

Analyzing The Effect of BRICS on The Economic Growth of Its Member

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ABSTRACT

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This study aims to analyze the effect of BRICS membership on the economic growth of its countries, specifically its impact on GDP growth rate and international trade. This study uses data on the GDP growth rate, exports, and imports from 1997 to 2021 for BRIC countries and from 2001 to 2021 for South Africa. In addition, this study also used descriptive statistical analysis methods and Wilcoxon signed rank statistical test to see the significance of differences before and after member countries joined the BRICS. However, the analysis shows that not all BRICS member countries have significant differences in terms of GDP growth rate, exports, and imports. This divergence is due to several influencing factors, such as economic crises, wars, or conflicts. Thus, this research will provide a better understanding regarding the influence and effectiveness of the BRICS economic cooperation.



A. INTRODUCTION

In the last couple of years, emerging countries have played a significant role globally, yet they have also faced multiple large-scale financial crises (Radulescu et al., 2014). After the crises that hit Asia and Russia in the late 1990s, Brazil and Turkey in 1999-2001, and Argentina in 2001, the focus on the economic and financial potential of the economy for emerging markets was higher, especially in the four largest countries, namely the BRIC countries: Brazil, Russia, India, and China. These four BRIC countries are the largest in the world regarding demographics and economy. In finance, these countries also play an important role in emerging market economies (Jensen, 2004).

Jim O'Neill, a global economist, who first coined the term BRIC in 2001, stated that the potential of emerging market economies created by BRIC would have a massive impact in the next few decades (Colt & O'Neill, 2004). BRIC began its formal operations in 2009 (Mottet, 2013). In 2011, BRIC officially evolved into BRICS, with South Africa joining the group (Nordiansyah, 2014). Countries that are members of the BRICS possess distinct economic characteristics that differentiate them from other emerging markets. In addition to having collectively distinguishing economic attributes, BRICS countries are also characterized by having large populations and areas (Saji, 2019).

The BRICS countries also show characteristics for several good reasons, including their size in terms of land area and the population that is half of the world's population, the amount they have in terms of population and natural resources, their formed educational systems which will produce a highly qualified labour force, and their contribution to the world's GDP which makes them a significant economic power. These characteristics could gain advantages through it in various ways. On top of that, the world was perplexed that China and India simultaneously had economic growth throughout the 2008 financial crisis while the rest of the developed nations experienced a severe recession (Al-Jafari, 2018).

Before emerging countries joined the BRICS, each country had different economic characteristics. Nonetheless, these differences made BRICS what it is today: a pertinent tool to strengthen cooperative relations, especially in the economic sector, and become a world economic power (Nassif et al., 2016). One of the indicators in assessing the success of BRICS economic cooperation is the GDP (Gross Domestic Product) growth rate (Barik & Pradhan, 2021). GDP is a measuring tool for the production, income, and also national expenditure of an economy (Kusnendi, 2002). With that, the GDP growth rate can be used as a gauge indicator of the country's economy that shows the magnitude of the economic development of a country.

The existence of international trade, both in the form of exports and imports, is also an important variable that can affect a country's GDP growth rate (Tang, 2015). Therefore, in knowing the effectiveness of BRICS economic cooperation and its effects on its member countries, a comparative analysis of GDP growth rate, exports, and imports will be carried out before and after member countries become part of BRICS.

A. LITERATURE VIEW

1. BRICS

Jim O'Neill first coined the 'BRIC' phrase in 2001, referring to Brazil, Russia, India, and China as the fastest-growing emerging economies countries. These BRIC countries predicted would surpass the European Union economy's market size in terms of population, dividend and rate of globalization. In 2050, Jim O'Neill believed that BRIC would become the largest economy in the world. BRIC was formalized in the first meeting in New York of the UN



General Assembly in 2006. BRIC evolved into BRICS in April 2011, as South Africa joined in the third summit of BRIC. The BRICS countries contribute 43 percent of the world's population and 25 percent of the world's gross domestic product. The BRICS formation has been seen as a significant move towards a global economic structure. The past few decades have led to a rise in income and asset inequality as the growth of BRICS nations, except for Brazil, experienced a decrease. However, these five countries held a leading shift in terms of global economic power from the developed countries' economies (Kundu, 2014).

2. Gross Domestic Product Growth Rate

According to Todaro and Smith (2009), Gross Domestic Product (GDP) is the total final output of products and services generated inside a nation's borders. At the same time, Lipsey (1992) states that GDP is the nation's income based on expenditures, which comprise all consumer, government, investment, and import or export spending combined. Mankiw (2007) concludes that Gross Domestic Product (GDP) aims to quantify the economic activity recorded over a particular period. The economic growth rate from year to year for all sectors of the economy or each industry can be shown with real Gross Domestic Product prices (Permadi, 2019). Hence, the economic growth of a country is determined by the Gross Domestic Product (GDP) growth rate. When the real income in a given year is higher than the real income in the prior year, it could be concluded that the country's economy is expanding. As a result, economic growth may also be characterized as the expansion of a country's economic activity as measured by its Gross Domestic Product (GDP).

3. International Trade

Rusydiana (2009) states that international trade is an instrument for countries to trade goods and services globally in the form of exports and imports to benefit both parties. According to economists, trade on a global scale involves the efficient exchange of various products and services for both parties' mutual benefit. According to Salvatore (2004), international trade can stimulate a nation's economy. In addition, Rusydiana (2009) claims that cooperation between different countries has led to a significant rise in global trade over the previous few decades. International trade is a critical component of the globalization process. Expanding trade with other countries worldwide will generate benefits and lead to domestic economic growth, both directly in terms of resource allocation as well as effectiveness and indirectly in the form of increased investment (Rusydiana, 2009).

4. BRICS International Trade and GDP Growth Rate

According to Priangani (2015), within a decade after the establishment of BRICS, BRICS was able to contribute and play an essential role in the global economy. In addition, judging from the economic growth in each BRICS country, BRICS countries outperformed the average GDP growth rate by reaching 4% in 2012 compared to the group of developed countries (G7), which only scored 0.7% in the same year. One of the studies conducted and supported by world economists also supported this. This research explains that over the next 15 years, BRICS countries are predicted to be able to maintain high economic growth in each country.

Results from De Castro (2012) show that exports of BRICS countries allocated to the market have increased but contain less significant group products. A review of export intensity revealed the result that the BRICS behaved independently rather than as a group. Research conducted by Saji (2019) suggests that the BRICS alliance increases competitiveness in the import field of each country. The import competitiveness index of each country supports this increase.

While the study by Yuan and Zhao (2011) state the majority of exports from China, South Africa, and Russia are targeted at developed countries, while exports from Brazil and India are focused at emerging markets. International trade shows positive indicators for the



exports and imports of BRICS countries and negative signs for non-BRICS countries, according to study by Sharma and Kallummal (2012). Except for Russia, this cannot indicate that BRICS countries' trade balances are positive as a result of global trade.

B. METHOD

This research uses a quantitative approach, as the data, which include the GDP growth rate, exports, and imports both in the time before and after joining BRICS, are obtained, measured, and analyzed numerically. In addition, in this study, researchers collected data on the GDP growth rate, exports, and imports from BRICS in the period 1997 to 2021 for Brazil, Russia, India, and China, and from 2001 to 2021 for South Africa. Each data was obtained from credible databases, namely the World Bank National Accounts and Organization of Economic Cooperation and Development (OECD) National Accounts. However, data from the year 2020 is not included in this analysis, as the occurrence of the COVID-19 (Coronavirus Disease 2019) pandemic in 2020 would undesirably affect the study. Therefore, 2020 is considered a *force majeure* (Hansen, 2020).

A descriptive statistical analysis method and Wilcoxon signed rank statistical test will be used to analyze the research data. The implementation of these two tests will be aided by the SPSS (Statistical Package for Social Science) Statistics 26.0 program. Descriptive statistics collect data and present it in a simple form so that it is easier to understand (Fadhilah, 2012). Descriptive statistics analyze statistical data by providing a general overview of each research variable reviewed through the results of the average value (mean), minimum and maximum values (Widyastari, 2017). To obtain the average value (mean) of a variable, the mean formula will be used in descriptive statistics as follows (Rahmita, 2018):

$$\bar{x} = \frac{\sum x_i}{n}$$

\bar{x} = Average (mean)
 $\sum x_i$ = Sum of X_i
 n = Amount to be on average

Data on the GDP growth rate, exports, and imports from each BRICS member country that has been collected will be analyzed using the statistical Wilcoxon signed rank test or two-sample Wilcoxon test to determine the results of the hypothesis test. Wilcoxon signed rank or two-sample Wilcoxon test is a non-parametric difference test method used to compare two independent samples (Datta & Satten, 2005). Seeing that the amount of data used in this study is less than 30, a non-parametric statistical analysis using the two-sample Wilcoxon test is needed (Herlinda et al., 2010). The two-sample Wilcoxon test formula that will be used in this study is as follows (Rahmita, 2018):

$$Z = \frac{T - \mu_T}{\sigma_T} = \frac{T - \frac{N(N+1)}{4}}{\sqrt{\frac{N(N+1)(2N+1)}{24}}}$$

Z = Normal test count
 T = Number of levels or small ranks
 μ_T = Average level or rank
 σ_T = Standard deviation of level or rank

Obtaining a test decision will be preceded by the statement of a hypothesis, where the null hypothesis (H_0) shows that there is no significant difference between before and after member countries join the BRICS and the alternative hypothesis (assumed as H_1) which shows that there is a significant difference between before and after member countries join the BRICS (Tektüfekçi & Kutay, 2016).

C. RESULTS AND DISCUSSION

1. Descriptive Statistical Test

Using simple descriptive statistical analysis in testing BRICS countries' data helps analyze the relationship between variables, especially in showing the comparison between the mean or average, minimum, and maximum values of GDP growth rate, exports, and imports before and after countries joined BRICS. In this study, each data from the five BRICS countries – Brazil, Russia, India, China, and South Africa – was divided into two periods, namely before and after joining the BRICS group. For Brazil, Russia, India, and China, the period before joining contains data from 1997 to 2008, and the period after joining contains data from 2009 to 2021. As for South Africa, the period before joining contains data from 2001 to 2010, and the period after joining contains data from 2011 to 2021. This is because South Africa joined the BRICS group in a different year compared to the other four countries. In addition, each of the data does not use results from 2020 because this year is considered *force majeure*. In this research, three variables are tested: GDP growth rate, exports, and imports. The following results of a descriptive analysis of statistics before and after the countries joined BRICS:

Table 1. Descriptive Statistical Results on GDP Growth Rate Data of BRICS Countries

Variable	N	Minimum	Maximum	Mean	Std. Deviation
Brazil's GDP (Before)	12	0.34	6.07	3.1884	1.99086
Brazil's GDP (After)	12	-3.55	7.53	1.5777	3.11385
Russia's GDP (Before)	12	-5.3	10	5.425	4.02902
Russia's GDP (After)	12	-7.8	4.75	1.4431	3.52832
India's GDP (Before)	12	3.09	8.85	6.172	2.10622
India's GDP (After)	12	3.74	8.68	6.8979	1.51538
China's GDP (Before)	12	7.66	14.23	9.9044	1.99467
China's GDP (After)	12	5.95	10.64	7.8574	1.36836
South Africa's GDP (Before)	10	-1.54	5.6	3.4838	2.07707
South Africa's GDP (After)	10	0.3	4.91	1.9347	1.35827

Table 2. Descriptive Statistical Results on BRICS Country Export Data

Variable	N	Minimum	Maximum	Mean	Std. Deviation
Brazil's Exports (Before)	12	6.98	16.55	12.3813	3.21217
Brazil's Exports (After)	12	10.85	20.1	12.8894	2.57011
Russia's Exports (Before)	12	24.73	44.06	34.6177	5.31167
Russia's Exports (After)	12	25.85	30.86	27.9837	1.73198
India's Exports (Before)	12	10.69	24.1	15.9632	4.58715
India's Exports (After)	12	18.69	25.43	21.5046	2.41426
China's Exports (Before)	12	18.16	36.04	26.3161	7.08451



China's Exports (After)	12	18.41	27.19	22.5247	3.16092
South Africa's Exports (Before)	10	22.76	32.25	26.2138	2.79387
South Africa's Exports (After)	10	27.14	31.19	28.1481	1.21038

Table 3. Descriptive Statistical Results on BRICS Country Import Data

Variable	N	Minimum	Maximum	Mean	Std. Deviation
Brazil's Imports (Before)	12	9.41	14.56	12.1761	1.55209
Brazil's Imports (After)	12	11.25	19.08	13.5396	2.0846
Russia's Imports (Before)	12	21	26.17	23.1755	1.5839
Russia's Imports (After)	12	19.98	21.31	20.666	0.35862
India's Import (Before)	12	11.93	29.27	18.0713	5.84286
India's Imports (After)	12	20.92	31.26	25.2728	3.60764
China's Import (Before)	12	14.08	28.44	21.9314	5.6295
China's Imports (After)	12	17.31	24.17	20.0983	2.60414
South Africa's Imports (Before)	10	21.81	33.72	25.6155	3.61843
South Africa's Imports (After)	10	25.02	30.5	27.8137	1.79792

2. Wilcoxon Signed Rank Test

Furthermore, a hypothesis test was carried out using the Wilcoxon signed rank test to determine the influence of the formation of BRICS on the economic growth (GDP growth rate, exports, and imports) of the five BRICS member countries. The amount of collected data is parallel to the amount of data that has undergone the descriptive statistical tests. This includes data from 1997 to 2008 for the period before Brazil, Russia, India, and China joined the BRIC and from 2001 to 2010 for the period before South Africa joined. 2009 to 2021 represent the period after Brazil, Russia, India, and China joined the BRIC. Similarly, 2011 to 2021 represents the period after South Africa joined. Here are the non-parametric testing results for the hypothesis:

Table 4. Wilcoxon Signed Rank Test Results on BRICS Country GDP Growth Rate Data

	(After) Brazil's GDP - (Before) Brazil's GDP	(After) Russia's GDP - (Before) Russia's GDP	(After) India's GDP - (Before) India's GDP	(After) China's GDP - (Before) China's GDP	(After) South Africa's GDP - (Before) South Africa's GDP
Z	-1.490	-2.118	-0.941	-1.961	-1.478
p-value (2-tailed)	0.136	0.034	0.347	0.05	0.139

Based on the table above, a notable positive difference can be observed before and after joining BRICS, particularly for Russia. This is evident as the results show a p-value of < 0.05. Thus, joining BRICS significantly influences Russia's GDP growth rate. However, judging from the descriptive statistical results in Table 1, the average GDP growth rate before Russia joined (5.425) was superior to after Russia joined (1.4431). Table 1 also shows that the minimum GDP growth rate before Russia joined the BRICS was -5.3 percent, and the maximum was 10 percent. Meanwhile, after Russia joined the BRICS, the minimum



value touched -7.8 percent, and the maximum value only reached 4.75 percent. This can be influenced by several factors, such as the crisis that occurred at the end of 2014 or the global crisis from 2008 to 2009 – known as the Great Recession.

Russia's state crisis in the field of its financial markets at the end of 2014 became the root of the country's economic problems over the past few years. In the previous years, the Russian economy deteriorated significantly due to people's decreased trust in the government, reduced resources, and more. In the same period, Russia also experienced a weakening currency condition and the occurrence of bank runs or deposit withdrawals—although not on a large scale (Eberhardt & Menkiszak, 2015). Through their research, Gaddy & Ickes (2010) explained that from mid-2008 to early 2009, Russia experienced a substantial economic decline in terms of total expenditure, industrial production, and stock value. This decline was preceded by Russia's rapid economic growth years before. This is reasonably the reason why Russia's GDP growth rate was low during the period when Russia joined the BRICS.

As for the other four countries, Brazil, India, China, and South Africa do not show significant results as the p-values are above 0.05 (>0.05). This indicates that these four countries did not experience as significant of a change in GDP growth rate before and after joining BRICS as Russia did. According to Didier et al. (2015), emerging markets have experienced a slowdown in economic growth since 2010 after passing good growth in the previous decade. Growth in emerging countries decreased by 7.6 percent in 2010 and hit 4.5 percent in 2014. All regions – except South Asia – felt the impact, where particularly parts of Latin America and the Caribbean got the worst hit. This resulted in an insignificant decrease in GDP growth rates in Brazil, China, and South Africa. In contrast, the GDP growth rates of South Asian countries such as India experienced a slight increase.

Table 5. Wilcoxon Signed Rank Test Results on BRICS Country Export Data

	(After) Brazil's Exports - (Before) Brazil's Exports	(After) Russia's Exports - (Before) Russia's Exports	(After) India's Exports - (Before) India's Exports	(After) China's Export - (Before) China's Export	(After) South Africa's Export - (Before) South Africa's Export
Z	-0.392	-2.667	-2.040	-1.255	-1.682
p-value (2-tailed)	0.695	0.008	0.041	0.209	0.093

The table above shows that Russia and India experienced significant changes in export data before and after joining the BRICS. P-values of < 0.05 indicate this. It can be concluded that there is a noteworthy influence of BRICS on the exports of Russia and India. From Table 2, exports before Russia joined (34.6177), were superior to those after Russia joined (27.9837). This is possible because, previously, Russia was the world's largest producer and exporter of natural gas and the second-largest producer and exporter of oil. As Russia's economic growth continues to depend on natural gas and oil exports, Russia faces competition and challenges in the natural resource market (Kutcherov et al., 2020; Su et al., 2021). As a result, Russia's economic growth slowed down to around 2.3% in 2018 and 1% in 2019. This occurrence is due to the increased value-added tax (VAT) from 18% to 20%, which led to high inflation in Russia (ILIJASOV, 2019). With higher oil prices, Russia's GDP growth rate declined from 5% in the third quarter of 2011 to 1.3% in 2013. The Great Recession also almost caused Russia to experience zero growth in 2008 and a negative 15.2% in 2009.



However, this trend did not apply to India's GDP growth rate, which, in contrast, experienced an increase after joining the BRICS, from an average value of 15.9632 to 21.5046. Kallummal's research (2014) results state that India's trade with Brazil, Russia, China, and South Africa doubled to USD 100 billion in 2012. The study also showed that India's exports to the four other BRICS countries doubled from USD 14 billion in 2007 to USD 28 billion in 2012. This shows that BRICS has a positive impact on India's exports.

Conversely, Brazil, China, and South Africa did not experience a significant change in exports, as the data shows little to no difference between before and after joining BRICS. This can be seen from the calculated p-value of > 0.05 , indicating that BRICS does not influence the export sector for these three countries. This is also supported by the results of research conducted by Saji (2019), which states that BRICS shows more divergent results, thus showing various possible outcomes. Hence, the study results show alignment with previous research because several member countries have significant and insignificant results in the same period in the field of exports.

Table 6. Wilcoxon Signed Rank Test Results on BRICS Country Import Data

	(After) Brazil's Import - (Before) Brazil's Import	(After) Russia's Import - (Before) Russia's Import	(After) India Import - (Before) India's Import	(After) China's Import - (Before) China's Import	(After) South Africa's Import - (Before) South Africa's Import
Z	-2.275	-3.059	-2.118	-1.020	-1.580
p-value (2- tailed)	0.023	0.002	0.034	0.308	0.114

The table above shows that Brazil, Russia, and India have p-values of < 0.05 . The difference between the number of imports before and after joining BRICS for these three countries is rather significant. Thus, it can be concluded that BRICS exerts a tangible influence on Brazil, Russia, and India in the field of imports. Based on the results of descriptive statistics in Table 3, the average import of Brazilian countries is higher after Brazil joined the BRICS, with a figure of 13.5396 compared to before Brazil joined the BRICS, which only touched 12.1761. Although Brazil's imports are high in scale, Brazil's exports are insignificant. Nevertheless, it increased since Brazil joined the BRICS. This is in line with the results of Saji's research (2019), which exhibits Brazil's non-positive trade revenues.

Just like Brazil, India also had a higher average import yield when India joined the BRICS at 25.2728 than before (with a number of 18.0713). The results of a study conducted by Kallumall (2014) answer the reason for this occurrence: India experiences a negative trade balance with other BRICS member countries, except Brazil. This allows for an increase in imports after India joins the BRICS.

Unlike Brazil and India, Russia has to juxtapose descriptive statistical results because its imports were more prominent on average when Russia was not in the BRICS at 25.2728 compared to after Russia joined the BRICS with a figure of 21.9314. From the research presented by Darvaz & Martins (2022), it is stated that the decline in Russian imports can be influenced by factors in the Ukraine-Russia war, whose invasion occurred in 2022. The war itself started in 2014. Russia ran a trade surplus in the first months of the war; about half of its increase was due to soaring energy prices, and the downfall influenced the other half in imports. The research also explained that sanctions imposed on Russia over this war affected the fall in Russian imports. This is because products from countries that



impose sanctions on Russia have decreased drastically, even recorded products from several countries that have not imposed sanctions have also decreased.

However, it is different with the remaining two countries, China and South Africa, as they both have p-values of > 0.05 . This means that these two countries show insignificant changes, so their memberships in the BRICS do not significantly influence imports. Thus, the study results show alignment with previous research because several member countries have significant and insignificant results in the same period in the field of imports.

The insignificant results in terms of GDP growth rate, exports, and imports aligned with the results of Saji (2019), stated that BRICS did not show significant results, so it does not rule out the possibility of mixed results. Yet, BRICS have an essential role in increasing India's exports and decreasing Russia's imports.

D. CONCLUSIONS

Based on the test results, the influence of BRICS on its member countries is not convergent in terms of GDP growth rate, exports, and imports. The divergence is because certain countries do not show notable results. Upon further review, many factors can affect insignificant outcomes, such as global crises, internal crises, or high inflation in member countries. However, results show a positive impact of BRICS cooperation for some member countries, such as India's exports, which increased after joining BRICS, juxtaposing the decline of Russia's imports after joining the BRICS.

This study has some limitations, such as the lack of variables tested to prove the effect of BRICS membership on its countries. In addition, the limited period of time that is studied due to the recency of the formation of BRICS could be a shortcoming in showing accurate results in this study.

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