this case, if proven otherwise, dummy variables would be added to differentiate between intercepts for the countries and the Fixed Effects Model Least Square Dummy Variables method will be used for the accurate estimate(Gujarati, 2009).

### 3.6 Fixed Effects Model – Least Square Dummy Variables Model

$$NXPT_{it} = \beta_0 + \beta_1 D_{1i} + \beta_2 D_{2i} + \beta_3 D_{3i} + \beta_4 D_{4i} + \beta_5 FDI_{it} + \beta_6 IR_{i,t} + \beta_7 GR_{i,t} + \beta_8 Tax\_Int_{i,t} + \beta_9 Unemp_{,t} + u_{i,t} \quad \ldots.(2)$$

$D_{1..8i}$ = shows dummy variables that intend to separate intercepts for each unit of the cross-section with only (i) as the observation unit but no time indicator as its constant, and all the else components describe the same as in the pooled ordinary least square method.

With time being more than variables and observing Bruesh-Pagan value, it is necessary to separate the intercept for those countries since they have different values to do that the easy way is to introduce dummy variables for the countries within the study since we have 5 subjects of study only 4 dummy variables are added to avoid falling into dummy variable trap. Lastly to determine whether the fixed effect method is appropriate or not the Hausman test shall be carried out and if proven to be otherwise, then the random effect model will be used (Kiviet, 2007).

### 3.7 Random Effects Model

$NXPT_{it} = \beta_{0i} + \beta_1 FDI_{it} + \beta_2 IR_{it} + \beta_3 GR_{it} + \beta_4 Tax\_Int_{it} + \ldots.. + \beta_9 Unemp_{it} + w_{it} (\varepsilon_i + u_{it}) - \varepsilon$ (random error term) .. (3)

$B_{0,\,i}$ = Is the mean constant of all the cross-sections

$W_{it}$ = The only difference in the random mode is that the Wit, which refers to two random error terms, one which belongs to the ordinary least square model and the second error term intends to address the randomness of the cross sections selected in case there are not sufficient data for some and due to that some are neglected from the study. While all the else components are the same as POLS and FEM models implying the same definition.

### 3.8 Optimal Panel Regression Model

Determining which model is the best one for the study would require tests with three phases in the process, the first common model used in panel regression is Pooled/Panel Ordinary Least Square model or method in the case that the intercept for all cross sections assumed to be as similar or close to each other. In case if the intercepts are different then the POLS would not be sufficient and would not yield conclusive and reliable result, then would divert to Random Effects Model with the Bruesh-Pagan value and Langrage Multiplier test, in the case that it is assumed that there are two randomness in the model as described. If random effect model turned out to be not appropriate due to difference in intercepts, then the second test to be done here is the Hausman test to determine whether it is good to pursue with Fixed Effect Model or stick with the REM, to simplify this process the tests with their hypothesis is described below (Gujarati, 2003).

*Table 3.5 Optimal Panel Data Model*

| Test | Assumption | Hypothesis | Conclusion |
|---|---|---|---|
| Langrange Multiplier Test – Breush Pagan Value | The assumption is that intercepts for cross sections are close to each other, and the Significance level is 5% | H0 – the selected model of POLS is appropriate. If BRP value > 0.05<br>H1 – REM shall be applied due to randomness already existing, if BRP < 0.05 | Based on the Bruesh Pagan value either POLS or REM |
| The Durbin–Wu–Hausman test | The assumption is that the Intercepts for each unit of the cross-section are different, and the Significance Level is 5% | H0 – the random effect model is appropriate If the P value>0.05.<br>H1 – the Fixed effect model shall be applied if the P value<0.05. | REM or FEM based on the P value |

# CHAPTER IV
# RESULT ANALYSIS AND DISCUSSION

## 4.1 BRIC Countries in International Trade

### 4.1.1 Current Developments for BRICS in International Trade Relations and Future Prospects

A crucial turning point for the BRICS' future global leadership and growth was in 2023, the combined efforts of the BRICS are demonstrated by their cooperation and teamwork in developing SWIFT substitute payment systems, progressively creating a financial system that is not based on the dollar, creating a common payment system called BRICS Pay, increasing trade in each country's native currency, and eventually creating a common currency. While each is moving forward at a different rate, it will be a big step forward when the corresponding digital currencies are used to settle upcoming intra-BRICS transactions. By the beginning of 2025, China, India, and Russia will introduce their digital currencies for widespread use. This will lessen the fear of the same against other nations and enable trade amongst them without requiring the worldwide SWIFT network. Brazil and South Africa are closely behind. While the majority of BRICS countries reached this technological stage three years ago, agreements on digital currency protocols have only just been reached by the US and the EU, two countries with relatively more developed financial systems (ITC report, 2023).

Incentives for official BRICS membership have gone up for 2023. Even though "BRICS Plus" was established in 2017 which has attracted non-BRICS officials, China has backed the idea of extending cooperation inside the "BRICS Plus" Model throughout the previous two years. There have also been hints from Moscow that the number of BRICS members may raise from five to seventeen. It is estimated that forty more nations, including powerful nations like Saudi Arabia, Egypt, Indonesia, Iran, Nigeria, Argentina, Turkey, and the United Arab Emirates, have indicated interest in participating.

Meanwhile, in the intra-BRICS trade agreements, Following COVID-19, China's economy is once again on a course for sustainable recovery. International investment and commerce have expanded despite ups and downs, with international trade remaining steady in 2022. However, issues with real estate, climate change, tightening international financial conditions, and escalating geopolitical tensions pose a threat to China's economy. Nonetheless, China's economic data shows a consistent post-COVID rebound in the first half of the2023. In H1 2023, China's GDP expanded at a robust 5.5% annual pace, bringing the country's total GDP to over US$8.3 trillion. The GDP increased 6.3% year over year in the second quarter of the current year.

In the first half of 2023 for China, the average disposable income per person was US$2,739; in the same period, international commerce reached US$1.36 trillion and increased by about 6% on a quarterly basis in Q2. In 2023, several initiatives aimed at bolstering the economy prioritized increasing economic growth, increasing domestic demand and consumption, enhancing supply chain flexibility, drawing in more foreign investment, and lowering unemployment. China has expanded its trade with other BRICS nations; in the first five months of 2022, trade with these nations rose by 12.1% over the same period in 2021. Energy, mining, and agricultural items make up over 76.3% of China's total import value from the BRICS countries, with mechanical and electrical products being one of the country's top exports to other BRICS economies. The five BRICS countries are successfully boosting their trade volume through the signing of free trade agreements, the creation of uniform product standards, the optimization of business practices, and the removal of entry-level restrictions. Due to their strong economic complementarities, trade between China and the other BRICS nations is predicted to continue growing. There is no denying China's dominance in BRICS trade(ITC report, 2023).

China and Russia now trade more than ever, with a combined value of US$190 billion in 2022. In the first half of 2023, trade volume between China and Russia increased by 20% over the same time the previous year, continuing the trend of development. China imports most of its gas, coal, and crude oil from Russia. Energy exports to China have been trending upward since the start of the year, and the volume of agricultural commerce and agricultural goods is also growing. In the initial five months of 2023, there was an 84% surge in Russian exports to China.

In 2022, commerce between China and India reached a record high of US$135.98 billion, and for the first time, New Delhi's trade imbalance with Beijing exceeded US$100 billion. Bilateral trade is currently steady despite chilly political relations. China's primary exports include semiconductors, computers, and smart phones, whereas India's key exports are iron ore, refined petroleum, and raw aluminum. The prognosis is now stable and growing, but it is nevertheless fragile because of contested territorial security challenges and political rivalries. If these issues are handled, as both presidents stated in August 2023, trade development may become dynamic if infrastructural connection is enhanced.

On the other hand, the China General Administration of Customs, reports that bilateral commerce between China and Brazil reached US$165.6 billion in 2022, up to 8.1% over the previous year. The two nations signed many trade agreements in April of this year to expand this even more, and therefore, bilateral commerce reached US$13.85 billion in June 2023. This suggests that trade levels are stable and have somewhat grown, but they might still improve before the end of the year. Iron ore, soybeans, and crude petroleum are Brazil's top exports to China; on the other hand, China shipped office supplies, smart

phones, and semiconductors. The agreements reached in April will improve cooperation on several topics, including infrastructure investment and aeronautical development (CGAC report, 2023).

Meanwhile, with US$56.74 billion in bilateral commerce in 2022, South Africa can be considered as China's biggest commercial partner in Africa. Thanks in part to higher commodity prices, that represented an 11% rise over the prior year. Thus far in 2023, trade levels have demonstrated durability and slower growth. Computers coated flat-rolled iron, and broadcasting equipment are China's top exports to South Africa. Gold, diamonds, and iron ore are South Africa's top exports to China. Despite this much collaboration, South Africa will never be a significant bilateral trading partner for China. The PRC may create east coast ties and connectivity through the Middle East to the INSTC and other BRI trade routes with the aid of South Africa's location as an entrance to Africa. Despite being the smallest member of the BRICS, South Africa still has a significant geographic influence(ITC Report,2023).

In general, China's major trading partner continues to be ASEAN. Trade with ASEAN nations made up 15.3% of China's overall commerce in the first half of 2023, amounting to US$428.96 billion, an increase of 5.4% over 2022. China is a party to an FTA with ASEAN. Trade between China and other RCEP members grew by 7.5% annually in 2022 to reach US$1.82 trillion. Foreign companies operating in China are eligible to enter the RCEP markets if they meet specific requirements related to rules of origin. In addition to Australia, Brunei, Cambodia, Indonesia, Japan, South Korea, Laos, Malaysia, Myanmar, New Zealand, the Philippines, Singapore, Thailand, and Vietnam, China are participants of the Regional Comprehensive Economic Partnership (RCEP), a free trade agreement (ITC Report,2023).

One of the important members of the BRICS group is India, Following the COVID-19 pandemic, the Indian economy recovered well, with 7.2% GDP growth in the 2022–2023 fiscal year. India's policies have implemented several measures to boost exports, the country's economy, and its rapid economic growth during the last ten years. India is expected to have a nominal GDP of over US$3.75 trillion was June 2023, with a notable growth rate of 16.1%. The focus of New Delhi's foreign policy is appropriate, It also includes implementing reforms, increasing industrial production and exports, increasing private investment, increasing consumption, leveraging available resources, increasing foreign exchange reserves, growing private sector spending, a sustained stream of foreign direct investment, and sensible economic expansion. All these factors contribute to the service sector and India's economy now ranks sixth in the world (Balasubramanyam, 2023).

Important economic and commercial sectors include the financial, industrial, agricultural, and service industries in India due to the growth of the country's industrial infrastructure and the absence of

total reliance on any one industry. India has nearly quadrupled its GDP per person over the past ten years, and it can utilize BRICS as a platform to increase its worldwide influence. With its commercial partners, India has made progress in negotiating free trade agreements (FTAs) to encourage commerce; it has also implemented several initiatives, such as open access to BRICS and plans for a digital platform. India has dealt with all the BRICS countries, having over US$100 billion in commerce with them in 2022. India can work out its issues with other members of BRICS and utilize that leverage to improve ties with South America and Africa.

As for the relationship between India and Russia, over the last two years, among India's trading partners Russia has risen from 25$^{th}$ to 7$^{th}$ place. Bilateral trade hit a record US$45 billion between April 2022 and February 2023. Mineral products made up about one-third of this volume (including ore and fuel). In 2021, India exported items to the Russian Federation valued at US$4.43 billion. These mostly consist of food items, raw materials for agriculture, machinery, equipment, and automobiles, as well as chemicals. Given the mutually valuable commodity products that the two hold, as well as the improved trade channels that will soon be made accessible via the INSTC, it is reasonable to expect this commerce to develop(ITC, 2023).

Moreover, India is now Brazil's fifth-largest commercial partner, shipping goods worth US$9.72 billion in 2022—a substantial raise over US$6.77 billion in 2021. Brazil's 2022 exports to India were US$6.34 billion, up from US$4.9 billion in 2021. Pesticides, packaged medications, and refined petroleum are India's top exports to Brazil. Brazil's principal exports to India include gold, soybean oil, and crude petroleum. Meanwhile, increased shipping routes and mutually beneficial trade goods are turning Indian-Brazilian commerce into a dynamic case study of mutual trade recognition and endeavor. This is a hot corridor, with bilateral trade expanding at 50% annual rates in either direction(Banday, 2023).

The intra-relationship between India and South Africa also impacts considerably, as, with a small rise over 2021; bilateral trade in 2022 was just about US$20 billion in a well-balanced partnership. Coal briquettes, raw copper, and gold are South Africa's top exports to India. Autos, special purpose ships, and refined petroleum are India's top exports to South Africa. However, rather than concentrating just on South Africa, India's trade development efforts are more broadly focused on the African continent, particularly East Africa. India aims to quadruple its overall commerce with Africa to US$200 billion by 2030, having grown by 9.26% to about US$100 billion in FY 2022–2023. India already possesses a substantial African network dating back to the British colonial era, thus it does not rely on South Africa’s

regional connections as much as China or Russia might. As a result, South Africa has less significance for India's larger African strategy, yet commerce remains consistent, and possibilities exist(Chatterjee, 2023).

India is worried about the BRICS countries' growth. A key component of India's foreign policy is its participation in the neighboring SAARC trade organization. The country views sub-regional cooperation as a means of advancing social progress, economic growth, cultural advancement, and regional security in South Asia. Nevertheless, India can create a plan for regional collaboration within SAARC by leveraging the strength and influence of the BRICS growth. Afghanistan, Bangladesh, Bhutan, Maldives, Nepal, Pakistan, and Sri Lanka are all part of the SAARC trade network, which also includes India. India controls the majority and ensures that multifaceted trade occurs on its terms, which has prevented the bloc from realizing its full potential. The combined GDP of SAARC is around US$4.47 trillion(ITC, 2023).

Another important member of the BRICS group is Russia, along with minerals, food goods, lumber, and natural gas, Russia is a major global supplier of these resources. Nonetheless, the Russian economy and its oil exports have been impacted by the crisis in Ukraine. Russia increased its prediction for the gross domestic product (GDP) in 2023 to an average growth rate of 1.2%. By the end of 2023, the Russian GDP has reached US$2.267 trillion. Additionally, the IMF upgraded Russia's forecast for economic growth in 2023. However, Russia's GDP growth in the second quarter of 2023 was 4.9%, indicating potential development. Russian traders have swiftly revived ancient trade routes eastward, effectively countering sanctions. These sanctions on Russian exports, particularly to non-Western nations like China and India, intensified in mid-2022. A concept document outlining Russia’s new foreign policy in March 2023 covered topics including the multipolar international order, global economic restructuring, new international reserve currencies, and diversified economic cooperation mechanisms.

As of trade with Brazil, by the end of 2022, trade between Brazil and Russia had surged to a new high of about US$10 billion, mostly due to Brazilian imports of Russian fertilizers and energy. Brazilian food items including cheese, pork, and wine are already being sold in Russian stores. Considering that commerce between Russia and Brazil in 2021 was just $723 million USD, this indicates a significant growth in bilateral activity. Potassic, nitrogenous, and mixed mineral and chemical fertilizers were the principal goods that Russia sent to Brazil. Brazil's principal exports to Russia were coffee, meats, and soybeans. The amounts of bilateral trade are approximately equal with remarkable trade outcomes, Brazil has partially filled the void in EU commerce left by Spain and Portugal. This commerce corridor should continue to be active soon since both tourism and other trade goods are likely to be beneficial to both parties. Brazil's nuclear power expansion plans also involve Russia(ITC, 2023).

On the other hand, Reaching US$1.3 billion, bilateral commerce between Russia and South Africa grew by 16.4% in 2022 over the previous year. However, according to South Africa's envoy to Moscow, trade with Russia is very low, with exports totaling just US$132 million between January and June 2023. For the first time in more than 30 years, direct maritime routes have now been constructed, and Russia's hosting of the Russia-Africa Summit in St. Petersburg earlier this year is likely to have an impact. Although this commerce corridor is still in its infancy, trade can grow if both parties can work toward better mutual outcomes. Both South Africa's wine industry and its consumer goods sector need to do more to expand in the Russian market; South African wines are still hard to find in Russian supermarkets. Small amounts of trade are growing. To introduce improved dynamics, both parties must put in more work and look for opportunities (Chatterjee, 2023).

Moreover, iterating the importance of Russia’s trade status, The Eurasian Economic Union (EAEU), a free trade association that also includes Kyrgyzstan, Belarus, Armenia, and Kazakhstan, is led by Russia. The GDP of the EAEU is estimated to be $5 trillion, and intra-EAEU trade rose by almost 17% in 2022. In addition, the group has free trade agreements (FTAs) with Vietnam, Serbia, and Iran. Several additional nations, notably India, a member of the BRICS, are negotiating free trade agreements with the EAEU. Under the relevant rules of origin circumstances, foreign investors that are included in the European Union (EAEU) can access these associated markets. In addition, Russia belongs to the Commonwealth of Independent States (CIS), whose members has separate bilateral trade agreements with one another but do not form a free trade bloc. Together with Tajikistan and Azerbaijan, the CIS comprises all the EAEU member states(ITC, 2023).

Another important member of the group is Brazil; Brazil has the largest economy in Latin America and the largest population, at over 200 million. Brazil offers food for around 1.5 billion people thanks to the growth of trade in its rising economy and the globalization of the economy. The government's influence over the economy has diminished. Despite its poor productivity, Brazil's economy has enormous potential in the industrial, service, and agricultural sectors. When Luiz Inacio Lula da Silva took office as Brazil's president in 2023, the country's foreign policy shifted back to a focus on the BRICS countries. Brazil's GDP increased 2.9% over the previous year to reach US$1.894 trillion in 2022. In 2022, the GDP per person was $8,831 USD.

Brazil's economy is characterized by boom-and-bust cycles, with the service sector accounting for about two-thirds of the country's GDP. South America's top destination for foreign direct investment inflows is still Brazil. Brazil’s commerce within the BRICS is mostly focused on Asia (China and India). China was Brazil's principal commercial partner in 2022. In the meanwhile, Brazil can serve as the link

between BRICS and Mercosur because of its significant and primary involvement in the latter organization. Brazil’s strategic strategy is well aligned with the pluralist framework of BRICS. Like India, Brazil is worried about the BRICS's rapid growth and thinks that it should happen gradually to preserve the region's equilibrium and the five permanent members' significant responsibilities(Chatterjee, 2023).

Another important member is South Africa, In addition to being one of the biggest exporters of gold and platinum, South Africa has a sophisticated infrastructure, a thriving financial, legal, communication, energy, and transportation industry, as well as the continent's biggest stock market. Strict internal regulations caused the GDP to contract to US$730.9 billion in 2022, with growth falling to 2% from 4.9% in 2021. There are several societal challenges in South Africa as well. As of December 2022, 30% of people were living in abject poverty, there is a significant level of inequality, and the unemployment rate was 32.7%. South Africa works to reduce poor intergenerational mobility, poverty, unemployment, and inequality as tight monetary and banking regulations, global economic headwinds, and a shortage of power have all presented difficulties(ITC,2023).

Nevertheless, South Africa continues to play a significant role as Africa's representative in the BRICS and as a regional ally in the efforts to expand the African market. Additionally, South Africa supports and promotes African interests and the involvement of the BRICS in the African Continental Free Trade Agreement (AfCFTA), particularly about the building of infrastructure for sustainable development. South Africa is in favor of the BRICS group's growth and has succeeded in boosting commerce with China and other BRICS nations. A growing portion of South Africa's exports are going to the other BRICS nations. The trade statistics of South Africa with China, India, Russia, and Brazil may be found in the corresponding sections of those respective countries.

Concluding, despite the astonishing potential engraved in BRICS, particularly in intra-trade relations, BRICS is dealing with several issues, including internal conflicts, a slowdown in global economic development, geopolitical concerns, issues with coordination, member goals that diverge, and outside influences. Since there is currently a lack of economic cooperation and cohesiveness within the BRICS, we may anticipate that this summit will see a greater institutionalization of the many BRICS projects. There will probably be talks on lowering import tariffs between the BRICS countries and liberalizing trade. Despite not being an official alliance, BRICS has created more chances with enormous potential because of their shared broad goals, such as the pursuit of a multipolar global governance structure. This makes it a representation of a massive consumer market, complete with a sizable middle

class, abundant natural resources, effective networks and communication, a stable judicial system, and state-of-the-art infrastructure.

### 4.1.2 BRICS's Challenges in Current Shifting Global Trade Landscape

The economies of Brazil, Russia, India, China, and South Africa, or BRICS, have become important forces in the world economy. But there are obstacles in their way of continued expansion. Numerous obstacles threaten to obstruct these countries' aspirations for economic growth and global influence.

Firstly, bottlenecks in the infrastructure: Several of the BRICS countries suffer from poor electricity grids, transportation networks, and logistics systems. These flaws make it more difficult for commodities and services to flow efficiently, which lower productivity and raises trade expenses). India's inadequate rural infrastructure is a barrier to agricultural exports, hence restricting the potential benefits of global commerce(Kragas & Mavrovitis, 2022).

Secondly, Skill Gaps is an important challenge, as knowledge-based sectors grow, so does the need for a competent labor force brought on by technological breakthroughs. Despite having sizable populations, several BRICS countries lack the skills needed to prosper in the emerging economy. The growth of advanced industrial and service industries may be hampered by this skill gap, making them dependent on low-skilled workers and reducing their ability to compete in the world market(Ffrench-Constant et al., 2017).

Thirdly, Policy Uncertainty is a major factor; a turbulent business climate can be brought about by inconsistent or unexpected government policies, which deters long-term investments in new industries and innovation. According to Dreher et al. (2008), bureaucratic obstacles and frequent policy changes might discourage entrepreneurship and impede economic progress. For instance, changes in South Africa's mining policies have raised doubts among investors and may deter foreign direct investment in this important sector.

Fourthly, Geopolitical difficulties pose a threat, as there are many difficulties in the global trade climate, particularly with the US and China's continuing trade spat. All economies, including the BRICS, are affected in a cascade manner by this. Furthermore, commercial flows and international investment may be disrupted and discouraged by political instability in some of the BRICS countries. For example, Russia's commercial partnerships have been severely harmed by the continuing war in Ukraine, which has also cast doubt on the country's economic future.

Fifthly, the Domestic Inequalities, although a few of the BRICS countries have seen remarkable rates of economic growth, not everyone has benefited equally. Political instability and societal discontent can result from widening economic disparities and a sizable informal economy. Furthermore, a sizable underclass may reduce domestic demand for products and services, impeding the expansion of the economy. To ensure long-term economic stability in the BRICS nations, addressing income inequality and fostering inclusive development will be essential(Milanović, 2016).

Lastly, the issue of Environmental Sustainability, there is tremendous pressure on the BRICS economies to implement sustainable practices, especially those that depend on resource exploitation. Long-term risks to their economic survival and international reputation come from environmental deterioration and climate change. The future of these economies depends on moving to greener energy sources and implementing ecologically friendly industrial techniques(Rockström et al., 2017).

Concluding, BRICS countries must deal with these policy issues specifically managing inflation, dealing with unstable currency rates, and achieving sustainable economic growth. For example, significant public debt and fiscal deficits constrain Brazil and South Africa's capacity to pursue broad fiscal policies. Russia's economy is highly dependent on oil prices, making its fiscal policy susceptible to volatility in the world economy. Despite their fast economic expansion, China and India need to manage their monetary policies to prevent inflation without slowing down their economies. Meanwhile, The BRICS countries have enormous potential for further expansion and worldwide impact despite these obstacles. Realizing this potential will depend on resolving the issues mentioned above. The BRICS countries can traverse the complexity of the global environment and assure a brighter future by investing in infrastructure development, boosting education and skills training, and promoting policy stability, expanding regional cooperation, and embracing sustainability.

### 4.2 Hypothesis Analysis

Recalling the hypothesis first proposed and considering the results, here is a quick analysis of the hypothesis and supporting theories behind them:

First hypothesis was that FDI does contribute to increased international trade, which found to be true, and it should be accepted that FDI increases trade. According to the estimation results it was found that there is a significantly positive relationship between FDI and Net exports presenting trade specifically among BRICS countries collectively despite the country specific statistics that are out of scope for this study. The theories supporting this result are the backward linkage theory, export platform, and the theory of substitutability which are already explained.

Second hypothesis was about the FDI affecting economic growth of BRICS countries in a positive manner which is shown to be accurate recalling the estimates in table 4.6 indicating positive impact of FDI with the coefficient being 0.7598907 at 0.000, 1% significance level. The first theory that is supporting the estimates of this study is capital formation theory, Paul Rosenstein-Rodan, an economist, first presented the Capital Formation Theory in his 1943 paper Problems of Industrialization of Eastern and Southeastern Europe, which emphasizes the significance of foreign direct investment (FDI) for economic expansion. According to this hypothesis, capital inflows from overseas investors enhance the amount of money available for investments in profitable ventures in emerging nations. This extra money can then be used to support increased investment, the creation of jobs, and eventually economic growth in general (Rosenstein-Rodan, 1943).

Second theory supporting the positive relationship is the technological spillover theory. Economists Vernon Raymond (1966) and Richard Caves (1971) developed the technical Spillovers Theory, which highlights how foreign direct investment (FDI) can spur technical development in underdeveloped nations. According to this notion, international companies who invest in a host nation bring with them a plethora of knowledge and experience in addition to finance. This covers cutting-edge managerial strategies, creative production methods, and novel technologies. Through a variety of mechanisms, these developments can subsequently spill over to nearby businesses. For example, local staff taught by the multinational company may apply this knowledge to new projects, or partnerships between international and domestic businesses might promote knowledge exchange (Vernon, 1966) (Caves, 1971).

Third hypothesis was that higher tax on international trades leads to a decreased amount of constructive trade and with the estimates provided and theories behind, it does involve a analysis on the complex relationship between two in the different circumstances with different factors that make up the environment of impact or not even a slight impact on the trade and eventually on the growth for BRICS nations as provided in tables 4.4 ad 4.6. Recalling the estimates, taxes on international trades does not affect trade and respectively growth in BRICS countries, the p-value for tax on its impact on trade is 0.561, 0.560, and 0.099 for the POLS, RE, and FE respectively, which indicates no relationship between the phenomenon. Additionally, the tax on international trade does not affect growth in BRICS countries as the estimates suggest based on the p-values provided in table 4.4 and 4.6 indicating 0.238, 0.236, and 0.107 probability values for POLS, RE, and FE models in the analysis. Concluding, it can be said the third hypothesis suggesting a negative relationship between taxes and trade and subsequently growth can be rejected, and the alternative hypothesis is that taxes do not affect trade and growth.

Forth hypothesis suggested that there is a twofold situation and the impact of exchange rates on Foreign Direct Investment (FDI) and growth. Recalling the estimates in Table 4.4 and 4.6, it is evident that the exchange rate does significantly negatively impact FDI with coefficients being -0.678, -0.678, and -0.1 respectively for the POLS, RE, and FE for the BRICS countries at 1% significance level and theory of currency depreciation as of the measure of REER (real effective exchange rate) supports this result and makes it clear that depreciations cause inflationary pressures and central banks for the sake of tackling inflation provide interest rates that alter the course of normal exports which deteriorates net exports. Meanwhile, the exchange rate based on the estimates in Table 4.6 does not affect growth for BRICS countries as the P-values are 0.176, 0.173, and 0.120 respectively for the POLS, RE, and FE with economic growth as the dependent variable. The idea behind this result is that although currency depreciation or appreciation affect normal trend of economic growth, but it does not impact significantly to alter the growth as the central banks create monetary and fiscal policies to tackle these issues specifically in the case of BRICS countries. Concluding, the fourth hypothesis can be rejected in case of growth for BRICS countries while it should be accepted in the case of exchange rate's impact on FDI for the BRICS countries.

### 4.3 Fulfilled Research Objectives

The first research objective was to identify the key factors that influence BRICS trade dynamics for the study period of 1970 to 2022 for 52 years of observation. This objective has been obtained while determining that the FDI, Interest rate, exchange rate, economic growth, and unemployment rate are the major determinants of the impact on trade and subsequently growth in BRICS countries. These factors collectively while considering political and other factors that cannot be included in the model but have impact on the outcome, affect trade in BRICS countries and respectively on economic growth for BRICS countries. The R-square for the estimation in both models have been 0.6318 which means to be having 63% explanatory ability for the estimation and the rest of 33% are included in the error term and cannot be addressed by the model which consists of geo-political factors and other unobservable factors that models cannot accommodate.

Another objective of this study was to evaluate the impact of FDI (outflow) on trade and growth in BRICS countries and it is achieved with the estimation results on Tables 4.4 and 4.6. The impact of FDI is turned out to be significantly positive with the 0.6790629 coefficient meaning that an increase in FDI would increase net exports (trade) by the attributed coefficient at 1% significance level with low standard error. Meanwhile, the impact of FDI on growth in BRICS countries is also determined to be of positive

outcome with 0.7598907 coefficients at 1% significance level, meaning that an increase in FDI would boost economic growth by the associated coefficient.

## 4.4 BLUE TEST

As the current study involves use of linear regression, the concept of BLUE assessment which refers to the Best Linear Unbiassed Estimator, is a critical step in the context of regression models. The best means the estimator possesses smallest variance among all unbiased estimators, linear refers to the linear function for the observed data, unbiassed depicts that the expected value of the estimator equals the parameter value, and lastly the estimator in BLUE (Gujarati,2003).

To obtain the optimal model for analysis and to ensure the criteria set forth according to the BLUE assessment. Adheringly, to identify the best linear unbiased estimators for the linear regression models involving ordinary least square regression, below mentioned tests along with their specific reasons for the usage are performed.

### 4.4.1 Heteroskedasticity

Heteroskedasticity, or the variance of the error term not being constant across observations in the panel data, is one of the fundamental presumptions of OLS estimation. It is generally accepted that heteroskedasticity produces consistent estimation results with biased standard errors. It violates the fundamental presumption that the model should be homoscedastic and eventually results in inaccurate hypotheses testing and inferences. Heteroskedasticity in cross-sectional least squares (LS) regression is frequently taken for granted though, If it is there, it may skew standard errors. There are two ways to deal with heteroskedasticity either to use robust standard errors (Huber-White or sandwich estimators) in conjunction with the LS method, or directly model heteroskedasticity using an appropriate maximum likelihood (ML) model(Gujarati, 2003).

The table below illustrates a trend of standard error spread, indicating the absence of heteroskedasticity in the model. In addition, table 4.1 of the Cook-Weisberg and Breusch-Pagan tests demonstrates the absence of heteroskedasticity and indicates that the p-value is higher than 0.05, allowing us to accept the constant variance null hypothesis.

*Table 4.1 Breush-Pagan/Cook-Weisberg Test for Heteroskedasticity*

Assumption: Normal error terms

Variable: Fitted values of Nxpt

H0: Constant variance

$Chi^2(1) = 1.63$

Prob > chi2 = 0.2020

*Source: Stata Ver.17

### 4.4.2 Multicollinearity

The correlation matrix in Table 4.3 demonstrates that there is no significant correlation across variables that might alter another variable's effect on the dependent variable, hence avoiding the multicollinearity issue for optimal outcomes. According to (Fabrycy, 1973) (Gujarati, 2003), a weak correlation has no effect on the coefficients in the regression but does alter standard errors. Depending on how strong the correlation is (Mild or Severe), mild collinearity affects the model's interpretability but has no effect on the model's forecasting capacity. Using Daoud's (2017) criteria, which states that values greater than 0.5 demonstrate high collinearity, one can assess the degree of mild or severe collinearity. It solely influences the p-Values and the variance of coefficient estimations and when it is mild then estimation can be trusted(Chennamaneni et al., 2016; Johnston et al., 2018).

| Table 4.2 Correlation Matrix | Net export | Interest rate | Growth rate | FDI | Exchange rate | Tax on trade | unemployment |
|---|---|---|---|---|---|---|---|
| Net export | 1.0000 | -0.4446 | 0.0200 | 0.0786 | -0.0612 | 0.1276 | -0.1087 |
| Interest rate | -0.4446 | 1.0000 | -0.3441 | 0.2172 | -0.2178 | -0.2711 | 0.0440 |
| Growth rate | 0.0200 | -0.3441 | 1.0000 | 0.2118 | 0.0869 | 0.0587 | -0.2997 |
| FDI | 0.0786 | 0.2172 | 0.2118 | 1.0000 | -0.0717 | -0.0831 | -0.1973 |
| Exchange rate | -0.0612 | -0.2178 | 0.0869 | -0.0717 | 1.0000 | 0.5511 | -0.4457 |
| Tax on trade | 0.1276 | -0.2711 | 0.0587 | -0.0831 | 0.5511 | 1.0000 | -0.4168 |
| Unemployment | -0.1087 | 0.0440 | -0.2997 | -0.1973 | -0.4457 | -0.4168 | 1.0000 |

After evaluating the three key presumptions for the Pooled OLS estimation—endogeneity (the independence of regressors from residuals), multicollinearity (correlation across variables), and heteroskedasticity (non-constant error variance), and moreover considering that Panel data (data with repeated observations for the same entities over time) or cross-sectional data with multiple observations

per entity are examples of unobserved heterogeneity models. Unobserved heterogeneity refers to individual-specific characteristics that are not directly observed but may affect the relationship between variables. Considering that fixed effects and random effects have almost equal impacts of estimation, including fixed effects can give entity-specific intercepts and it also captures time-invariant variations across entities (e.g., individual-specific qualities, unobservable factors) which are the case in unobserved heterogeneity. While in the case of fixed effects, the model merely captures the time-invariant disparities, the random effects model catches both time-variant and time-invariant disparities as they capture the unobserved heterogeneity that changes over time between different entities and Individual-specific effects are assumed to be random and uncorrelated with the independent variables in RE models. Therefore, it is determined that Random Effects Model with Maximum Likelihood (ML) of Ordinary Least Square regression for the estimation is optimal model to be used for conclusive results.

### 4.4.3 Endogeneity – Slope Heterogeneity Test

To avoid false and biased results, it is necessary to address endogeneity in the panel data estimation process before moving forward with the estimation process as described in Chapter 3. First, the slope heterogeneous test can be used to detect potential endogeneity. This test is based on the premise that in the presence of cross-section and time series, there will be a correlation between the independent variable and the error term, which must be resolved before further estimation can be performed. One of the main causes of endogeneity is heterogeneity, which is the term used to describe variation and differences between cross-sectional units(Moon, 1999).

This test aims to identify heterogeneity or homogeneity. Because of variable bias and so-called unobserved time-invariant effects, it can be helpful in identifying endogeneity. While there are numerous tests with the same goal, the one created by Pesaran and Yamagata is the most widely used one for this purpose. Blomquist & Westerlund (2013) proposed a different test type that addresses heteroskedasticity and autocorrelation-consistent robust technique, but it makes different assumptions.

Table 4.2, shows that the assumption of slope and data being homogenous has to be rejected as the p-value is 0.000 and lower than criteria of 0.05, constructing the situation of heterogeneity which has to be addressed prior estimation to avoid biased results. Initially, as set forth by (Pesaran & Yamagata, 2008), (Wooldrige,2010), (Philips,1999), and (Blomquist, 2013) in case of the presence of endogeneity due to heterogenous data static panel data models consisting usual Ordinary Least Square regression is not appropriate to be used for the estimation and dynamic models shall be implemented to address the matter. However, as explained by the scholars mentioned above random effect model can be suitable for

the panel analysis due to the reason that random effects and fixed effects models can address the issue of unobserved heterogeneity models.

*Table 4.3 Testing Slope Heterogeneity*

| | | |
|---|---|---|
| (Pesaran, Yamagata. 2008. Journal of Econometrics) | | |
| H0: slope coefficients are homogenous | | |
| | Delta | p-value |
| | 4.927 | 0.000 |
| Adj | 6.201 | 0.000 |
| Variables partialled out: Constant | | |

Panel data (data with repeated observations for the same entities over time) or cross-sectional data with multiple observations per entity are examples of unobserved heterogeneity models. Unobserved heterogeneity refers to individual-specific characteristics that are not directly observed but may affect the relationship between variables. Considering that fixed effects and random effects have almost equal impacts of estimation, including fixed effects can give entity-specific intercepts and it also captures time-invariant variations across entities (e.g., individual-specific qualities, unobservable factors) which are the case in unobserved heterogeneity. While in the case of fixed effects, the model merely captures the time-invariant disparities, the random effects model catches both time-variant and time-invariant disparities as they capture the unobserved heterogeneity that changes over time between different entities and Individual-specific effects are assumed to be random and uncorrelated with the independent variables in RE models(Gujarat,2003) (Blomquist & Westerlund, 2013).

## 4.5 Panel Ordinary Least Square Model

Assuming the intercept to be common for all the cross-sections, Panel Ordinary Least Square Model is used to forecast and establish the relationship between variables' Net exports, Exchange rate, FDI, Interest rate, Economic growth, Tax on trades, and Unemployment. The model consists of:

$$NXPT_{it} = \beta_0 + \beta_1 FDI_{it} + \beta_3 IR_{it} + \beta_4 Grate_{it} + \beta_5 Tax\_INT_{it} + \beta_6 Unemp_{it} + u_{it} \ldots \quad (1)$$

$\beta_0$ = Intercept for each unit of cross-section

$\beta_{1.10}$= Coefficients of the independent variables

$FDI_{it}$ = FDI for each country over time

$IR_{it}$ = Interest Rate for each country over time

$Grate_{it}$ = GDP growth rate for each country over time

$Tax\_INT_{it}$= Tax on International Trade as a percentage of revenue

$U_{it}$ = Error term with (i) unit of cross section and (t) time

### 4.5.1 Fixed Effects Model

$NXPT_{it} = \beta_0+\beta_1 D_{1i} + \beta_2 D_{2i} + \beta_3 D_{3i} + \beta_4 D_{4i} + \beta_5 FDI_{it} + \beta_6 IR_{i,t} + \beta_7 GR_{i,t} + \beta_8 Tax\_Int_{i,t} + \beta_9 Unemp_{,t} + u_{i,t}$ ….(2)

$D_{1..8i}$ = shows dummy variables that intend to separate intercepts for each unit of the cross-section with only (i) as the observation unit but no time indicator as its constant, and all the else components describe the same as in the pooled ordinary least square method.

With time being more than variables and observing Bruesh-Pagan value, it is necessary to separate the intercept for those countries since they have different values to do that the easy way is to introduce dummy variables for the countries within the study since we have 5 subjects of study only 4 dummy variables are added to avoid falling into dummy variable trap. Lastly to determine whether the fixed effect method is appropriate or not the Hausman test shall be carried out and if proven to be otherwise, then the random effect model will be used (Kiviet, 2007).

### 4.5.2 Random Effects Model

$NXPT_{it} = \beta_{0i} + \beta_1 FDI_{it} + \beta_2 IR_{it} + \beta_3 GR_{it} + \beta_4 Tax\_Int_{it} + \ldots.. + \beta_9 Unemp_{it} + w_{it} (\varepsilon_i + u_{it}) - \varepsilon$ (random error term) .. (3)

$B_{0,\,i}$ = Is the mean constant of all the cross-sections

$W_{it}$ = The only difference in the random mode is that the Wit, which refers to two random error terms, one which belongs to the ordinary least square model and the second error term intends to address the randomness of the cross sections selected in case there are not sufficient data for some and due to that some are neglected from the study. While all the else components are the same as POLS and FEM models implying the same definition.

Table 4.4 below shows the result of POLS estimation with the difference that it does not account for observable heterogeneity which was proved to be present in the model. Meanwhile, it should be noted that to see whether it is an optimal model, the Langrange Multiplier presenting Bruesh-Pagan value constructing the criteria for the appropriateness of the model is performed. Furthermore, to address the matter of heterogeneity as explained in the slope heterogeneity test, a random effects model with a maximum likelihood option is performed to capture the unobservable heterogeneity avoiding the biased results.

*Table 4.4 Panel Estimation BRICS*

| Dependent Variable | Net export | | |
|---|---|---|---|
| Sample (adjusted) | 1970 2022 | | |
| Number of Obs after adjustments | 222 | | |
| Net export | POLS | Random effect | Fixed effect |
| FDI | 0.6790629*** | 0.6790629*** | -0.0640267, |
| | (0.011) | (0.010) | (0.737) |
| St. Error | 0.2625365 | 0.2625365 | 0.1901824 |
| Interest rate | -0.320476*** | -0.320476*** | -0.2068426*** |
| | (0.000) | (0.000) | (0.000) |
| St. Error | 0.0455199 | 0.0455199 | 0.0463837 |
| Exchange rate | -0.678433*** | -0.678433*** | -0.1003033*** |
| | (0.003) | (0.002) | (0.000) |
| St. Error | 0.222488 | 0.222488 | 0.0274778, |
| Growth rate | -3.250602*** | -3.250602*** | -0.0778672 |
| | (0.002) | (0.001) | (0.225) |
| St. Error | 0.1001391 | 0.1001391 | 0.063777 |
| Tax on international Trade | 0.0332219 | 0.0332219 | -0.0986663* |
| | (0.561) | (0.560) | (0.099) |
| St. Error | 0.570482 | 0.570482 | 0.0593718 |
| Unemployment | -.1696617*** | -.1696617*** | 0.0713436 |
| | (0.016) | (0.014) | (0.415) |
| St. Error | 0.0693585 | 0.0693585 | 0.0872171 |

*Denotes significance at 10%, **significance at 5%, and *** significance at 1%.

Prior to the explanation of the results one thing that should be clear is the similarity between the result of random effects model and POLS model estimation. The result showcase extreme similarity between the two which is the result of a rare situation that is called as the case in which unobserved heterogeneity does not exists or the unobserved heterogeneity is not correlated with regressors(Greene, 2018). Although it is a rare condition but as the prior tests showcase, unobserved heterogeneity does not exists or even if it exists is not related to the regressors or even with the use of random effects which can address the issue. Therefore, it can be concluded that since unobserved heterogeneity does not exists in the estimation results for both show similarity however with more accurate p-value in case of random effects model (Wooldridge, 2010).

The estimation results can be explained as such that FDI has a positive impact on net exports with the coefficient being 0.6790629, standard error 0.262 and p-value 0.011 indicating significant positive impact with sign of coefficient being positive. The FDI has almost same impact and relationship with net exports in random effect model although the p-values showcase more precision in case of RE than POLS which asserts the case of unobserved heterogeneity issue that is being address by RE. Furthermore, according to the Fixed effect model the coefficient for FDI is -.0640267, standard error 0.1901824, and p-value 0.737 showing insignificantly negative relationship and impact on net exports which is understandable due to matter that the fixed effects model only accounts for time-variant cross section and cannot address time-invariant as well at the same time.

Interest rate is shown to be significantly impacting net exports in a negative way with the coefficient being -0.320476, standard error 0.0455199, and 0.000 at 1% significance level. It has the same impact in random effects model with same coefficient, standard error, and significance level. Lastly, Interest rate has a negatively significant impact on net exports with the coefficient -0.2068426, 0.0463837, and 0.000 at 1% significance.

Exchange rate has a negatively significant impact on net exports with the coefficient -0.678433, 0.0455199, and p-value 0.003 which can be explained that a one unit increase in exchange rate will significantly decrease net exports by 0.678 units. Meanwhile, a one unit increase in exchange rate will significantly decrease net exports by the same value of 0.678 units in random effects model which is identical to POLS. Furthermore, exchange rate negatively impacts net exports while one unit increase in exchange rate decreases net exports by -0.1003033 units and has 1% significance level. This implies that greater economic growth in the BRICS nations may be linked to a weaker currency (depreciation), yet this finding is not strong enough to account for country-specific impacts.

Economic growth has a significantly negative impact on net export with the coefficient being -3.250602, standard error 0.1001391, and p-value 0.002 which is identical to the random effects model estimation results indicating that a one unit increase in economic growth will significantly decrease net exports by -3.25 unit which professes a complex relationship between net exports and economic growth which is constraint to one of three theories of export-led growth hypothesis, aggregate demand, and currency effect hypothesis. Meanwhile, according to the fixed effects model it does not have any significant impact on net exports with significance value is 0.225 and assert that there are more complex factors that the fixed effects model cannot address.

Tax on international trades does not have any impact on net exports according to the POLS and RE estimates which is shown by 0.561 significance level, while it is shown that it can have a positive impact

on net exports and one unit increase in taxes will increase net exports by 0.0332 units which is not valid due to the high standard error of 0.570482. Meanwhile, in Fixed Effects model taxes on international trades have negative impact on the net export while one unit increase in taxes will significantly decrease net exports by 0.098 units at a 10% significance level and low standard error of 0.0593 which accounts for country specific attributes while not observing heterogeneity issue properly.

Unemployment on the other hand significantly impacts net exports in negative manner in both POLS and RE estimations and the coefficients are identical for both whereas the p-value is slightly different showing more precision in case of RE as it is 0.016 in POLS and 0.014 in RE and the coefficient is -.1696617 and standard error is 0.06935585 which shows that results are reliable due to very low standard error. Furthermore, in case of Fixed effects model it can be seen that the FE model predicts a positive relationship between unemployment and net exports with the 0.0713436 coefficient and 0.08 standard error although p-value being 0.415 which shows insignificant impact of the factor.

To determine whether it is appropriate to stick with POLS model for the result or go with random effects model it is crucial to perform Bruesh-Pagan test/Langrange Multiplier for conclusive outcome. Meanwhile, it should be stated that according to the estimation results between POLS and RE it is evident that it does not matter to choose Random effects model or POLS since they are identical to each other with slightly different more precision in P-value for the RE model, and the capacity of RE model to accommodate both time-variant and time-invariant qualities. Therefore, for clear determination the LM test in table 4.5 presents the criteria for the selection.

*Table 4.5 Langrange Multiplier Test*

Nxpt[cid,t] = Xb + u[cid] + e[cid,t]

| Estimated results: | | |
|---|---|---|
| | Var | SD= sqrt(Var) |
| Nxpt | 23.81143 | 4.879696 |
| e | 5.928376 | 2.434826 |
| u | 0 | 0 |
| Test: Var(u) = 0 | | |
| | $chiba^{r2}(01)$ | 0.00 |
| | Prob > $chibar^2$ | 1.0000 |

The LM test indicates that it is not necessary to proceed with RE or FE models as the p-value is 1.0000 and we cannot reject the null hypothesis of POLS being appropriate for the analysis as the criteria is that p-value should be higher than 0.05 which is higher in this case. Therefore, panel ordinary least square regression is optimal model for the analysis.

Meanwhile, as the focus of the study is not just to provide the existing relationship between FDI and Trade but also to eventually see whether collectively they effectively impact on growth for BRICS countries or not. While the estimation for FDI and trade is performed now here the estimation is performed separately for the growth of BRICS countries based on provided factors. Therefore, the POLS, RE, and FE estimation in the Table 4.6 is provided and associated below is the mathematical model for POLS estimation of the Growth model.

$$Grate_{it} = \beta_0 + \beta_1 FDI_{it} + \beta_2 Nxpt_{it} + \beta_3 IR_{it} + \beta_4 Exch\_ratee_{it} + \beta_5 Tax\_INT_{it} + \beta_6 Unemp_{it} + u_{it} \ldots (1)$$

Where:

$\beta_0$ = Intercept for each unit of cross-section

$\beta_{1.10}$= Coefficients of the independent variables

$FDI_{it}$ = FDI for each country over time

$IR_{it}$ = Interest Rate for each country over time

$Grate_{it}$ = GDP growth rate for each country over time

$Tax\_INT_{it}$= Tax on International Trade as a percentage of revenue

$U_{it}$ = Error term with (i) unit of cross section and (t) time

*Table 4.6 Panel Estimation BRICS (Economic growth as dependent Var)*

| Dependent Variable | Economic growth | | |
|---|---|---|---|
| Sample | 1970 2022 | | |
| Obs (adjusted) | 222 | | |
| Economic growth rate | POLS | Random effect | Fixed effect |
| Net export | -.2582168*** | -.2582168*** | -0.1702175 |
| | 0.002 | 0.001 | 0.225 |
| St. Error | 0.0795471 | 0.0795471 | 0.139401 |
| FDI | 0.7598907*** | 0.7598907*** | 0.7100006*** |
| | 0.001 | 0.001 | 0.011 |
| St. Error | 0.230035 | 0.230035 | 0.2731399 |
| Interest rate | -.3612306*** | -.3612306*** | -0.3101189*** |
| | 0.000 | 0.000 | 0.000 |
| St. Error | 0.0419763 | 0.0419763 | 0.0684047 |
| Exchange rate | -0.0278639 | -0.0278639 | -0.0666574 |
| | 0.176 | 0.173 | 0.120 |
| St. Error | 0.0204515 | 0.0204515 | 0.0425273 |
| Tax on trade | -.0599917 | -.0599917 | -0.142788 |

| | | | |
|---|---|---|---|
| | 0.238 | 0.236 | 0.107 |
| St. Error | 0.0506121 | 0.0506121 | 0.0878276 |
| Unemployment | -0.234294*** | -0.234294*** | -0.1241249 |
| | 0.000 | 0.000 | 0.337 |
| St. Error | 0.059522 | 0.059522 | 0.1288019 |
| *Denotes significance at 10%, **significance at 5%, and *** significance at 1%. | | | |

The path for this research is not only to provide empirical evidence for the impact of FDI on trade within BRICS nations but also to provide the consistency of eventual effect of trade on growth of those countries, therefore the table provides the basis to provide the result as such that net exports does significantly impact in negative manner on economic growth based on the complexity of the issue that it depends on several factors. As set forth in the table 4.6 the net exports in negative manner significantly impact on growth as an increase in net exports will decrease growth by -0.2582168 at 0.002, 1% significance level. Meanwhile, net exports has the same impact in Random effect model with more accuracy in the p-value reflected in 0.001, 1% significance level and finally in the fixed effects model it does not affect economic growth as the p-value is 0.225 and does not significantly have any impact on the economic growth for the BRICS countries. Lastly, with the justification provided in previous estimation for net exports as the dependent variable, specifically for the selection of optimal model, same justification is reiterated for the sake of selecting best model which is Random effects model.

Another variable that is significantly affecting economic progress for the countries of BRICS is FDI which has a positive impact on economic progress with the coefficient being 0.7598907 at 0.001 1% significance level which is the same result as of random effects model and fixed effects model that collectively these panel data models suggest that FDI has a positive significant impact on the economic growth of BRICS nations. Moreover, the coefficient for FDI in fixed effects model is 0.7100006indicating that a point increase in FDI will lead to 0.71-point increase in economic growth at 0.011, 1% significance level although the standard error is 0.273 which makes it inspectable to and doubt to believe.

Interest rate also has a significantly negative impact on the economic growth of BRICS countries as of any other country with the reasons provided in the following paragraphs. The coefficient is – 0.361 indicating that a one percent increase in interest rate will decrease economic growth by -0.361 at the 0.000 and 1% significance level which is the same thing for the random effects model although slightly lower than estimated results for the POLS and Random effects is fixed effects with -0.31 but higher standard error of 0.06 which makes doubtful to accept the fixed effects.

Exchange rate is shown not to be significant at all collectively through any type of panel data analysis as the p-values for POLS is 0.176, for RE is 0.173, and for fixed effects it is 0.120 which makes useless to reflect on for more details although the sign in all models indicates a negative relationship between exchange rate and economic growth due to depreciation situation of currency making inflationary pressures which leads to economic distress and rapid fall in economic growth specifically for BRICS countries.

Taxes on international trade construct another factor that does not affect economic growth based on the estimation results. The p-values as shown in table 4.6 are respectively 0.238, 0.236, and 0.107 for the POLS, RE, and FE which indicates the absence of any relationship between taxes with economic growth, although logically and with some theories that are provided in the following paragraphs under specific subtitles explaining the relationship between variables, it is evident that connection exists but in this study it is provided otherwise based on the estimates.

Lastly, unemployment is the last factor that has a significantly negative impact on the economic growth with the coefficient -0.234294 at 1% 0.000 significance level which is the same thing for random effects model indicating that an increase in unemployment rate would decrease economic growth by -0.2 percent. Although the impact is same for the POLS and RE, the impact of unemployment on economic growth of BRICS countries is not significant in the case of fixed effects model due to the model's inability to account for time-variant and time-invariant attributes in the meantime which make irrelevant to the economic growth.

To see whether the model is appropriate for the analysis or not, the LM test is performed in table 4.7 with the results suggesting that the initial hypothesis of POLS being reliable is correct, as set forth in the table 4.7 below.

*Table 4.7 Langrange Multiplier Test (Second Panel Models) Grate as dependent variable*

Nxpt[cid,t] = Xb + u[cid] + e[cid,t]

Estimated results:

| | Var | SD= sqrt(Var) |
|---|---|---|
| grate | 18.8612 | 4.342948 |
| e | 12.95941 | 3.599918 |
| u | 0 | 0 |

Test: Var(u) = 0

| | |
|---|---|
| chiba$^{r2}$(01) | 0.00 |
| Prob > chibar$^2$ | 1.0000 |

The P-value is higher than 0.05 which indicates that initial assumption and hypothesis of POLS being appropriate for the analysis is reliable, cannot be rejected. However, it should be stated that according to the estimation results between POLS and RE it is evident that it does not matter to choose Random effects model or POLS since they are identical to each other with slightly different more precision in P-value for the RE model, and the capacity of RE model to accommodate both time-variant and time-invariant qualities.

## 4.6 Findings and Analysis

### 4.6.1 FDI and Net Export

While exploring the relationship between Foreign Direct Investment (FDI) and net exports, what is more theoretical and practically is proven is that FDI increases Net exports which is the case here for our study as one unit increase in FDI causes 0.67-unit increase in Net exports. However, the argument here is to support the results based on the initial hypotheses asserted in the chapter and in more detail in this chapter. There are 6 theories emphasizing this positive relationship:

Firstly, the Backward Linkage theory postulates that foreign direct investment (FDI) strengthens a nation's export potential by establishing connections between foreign investors and domestic suppliers. Multinational businesses (MNCs) frequently source intermediate items locally when they make investments in a nation, which boosts exports(Lakshani, 2023). Secondly, the hypothesis known as the Export Platform holds that foreign direct investment facilitates exports. Multinational corporations (MNCs) set up production facilities in their host nations to cater to domestic and global markets. These establishments start focusing on exports, which helps NE(Sanudarwan, 2023).

Thirdly, the 1970s saw a rise in interest in trade, foreign direct investment, and knowledge spillovers. Outward-oriented economies, those that are accessible to outside investment and trade—consistently outperformed inward-oriented ones; Curiosity about the reasons underlying this performance disparity was piqued by this empirical evidence. Meanwhile, long-term per capita income development is largely dependent on knowledge spillovers, a theory further codified by endogenous growth theory. Additional knowledge flows were advantageous to economies that engaged with foreign agents through trade and foreign direct investment. These exchanges promoted organizational improvements, alternative management techniques, and the transfer of skills, all of which improved economic performance. These historically led to the Knowledge transfer theory asserting that FDI provides the host nation with technology, managerial know-how, and knowledge. Local businesses benefit NE by being more competitive and export focused as they pick up skills from MNCs(Fernando,2023).

Fourthly, according to the substitutability theory, trade and foreign direct investment (FDI) can either enhance or replace one another. It specifically says that FDI could take the place of exports in situations when trade restrictions are present. This viewpoint isn't shared by everyone, though. Meanwhile, mixed findings have been obtained from empirical investigations. While some studies show that FDI replaces trade flows, others find that the two have a complementing effect1. Researchers such as Blonigen (1997), for example, discovered compelling evidence of the complementarily between trade and FDI. However, variables like freight expenses and tariff obstacles may have an impact on the relationship(Blonigen & Robert, 1997).

This notion was first proposed by Mundell (1957), who believed that FDI and commerce will eventually replace one another. Research on this link has been done in the past, but there is still disagreement over it, emphasizing how intricately FDI and international commerce interact. In conclusion, research on the substitutability hypothesis is still underway, with researchers looking at the complex relationships that exist between trade and foreign direct investment in a variety of settings and eras(Mundell,1957).

Fifthly, is the labor costs theory where Discussions about how relative labor costs influence FDI decisions date back to the 1800s. Prominent proponents of the labor theory of value comprise of economists including Karl Marx, David Ricardo, and Adam Smith and the foundation for comprehending how labor affects economic value and investment decisions was established by these intellectuals. Even though mainstream economists no longer support the labor theory of value, its historical importance is nevertheless important when talking about production, trade, and investment. Moreover, according to the relative labor cost theory, labor costs have an impact on decisions about foreign direct investment (FDI).

Multinational corporations (MNCs) are more willing to invest in a host nation that has cheaper labor expenses and the host nation's exports may rise because of this investment. The labor theory of value, which contends that the quantity of labor required to produce an economic good determines its value, forms the basis of the theory. In this case, a natural price based on labor inputs explains relative pricing between items and tends toward it(Caves,1971).

Lastly, theory of Imperfect Capital Markets asserting that FDI can correct flaws in the capital market. MNCs make investments to increase local production and exports in areas where capital markets are inefficient. Financial contracting is expensive and investor protection is inadequate in imperfect capital markets. Businesses encounter difficulties when deploying technology overseas in these circumstances. According to the idea, financial frictions and non-verifiable monitoring are the main reasons why multinational corporations (MNCs) participate in FDI and cross-border activities. C. Fritz Foley initially

proposed this hypothesis in 2007and he looked at how flaws in the capital market affect MNC conduct and FDI choices(Antràs & Desai, 2007).

### 4.6.2 Interest Rate and Net Export

The relationship between Interest rate and net exports is commonly believed among scholars and practically proven to be adverse relationship. Two approaches have been taken so far to explain this phenomenon; firstly, in case of higher real interest rates, while observing a key concept in international economics as the relationship between real interest rates (r) and net exports (NX), Investors often find domestic assets, like bonds, more appealing when the real interest rate rises in this case foreign investors move their capital to the nation with the higher interest rates in search of bigger returns.Net capital inflows (KI) rise as foreign money pours in,but it also means that the value of the home currency increases in relation to other currencies and for international buyers, exports are more expensive due to the rise of the home currency which results in net exports fall (Romer, 2017).

On the other hand, in the case of lower interest rates, international investors find domestic assets less attractive when the real interest rate declines as the lower net capital inflows results from capital flowing out of the nation while net exports increase because of the home currency's depreciation, which increases export competitiveness. In conclusion, changes in real interest rates have an impact on currency rates, capital flows, and eventually net exports.

Secondly, explaining this relationship involves a transmission mechanism consisting of the interest rates, exchange rate, aggregate demand, and their impact on net exports and consequently on economic growth. Monetary policy is how central banks set interest rates and central banks can draw in foreign capital seeking higher returns by hiking its policy rate, when foreign investors purchase domestic assets, net capital inflows (government bonds, for example) the value of the home currency increases in relation to foreign currencies as demand for it increases. For international buyers, exports are more expensive due to the rise of the home currency that is why net exports fall; on the other hand, a lower interest rate promotes net exports, weakens the currency, and discourages capital inflows. Therefore, this whole transmission mechanism advocates for adverse and negative relationship between interest rate and net exports and supports the POLS and RE estimation of constructing negative relationship(Krugman, 2018).

### 4.6.3 Economic Growth rate and Net Export

There are three hypothesizes explaining this relationship, firstly the export-led growth hypothesis asserts the positive relationship and impact of economic growth on net exports, secondly the aggregate demand, lastly the currency effects theory indicating negative relationship among them and for the study in hand as the estimates showcase there is a negative relationship between them as one point increase in economic growth decreases net exports by -3.250602 units indicating the adverse effect.

According to the ELGH, a rise in exports propels economic development and national growth, when a country has a surplus reinvesting can boost production and create jobs in domestic industries. The ELGH essentially contends that commerce increases production, which fuels economic expansion as a whole but it's important to understand that rapid expansion may also result in inflationary pressures, which would reduce the competitiveness of exports. On the other hand, Higher growth may also lead to higher interest rates, which could cause the exchange rate to appreciate and reduce the competitiveness of exports.(Smith, 1937)This theory was first proposed and developed in classical economics by Adam Smith, David Ricardo, and later on in the modern economics Krugman (1984) and Lancaster (1980) emphasized on the importance of export-led growth hypothesis as well as the growth-led export hypothesis considering both as substitutes (Krugman, 1984) (Lancaster, 1980).

Although it is more frequent for economic growth and net exports to be positively correlated, some theories contend that there may be a negative link under some circumstances, as stipulated above following are the main arguments of the negative relationship.

Dutch Disease: According to this hypothesis, a country's currency might increase in value in response to a spike in exports, especially those of natural resources as a result other industries, such as manufacturing, are less competitive on the world market. As a result, resources may be overlooked in favor of other businesses that could spur overall economic growth in favor of the expanding export industry. The Dutch disease hypothesis was named after the 1960s recessions in Netherlands and was mainly consisting of currency appreciation issues because a stronger currency may result from high export revenue and it would lower the competitiveness of the nation's other exports—manufactured goods and may impede their growth by making them more expensive in foreign markets.

One of the essentials of the Dutch disease was Resource Dependency neglecting other economic sectors (such as manufacturing or agriculture) which might result from a heavy concentration on exporting a particular resource. Falling resource prices make the economy more susceptible to outside shocks, while another essential point is CrowdingoutEffect andas a result of the export industry's rise,

other sectors may see a decrease in overall growth and productivity as labor and capital are drawn away from them.

Additionally, Inflationary pressures play a vital role on the negative relationship of Economic growth and exports, as the cost of production rises in tandem with prices. Businesses, consumers, and the economy are all impacted by this. Demand-side pressures and supply shocks (such natural disasters or rising production costs) are two factors that drive inflation as when prices increase demand side pressures require more attention on domestic demands rather than fulfilling export demands for other countries. Therefore, countries tend to first fulfill domestic demands and then go to exports which decreases exports(Smith, 2008).

Moreover, as an outcome of inflationary pressures, a nation's exports lose their competitiveness when its inflation rate is comparatively greater than that of its trade partners. Why? because businesses' manufacturing costs rise in response to greater inflationand particularly small businesses encounter difficulties since their profit margins are narrower than those of larger companies. These rising expenses (wages, energy, and raw materials) can reduce profit margins and force businesses to make difficult choices about whether to absorb or pass costs through to clients(Smith, 2008). Meanwhile, rapid economic growth leads to inflationary causes and central banks to combat inflation may decide to hike interest rates and Increased interest rates have the potential to draw in foreign capital, which strengthens the value of the home currencyas for overseas buyers, exports are more expensive when the currency is stronger(Johnson, 2012).

Compositions of exports, some nation's exports are mostly made of primary items, like raw resources and their prices may fluctuate if these basic items make up most of the export basket growth in the economy might not help these industries, which would hurt exports. Therefore, if the economy grows then it would primarily shift from primary resources to luxury goods and the quantity of exports will decline as other countries would still seek for the raw materials and the rich will no longer be able to fulfill the amount of trade required as before they could, and it would enormously hurt exports(Lee, 2015).

Another theory and reason is the issue of the redundancy of natural resources as the countries with a wealth of natural resources, such as those in the Gulf Cooperation Council, may see economic growth as a result of resource extraction. It's possible, though, that this increase won't be sustainable or advantageous for other industries, like exports because diversification may be hampered by an over reliance on resource exports. These nations become more susceptible to changes in the market and price volatility because resource sectors frequently demand specialized expertise; there aren't many job options available to the

public. Long-term economic resilience can be hampered by neglecting other industries, such as manufacturing, services, or agriculture (Petrov, 2010).

### 4.6.4 Exchange rate and Net Export

The exchange rate specifically as of the measure of real effective exchange rate(REER) is a pivotal element of determining exports within a nation, it is either depreciation where price of goods and services fell down or appreciation where prices go up, but what is here more important is depreciation that can have more long-term negative effects on exports. Exporters may face difficulties due to currency devaluation. Although exports may initially cost less to overseas consumers, there are a few factors that may offset this advantage.

First off, over time, depreciation may reduce export competitiveness. Foreign purchasers may become less interested in a country's products if their price increases because of the weaker currency, which would reduce the amount of exports. Secondly, exporters may experience pressure on their profit margins. Depreciation drives up the cost of imported inputs (such raw materials) in tandem with rising export prices which profitability may be greatly impacted by this.Thirdly, there may be strain in supply systemsas the cost of imported materials is higher for industries that depend on imports, which could limit their capacity to meet export demand and possibly interrupt production. Fourthly, there may be a paradoxical circumstance in which import dependence really rises. Businesses may depend even more on foreign inputs as a result of rising domestic production costs brought on by a pricey import dependency, which would hurt export-oriented industries. Finally, exporters face uncertainty due to frequent currency swings. Exchange rate volatility can pose a challenge to long-term planning and investment decisions, hence increasing the likelihood that risk-averse enterprises will delay export expansion(Stojanov & Varela & Engel, 2024).

In conclusion, while there may be some short-term benefits to exports from currency depreciation, its long-term effects—such as decreased competitiveness, tightened margins, and supply constraints—need to be carefully considered. Policymakers and companies alike should consider the possible consequences before depending exclusively on a depreciating currency to increase exports. The estimation within this study have resulted in a negative relationship between net exports and exchange rate as one unit increase in exchange rate will decrease exports by -0.678433 which is solely based on the condition that if exchange rate leads to depreciation then will cause reduced exports.

### 4.6.5Trade Tax and Net Export

Export taxes, which are imposed on items that are leaving a nation, have a big influence on trade, when enforced, they result in a price difference between the exported good's local price, which is lower, and its overseas price, which is higher. As a result, exports become less common and are discouraged and economists examine export taxes from a few angles, such as influence on state budgets, efficiency, and justice. These tariffs, however, may not always encourage exports or competitiveness and may even alter the distribution of resources(Baldwin & Krugman, 1979). If there is little harm done to domestic industry and renewable resources, export tariffs may be a triple win for nations that export resources. On the other hand, countries that import resources and levy import duties may suffer a triple loss. Meanwhile, Refunds for Value Added Tax (VAT) also have an impact on export margins (value, quantity, and price). Lowering VAT rebate rates may result in a decline in export value and volume, even if this decline may not be fully reflected in the export price. These consequences are comparable to those brought about by alterations to tariffs and exchange rates(Devarajan & Lewis & Robinson, 1990).

### 4.6.6 Unemployment and Net Export

The striking relationship between exports and unemployment is suggested by the Ricardian Comparative Advantage hypothesisand it implies that nations can gain from trade even in the absence of an absolute advantage whichis the ability to produce a good more efficiently than anyone else. It is crucial to instead concentrate on their comparative advantage, which allows them to provide a good at a comparatively lower opportunity cost.

There are intriguing ramifications for unemployment from this viewpoint as the high unemployment rates are an indicator of unused labor in a country. According to the Ricardian viewpoint, this excess labor can be used to produce items that can be exported. With labor expenses accounting for a large portion of manufacturing costs, this increasing emphasis on exports may turn into a tactic to make use of idle resources because underutilized labor is directed toward export-oriented production. The theory suggests a counterintuitive relationship, in the short run, higher unemployment may be linked to increased export activity but it's crucial to keep in mind that this is an oversimplification that ignores the long-term effects of high unemployment as well as the complexity of contemporary economies(Dutt & Mitra & Ranjan, 2009).

Many other Empirical studies have found the same result of negative impact of unemployment on exports which is the case here in this study. This study found that unemployment causes decreased exports due to the coefficient being minus, as one unit increase in unemployment will decrease exports by -.1696617 units which is supported by the Ricardian Comparative Advantage Hypothesis.

# Chapter V
# CONCLUSION AND POLICY RECOMMENDATIONS

## 5.1 Summary and Conclusion

The purpose of this study was to comprehensively analyze the dynamics and challenges of international trade in BRICS countries from 1970 to 2022. The study aimed to understand the factors that have influenced trade performance during this period and identify the challenges faced in international trade relations. By examining specific sectors, the research provides insights into sector-specific dynamics and challenges. The goal is to derive policy recommendations that can enhance trade competitiveness, address trade imbalances, promote export diversification, and strengthen trade facilitation measures. The study intends to contribute to the existing body of knowledge on international trade and provide valuable insights for policymakers, industry stakeholders, and researchers.

Specifically, the objectives were to identify the impact of FDI on trade and growth in BRICS countries, to determine the factors that influence the BRICS international trade, and to identify the current developments of FDI in BRICS countries. Analyzed data of Countries within BRICS (Brazil, Russia, China, India, and South Africa) from 1970 to 2022 constructing 260 observations. The variables used in the study were Net exports, FDI in terms of outflow, Tax on international trade, Interest rate, Economic growth rate, and Exchange rate. The models used in this study were Panel Ordinary Least Square, Random Effect with maximum likelihood option, and Effects constructing two different models evaluating the Impact of FDI on trade and assessing the impact of FDI in the meantime on Economic growth for BRICS economies. Therefore, one dependent variable throughout panel data analysis models was Net Exports and another dependent variable was Economic growth. The estimation result from both models found that:

- FDI indeed impacts positively in a significant manner on the trade among BRICS nations with a positive coefficient of 0.6790629 at a 1% significance level. Meanwhile, FDI does impact on growth positively with the coefficient 0.7598907 at a 1% significance level on BRICS nations. This result answers the research question of the impact of FDI on trade and growth in BRICS countries.
- The factors that influence the dynamics of BRICS's international trade are, FDI with a significant positive sign, Economic growth with a significant and negative manner with a -3.250602 coefficient at a 1% significance level, which is due to inflationary pressures, as the economy grows,

PPP grows which leads to inflation and to tackle inflation, monetary policies lead to the decreased value of trade although same quantity of trade.

- Another factor is the interest rate as it impacts significantly in a negative manner with a -0.320476 coefficient, Unemployment with significant and negative impact and -0.1696617 coefficient, the Exchange rate with -0.678433 coefficient indicates negative impact, and lastly, Tax on international trade which does not have any significant impact on the trade due to missing observations.

## 5.2 Policy Recommendations

Trade between the economies of Brazil, Russia, India, China, and South Africa, has enormous potential. However, by putting in place smart fiscal and monetary policies, their capacity to realize this potential may be greatly increased. The main factors for both policy sectors are outlined herebriefly to improve trade performance among the BRICS nations, Meanwhile, these policy recommendations are based on the estimation results that are obtained and can be subject to scrutiny:

As for the monetary policies, firstly the establishment of an exchange rate management is highly important to keep their currencies competitive; the BRICS countries might make use of exchange rate management instruments. This deters excessive imports and promotes exports by making them more affordable for overseas consumers. To prevent currency undervaluation, which might result in trade conflicts, this technique must be balanced. Secondly, maintaining interest rates is highly essential whether it's domestic interest rate foreign interest rate or both Real Effective Interest Rate (REER), as it can encourage investment in industries focused on exports. However, to avoid an overheating economy and currency depreciation, this strategy must be balanced with inflation management. Thirdly, the stable financial market is a necessity to draw in foreign investment and ease international commerce, stable financial markets with little volatility are essential. To maintain a positive business climate, financial stability measures must be given top priority by the central banks of the BRICS nations.

As for the Fiscal policies, firstly It is highly important to develop trade infrastructure By making investments in communication infrastructure, logistics platforms, and transportation networks, trade expenses may be drastically lowered while export and import procedures become more effective. Secondly, Export promotion programs shall be initiated by offering firms incentives like tax exemptions, subsidies for export marketing, and trade show participation, targeted government programs may help boost export growth. Thirdly, trade negotiations and deals should be implemented as The BRICS countries stand to gain by pursuing strategic trade deals with other countries, especially those whose economies complement their own. Furthermore, it is critical to negotiate lower trade barriers and promote regional trade cooperation. Fourthly, educational and skills development programs should be implemented, as funding educational and training initiatives can provide workers with the tools they need

to succeed in the global economy. This entails developing abilities in fields like technology know-how, foreign languages, and international business procedures. And lastly, in Research and Development through fostering scientific, technological, and innovative R&D, new goods and services with greater export potential may be produced.

### 5.3 Limitations of the Study

While conducting research on the dynamics and challenges of international trade in BRICS, several limitations may be encountered. It is important to acknowledge these limitations to ensure the study's findings are interpreted within their appropriate context. The potential limitations of this research are as follows:

Data Availability: The availability and reliability of data on international trade can pose a limitation. The accuracy and consistency of trade data, especially for certain sectors or regions, may vary, which could affect the robustness of the analysis. It is important to use the most reliable and comprehensive data sources available and acknowledge any limitations in the data.

Scope and Generalizability: The study focuses on the dynamics and challenges of international trade in BRICS during a specific time frame (1970-2022). Although this offers a useful overview of trade trends and obstacles, it might not fully capture all the subtleties and developments in the trading environment. As a result, there may be restrictions on how broadly the results can be applied to other nations or historical periods that are not included in the given range.

Complex Factors: International trade dynamics are influenced by a multitude of factors, including economic, political, social, and technological aspects. Determining and measuring each individual factor's influence on trade performance may be difficult. While taking into account and accounting for as many pertinent aspects as feasible, the study should also recognize that it may be challenging to precisely assess or quantify some influences.

External Factors: The dynamics of international trade are also influenced by external factors such as global economic conditions, geopolitical events, and international trade policies. Even while the study has made an effort to examine the dynamics of trade among the BRICS in its particular context, it might not be able to take into consideration every outside element that could have had an impact on trade performance during the research period.

Sectoral Focus: The research analyzed specific sectors, such as information technology, agriculture, and automotive, to understand sector-specific dynamics and challenges. Although this offers insightful

information about these industries, it's possible that the results under represent the dynamics and difficulties faced by other industries involved in India's foreign trade.

Despite these limitations, the study offered insightful information about the dynamics and difficulties of international trade among the BRICS nations. The study has made an effort to reduce these constraints' influence on the validity and reliability of the results by identifying them and applying the proper research techniques.

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