

Review paper

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ANALYZING THE IMPACT OF MACROECONOMIC CONDITIONS ON GDP GROWTH: BRICS VS. G7 COUNTRIES

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The economic rivalry between the BRICS countries and the G7 nations has been a central theme in global development for decades. This study seeks to compare the GDP growth dynamics between the BRICS and G7 countries, while examining the differential impact of the key macroeconomic indicators on their economic trajectories. To achieve this, statistical methodologies, including independent t-tests and ANOVA, were utilized so as to compare the group-level differences, while the tests of between-subjects effects were applied to assess the variations in the effects of the regression coefficients for the macroeconomic factors influencing GDP growth. The study posits that the distinct economic structures of the BRICS countries and the G7 nations lead to varying macroeconomic conditions which shape their growth patterns in distinct ways. The findings of this research offer actionable insights into the strongest and weakest determinants of the GDP growth within these economic blocs. It contributes to a broader discourse on global economic competition, offering evidence-based recommendations for balanced growth strategies.

Keywords: macroeconomic conditions, GDP growth, BRICS, G7

JEL Classification: E01, E60, O47, C33, F43

INTRODUCTION

The global economic landscape has significantly been shaped by the interplay between developed and emerging economies, with the G7 and the BRICS nations representing two pivotal blocs in this

dynamic. Composed of advanced industrialized countries, the G7 has historically dominated global economic leadership through its technological innovations, robust institutions, and established markets. Formed in 1975, the G7 includes the world's most advanced economies, namely France, Germany, Italy, Japan, the U.S., the U.K., and Canada, which joined in 1976 (Rustamov, 2023). Conversely, BRICS - a coalition of emerging economies - has rapidly risen in prominence, challenging the traditional

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dominance of the G7 with its resource-rich markets, demographic advantages, and increasing integration into global trade. The BRICS nations - Brazil, Russia, India, China, and South Africa - are broadly recognized as a significant economic bloc characterized by their remarkable recent economic growth (Siljković, Dedović & Kalač, 2024). Over the past two to three decades, these nations have undergone unprecedented economic expansion, solidifying their status as pivotal players in the global economy (Budhwar, Tung, Varma & Do, 2017). The 15th BRICS Summit held at the Sandton Convention Centre in Johannesburg, South Africa, from August 22 to 24, 2023, marked a significant milestone for the BRICS Diplomatic Progress Initiative by broadening its membership diversity. Starting January 1, 2024, six new countries were invited to the five existing members, i.e. Argentina, Egypt, Ethiopia, Iran, Saudi Arabia, and the United Arab Emirates (Antony, 2023).

This study is specifically focused on several research objectives, particularly intending:

1. to analyze and compare the GDP growth rates of the BRICS and the G7 countries, identifying the key variations in their economic performances,
2. to investigate the influence of specific macroeconomic factors - such as the inflation rate, the unemployment rate, the real interest rate, the exchange rate stability, the export of goods and services, the government debt-to-GDP ratio, FDI net inflows and outflows, and agriculture, forestry, and fishing value-added - on the GDP growth within each group,
3. to evaluate and contrast the macroeconomic impacts on the GDP growth between the BRICS and the G7 countries, highlighting similarities and differences in how these factors shape economic growth in emerging versus developed economies, and
4. to assess the relative contribution of these macroeconomic factors to the overall GDP growth trends in the BRICS and the G7 countries, providing insights into their economic resilience and adaptability to global economic changes.

In order to identify the key differences in the GDP growth rates between the BRICS and the G7 countries over the past decade, the study's initial hypotheses are as follows:

H1₀: There is no significant difference in the average GDP growth rate between the BRICS countries and the G7 countries ($\mu_{\text{BRICS}} = \mu_{\text{G7}}$).

H1_a: There is a significant difference in the average GDP growth rate between the BRICS countries and the G7 countries ($\mu_{\text{BRICS}} \neq \mu_{\text{G7}}$).

This study also aims to bridge this gap by systematically examining the GDP growth trends in the BRICS and the G7 nations over the past decade and is focused on understanding the key macroeconomic factors driving the GDP growth disparities between the BRICS and the G7 countries and how these factors influence economic performance in emerging and developed economies differently. In this regard, the study's second and third hypotheses are established:

For the BRICS countries:

H2₀: The independent variables (Inflation Rate, Unemployment Rate, Real Interest Rate, Exchange Rate Stability, Export of Goods and Services, Government Debt-to-GDP Ratio, FDI Net Inflows, FDI Net Outflows, and Agriculture, Forestry, and Fishing Value-Added) have no significant effect on the GDP growth in the BRICS countries ($\beta_1 = \beta_2 = \beta_3 = \dots = \beta_k = 0$).

H2_a: At least one independent variable has a significant effect on the GDP growth in the BRICS countries ($\beta_k \neq 0$ for at least one_k),

where β_k represents the regression coefficients of the independent variables for the BRICS countries.

For the G7 Countries:

H3₀: The independent variables (Inflation Rate, Unemployment Rate, Real Interest Rate, Exchange Rate Stability, Export of Goods and Services, Government Debt-to-GDP Ratio, FDI

Net Inflows, FDI Net Outflows, and Agriculture, Forestry, and Fishing Value-Added) have no significant effect on the GDP growth in the G7 countries. ($\beta_1 = \beta_2 = \beta_3 = \dots = \beta_k = 0$).

H3_a: At least one independent variable has a significant effect on the GDP growth in the G7 countries ($\beta_k \neq 0$ for at least one k),

where β_k represents the regression coefficients of the independent variables for the G7 countries.

As these blocs navigate their distinct economic trajectories, a comparative analysis of their GDP growth and the underlying macroeconomic factors is crucial for understanding the drivers of economic success and stability in developed versus emerging economies. Given the additional interest in uncovering the impact of FDI net inflows, FDI net outflows, and the government debt-to-GDP ratio on the economic performance in emerging (BRICS) versus developed (G7) countries, and identifying the key similarities and differences in the effect of these factors, the fourth hypothesis was developed as follows:

H4₀: There is no significant difference in the effects of the independent variables on the GDP growth between the BRICS and the G7 countries ($\beta_{\text{BRICS}} = \beta_{\text{G7}}$).

H4_k: There is a significant difference in the effects of the independent variables on the GDP growth between the BRICS and the G7 countries. In other words, the regression models differ between the two groups ($\beta_{\text{BRICS}} \neq \beta_{\text{G7}}$).

LITERATURE REVIEW

Gross Domestic Product (GDP) represents the value of the goods and services produced within a country's economy, overlooking production costs. GDP is also the total of personal consumption expenditures, gross private domestic investment, the net export of goods and services, and the government consumption expenditures and gross investment (Dynan & Sheiner, 2018). GDP is an essential measure

of an economy's wellbeing and allows for direct comparisons between countries (Fraumeni, 2022). GDP is measured by assessing the total value of all goods and services produced, using the value-added method to highlight the economy's main drivers. There are two key attitudes for measuring the GDP, which theoretically produce the same outcome. Firstly, the expenditure approach computes GDP by adding personal spending, capital investment, the government expenditure, and net exports. Secondly, the income approach measures GDP by adding firm profits and household income earned from providing resources (Trinh, 2017).

Moreover, GDP measures a country's domestic income and productivity over a definite period. It signifies the total market value of all final products and services generated within the country during that time. Additionally, GDP originates from the total real demand for national products, both local and foreign. Local demand involves spending through governments, households, and organizations, while foreign demand is driven from exports. However, imports, which satisfy part of local demand, may reduce the overall GDP (Khan & Khan, 2021).

The key macroeconomic factors affecting GDP growth

The performance of an economy depends on the stability of the main macroeconomic indicators, such as the supply of money, inflation and the exchange rate, as well as other fundamental factors (Kankpeyeng, Maham & Abubakar, 2021). Macroeconomics focuses on the performance of the overall economy, taking a comprehensive perspective on economic trends. It observes significant economic indicators and interactions among diverse segments to better understand how the entire economy functions. As one of the key macroeconomic factors, inflation considerably affects economic development. It signifies the general rise in the prices of products and services over time within an economy. Moreover, labor force participation, shaped by Foreign Direct Investment (FDI), plays a fundamental role. FDI can improve access to the funds (Selaković, 2022) and

employment opportunities in hosting nations and facilitate the relocation of advanced technological proficiencies (Shah, Asghar & Riaz, 2020). Furthermore, GDP *per capita* and the gross savings rate are positively correlated, indicating that a higher savings rate is associated with a higher GDP *per capita* (Ahsan, 2024).

The economic profiles of the BRICS and G7 countries

Over the last 20 years, economic dominance worldwide has significantly shifted. This transformation has occurred mostly due to the emergence of China (Janković, 2018), but in a broader perspective owing to the BRICS countries, consisting of Brazil, Russia, India, and China. The confidence of BRICS in accomplishing their goals can be seen through their economic efficiency. The economic growth of BRICS has been observed by many countries, except in 2021, when the global economy was impacted by COVID-19. The BRICS economies account for 25.61% of the world's GDP (Paudel, 2023).

The Group of Seven (G7), consisting of the United States, Japan, Germany, the United Kingdom, France, Italy, and Canada, is a political forum containing some of the world's leading economies. These countries are characterized by their significant levels of industrialization, economic strength, and commitment to international economic stability. Advocating for the GDP of over \$29 trillion, the United States has the leading economy and is a frontrunner in technology, finance, and healthcare. The third largest economy is Japan, with the GDP of about \$4.07 trillion. It is recognized for its advanced technology, export-oriented fields, and automotive industries. Germany, on the other hand, with its GDP of \$4.71 trillion, is the leading economy in Europe. The country specializes in engineering and the export of machinery and vehicles. With the GDP exceeding \$3.59 trillion, the United Kingdom is an international financial center, with London acting as the primary base for banking and financial facilities. With the GDP of \$3.17 trillion, France tracks closely because of its varied economy that contains robust sectors for

luxury goods, agriculture, and aerospace. With its GDP of \$2.38 trillion, Italy is known for its flourishing manufacturing segment, and is particularly strong in the fashion, automotive, and design industries. Finally, Canada, with the GDP of \$2.21 trillion, is heavily reliant on natural capitals, such as minerals, oil, and gas, and also has an advanced financial sector and close economic bonds with the United States (Statista, 2024).

The GDP growth rate and inflation

The GDP growth of the US has been steady and strong, whereas Japan, the UK, Italy, France, and Canada have faced some fluctuations over the recent years. Inflation is a result of money supply exceeding the production of goods and services in an economy, mainly driven by extreme aggregate demand. Temperate inflation can affect the output, while extreme inflation lessens labor demand, leading to lower production and eventually slowing down economic development (Kankpeyeng *et al*, 2021). The Keynesian School implies a positive connection between inflation and GDP growth, while the neoclassical view claims that rising inflation diminishes the output and wellbeing. Additionally, higher inflation lowers purchasing power, discouraging spending on goods and capital, eventually reducing the stable output (Tien, 2021). Inflation can significantly influence economic progress, making price constancy essential for emerging economies. Defined as the sustained rise in overall price levels over time, inflation poses a significant obstacle to economic balance. By increasing manufacturing costs for businesses, traditional economists reason that inflation obstructs economic growth (Haider, Ullah, Khan, Raza & Ali, 2024). Furthermore, inflation brings out currency devaluation. Excessive inflation lowers product demand, which consequently decreases national production. As production deteriorates, demand for labor declines, thus significantly increasing unemployment (Alam, Nur Alam & Hoque, 2020).

In the long run, GDP growth leads to inflation. If not controlled, inflation can accelerate into hyperinflation, creating a self-perpetuating cycle. In an environment

of rising inflation, people are likely to spend more, expecting that their money will lose value eventually. This increased spending for the time being boosts GDP, further escalating prices (Ali, Yusop, Kaliappan, Chin & Meo, 2022).

An alternative interpretation is that rising inflation is not the cause of gradual economic development, but rather an indication of core concerns, similar to supply disruptions or fiscal imbalances. Certain theories, like New-Keynesian models, imply that inflation may even boost GDP in the short run in specific circumstances. Nevertheless, these theories struggle to account for situations like stagflation, where a high level of inflation and slow growth take place at the same time (Agarwal & Baron, 2024).

National economic competitiveness in global trade relies on inflation, because higher inflation increases export prices while cutting import prices, resulting in trade inconsistencies and the current account gaps. Huge inflation rates trigger capital outflows across countries because investors hunt for low-inflation areas, which eventually stress foreign exchange rates and reduce foreign currency stocks. Certain economists argue that inflation needs to exist at a low rate in order to stimulate economic development through elevated spending, while improving debt viability over time. Sustaining inflation at an average level continues to function as a top policy aim, supporting the stability of the economy and development sustainability (Xavier, Fernandes & de Oliveira, 2021).

The impact of unemployment on GDP growth

Unemployment describes a condition where people who are willing and able to work cannot find appropriate paid employment. As unemployment rates increase in an economy, so do the levels of poverty and related welfare matters. Creating employment opportunities is crucial for economic development and poverty reduction. Moreover, labor plays a vital role in development. Employment concerns are deeply linked to the environment and

can generate new challenges in both economic and noneconomic areas. High unemployment results in lower income, thus leading to poverty (Dahliah & Nur, 2021). Besides, excessive unemployment causes a reduced industrial output and the inefficient application of both industrial and social capital. It aggravates inefficiency by deteriorating workers' skills and weakening their motivation (Janoski, 1990). Economic growth leads to employment opportunities, which in turn reduces unemployment, which builds a nonlinear relationship between unemployment and economic growth, causing a zigzag pattern (Hashmi, Khushik, Gilal & Yongliang, 2021). Unemployment rates in France, Italy, and the United Kingdom show long-term persistence (the unit root), while those in Germany and Italy are stationary. In Canada, unemployment rates additionally have a unit root, whereas in Japan and the United States, they are stationary only in the first regime. This suggests that unemployment hysteresis affects France, Italy, the United Kingdom, and the second regime of Japan and the United States (Yilanci, Ozkan & Altinsoy, 2020).

The key differences between the BRICS and the G7 countries

In 2010, the BRICS countries (with 2.8 billion people) had a significantly larger population compared to the G7 countries (740 million). The BRICS united in trade negotiations against the G7, which had controlled global trade for decades. While the G7 lost momentum, the BRICS economies flourished. By 2019, BRICS' GDP reached \$21 trillion, whereas the G7's was \$39 trillion, reflecting accelerated economic growth, as well as a progressively influential role in the global economy. BRICS' GDP grew 1.8 times, whereas the G7's grew 1.2 times. In terms of science and technology, the G7 countries have a more uniformed structure dominated by biosciences. In contrast, the BRICS countries mainly focus on core sciences, excluding Brazil, where biosciences dominate. Turning to another aspect, BRICS' GDP ratio to the global GDP grew from 0.12 to 0.236 between 2009 and 2019, emphasizing its growing economic effect. In contrast to the G7, BRICS' broadening influence in financial markets has attracted attention as a potential

source of international threats. This shift could reform market integration, affecting investment, speculation, and risk variation strategies (Agyei, Owusu Junior, Bossman, Asafo-Adjei, Asiamah & Adam, 2022).

RESEARCH METHODOLOGY

In terms of the research methodology, the collected secondary data summarize the GDP growth rates through the historical figures of the two groups of countries, namely the BRICS nations (Brazil, Russia, India, China, South Africa, Egypt, Ethiopia, Iran, Saudi Arabia, and the UAE) and the G7 nations (the United States, Japan, Germany, the United Kingdom, France, Italy, and Canada). The dataset was extracted from credible sources, including the Federal Reserve Economic Data (FRED), the International Monetary Fund (IMF), and the World Bank (WB), encompassing a 12-year period from the year 2011 to 2022.

Prior to conducting the analysis, cleaning and organizing the data was performed so as to ensure accurate and reliable results. This process consisted of the elimination of the missing values and the positioning of each observation to its corresponding year in order to maintain consistency and comparability.

To test the first hypothesis, focusing on testing the difference in the average GDP growth rate between the BRICS countries and the G7 countries, an independent two-sample t-test was applied under the assumption that BRICS and the G7 are two independent groups. The data pertaining to the GDP growth rates for BRICS (Brazil, Russia, India, China, South Africa, Egypt, Iran, Ethiopia, the UAE) and the G7 (Canada, France, Germany, Italy, Japan, United Kingdom, the United States) were being collected over the period of 12 years from 2011 to 2022, sourced from the World Bank Open data website. A t-test was conducted in order to compare the means of the BRICS and the G7 groups, determining whether significant differences in the GDP growth do exist between the two groups. Additionally, how the two blocks are concise in terms of their growth was analyzed measuring the

growth disparity from the mean within each bloc by evaluating the level of the standard deviation for each group.

In the second step, the research objective on how macroeconomic factors such as the inflation rate, the unemployment rate, and the real interest rate influenced the GDP growth within the BRICS and the G7 countries was distinctively addressed. To test the second and third hypotheses, a multiple regression model was developed:

$$\text{GDP Growth } (\gamma)_i: \gamma = \beta_0 + \beta_1(\text{Inflation Rate}) + \beta_2(\text{Unemployment Rate}) + \beta_3(\text{Real Interest Rate}) + \beta_4(\text{Exchange Rate Stability}) + \beta_5(\text{Export of Goods and Services}) + \beta_6(\text{Government Debt-to-GDP Ratio}) + \beta_7(\text{FDI Net Inflows}) + \beta_8(\text{FDI Net Outflows}) + \beta_9(\text{Agriculture, Forestry, and Fishing Value-Added}) + \varepsilon$$

where:

- β_0 is the intercept.
- β_1 to β_9 are the coefficients for the respective independent variables.
- ε represents the error term.

This model was applied individually for the BRICS and the G7 groups so as to identify the most impactful macroeconomic factors for the GDP growth in each group for the period $t = 2011$ to 2022. The initial analytical approach was through ANOVA in order to understand if the set of the independent variables in the regression model collectively explained a significant amount of variance in the GDP growth separately for the BRICS and the G7 countries. Through Multiple Linear Regression (MLR), the relationship between the dependent variable, the GDP growth, and various independent variables was analyzed so as to identify the key macroeconomic factors influencing economic performance. The variables were taken from the WorldBank Open Database. The values were not transformed but rather used in their original percentages or local currency units, as reported by the source. The variables included in the model are as follows:

- Y: GDP Growth,
- X1: Inflation Rate,

- X2: Unemployment Rate,
- X3: Real Interest Rate,
- X4: Exchange Rate Stability,
- X5: Export of Goods and Services,
- X6: Government Debt-to-GDP Ratio,
- X7: FDI Net Inflows,
- X8: FDI Net Outflows,
- X9: Export of goods and services,
- X10: Agriculture, Forestry, and Fishing Value-Added, Agriculture and Rural Development.

The regression models were developed separately for the BRICS and the G7 countries, where each group was treated as an aggregated cross-sectional dataset. The focus was mainly on group-level modelling with the primary objective to evaluate the macro-level differences between the two economic blocs, not within individual countries, over time.

Given the additional interest in uncovering the differences of the effects of the independent variables on the dependent variable in the two different regression models, namely for BRICS and the G7, the fourth hypothesis was tested. To test the aforementioned hypothesis, a Tests of Between-Subjects Effects test was used to determine whether there were significant differences between the coefficients of the two linear regression models, which results from the fact that the relationship between the dependent and the independent variables was suspected to differ across these two groups, namely the BRICS and the G7 countries.

RESEARCH FINDINGS

The group statistics in Table 1 displays the summary of the descriptive statistics comparing the GDP growth rates between the two groups:

- Group 1 (V1 = 1) represents the BRICS countries.
- Group 2 (V1 = 2) represents the G7 countries.

According to the results of the descriptive statistics for the GDP growth rate across the BRICS and the G7 countries, the average GDP growth rate is significantly higher in BRICS, with 3.7%, in comparison with that of the 1.3% rate in the G7 countries. Therefore, the BRICS economies - often categorized as evolving markets - demonstrate stronger growth than the more advanced G7 countries.

Moreover, the standard deviation outcomes underline a greater inconsistency - therefore lesser reliability - in the GDP growth among the BRICS countries (3.79), as opposed to the lower variability and comparatively higher consistency shown in the G7 countries (2.92).

Notwithstanding the results of the descriptive statistics, a t-test was conducted in order to test the H_1 hypothesis for the significance of the difference in the means. The products of Levene's Test for Equality of Variances are shown in Table 2.

The results of the Independent Samples t-test comparing the GDP growth rates (%) between the BRICS and the G7 countries indicated the F-value: 14.355 and the p-value of 0.000. Since the significance level is below 0.05, this shows that the variances are not equal. Therefore, it can be concluded that there is a difference in the variability of the GDP growth among the two groups. Hence, the values based on nonequal

Table 1 The descriptive statistics for the GDP growth

Group Statistics					
	V1	N	Mean	Std. deviation	Std. error mean
GDP Growth Rate %	1	108	3.702214280233629	3.799638393509069	.365620374885950
	2	84	1.335643623688180	2.926090481867369	.319262645796358

Source: Authors

Table 2 The independent samples t-test

		Levene's test for equality of variances		t-test for equality of means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean difference	Std. error difference	95% Confidence interval of the difference	
									Lower	Upper
GDP Growth Rate %	Equal variances assumed	14.355	.000	4.722	190	.000	2.366570656545449	.501230167308057	1.377880025861309	3.355261287229588
	Equal variances not assumed			4.876	189.986	.000	2.366570656545449	.485393547065299	1.409117761254293	3.324023551836605

Source: Authors

variances were applied, rather than assumed, to interpret the outcomes. The results of the independent samples t-test based on the assumption of unequal variances show a statistically significant difference in the GDP growth rates between the BRICS and the G7 countries. The t-value is 4.876 with 189.99 degrees of freedom and the p-value is 0.000, which leads to the conclusion that H_{10} should be rejected, meaning that there is a statistically significant difference in the average GDP growth rates among the BRICS and the G7 nations. The mean difference is 2.366%, denoting that the BRICS countries have a higher GDP growth rate on average in comparison to the G7 countries. Thus, a fact can be established that the BRICS countries exceed the G7 countries with respect to the GDP growth rate, as the mean difference shows a positive sign. Since there is a statistically significant difference in the GDP growth rates among the two groups, the null hypothesis H_{10} is rejected and the alternative H_{1a} is accepted, signifying that the average GDP growth rates of the two groups are significantly different.

To evaluate the hypotheses H_2 and H_3 , two separate regression analyses were carried out. The findings are showcased in the following sections.

Regression analysis assumptions

To check the model assumptions, the Shapiro-Wilk test was conducted so as to assess whether the

residuals from the regression model were normally distributed. According to the findings, the W statistic = 0.968 with the p-value = 0.080. These results indicated that residuals did not significantly deviate from normality. Thus, the assumption was met. Furthermore, the linearity check showed that all the variables demonstrated either linear or approximately linear relationships with the GDP Growth Rate. Thus, the linearity assumption was reasonably met for the regression analysis. The Variance Inflation Factor (VIF) was also checked so as to detect multicollinearity in the multiple regression model. According to the findings, there was no significant multicollinearity among the predictors as all the predictor VIF values were well below 5, which means that the assumption was also met in this case. The Breusch-Pagan test revealed that the test statistic = 13.75, with the p-value = 0.056. Therefore, the assumption of the constant variance of the residuals (homoscedasticity) was reasonably met, although being borderline.

Regression analysis for the BRICS countries

Table 3 demonstrates the results of the regression analysis model for the BRICS countries. Based on $R^2=0.725$, it was determined that the model had displayed a relatively strong descriptive fit for explaining the variations of the GDP growth in the BRICS countries, drawing from changes in the

independent variables. Here, 72.5% of the variation in the dependent variable is explained by the model. Overall, the model is reasonably well-fitted, as is implied by the standard error of 2.056, which is low to moderate, suggesting that the predictors, which include the key economic indicators such as foreign direct investment (inflows and outflows), exports, and inflation significantly contribute to the explanation of the differences in the GDP growth between the BRICS and the G7 countries.

The ANOVA (Analysis of Variance) outcomes for the regression model forecasting the GDP growth rate for the BRICS countries are portrayed in Table 4. The Regression Sum of Squares (SST): 312.722 represents the variation in the GDP growth rates explained by the predictors (the independent variables), while the Residual Sum of Squares (SSR): 118.370 represents the

unexplained ones. To summarize, the independent variables in the model significantly describe the variation in the GDP Growth Rate %. Overall, the ANOVA results signify that the regression model is statistically significant ($F = 7.397$, $p = 0.000$), suggesting that the predictors explain a substantial portion of the variation in the GDP growth rates for the BRICS countries. With the SST (312.722) being much greater than the remaining sum of squares (118.37), the model appears to show a strong explanatory power for this dataset, which is consistent with the earlier findings, accounting for the fact that the economic variables, such as foreign direct investment, exports, and inflation are the critical elements of the GDP growth for BRICS.

Table 5 identifies the key elements influencing the GDP growth in the BRICS countries:

Table 3 The regression model summary for the BRICS countries

Model summary ^a				
Model	R	R square	Adjusted R square	Std. error of the estimate
1	.852 ^b	.725	.627	2.056090069103176

a. V1 = 1

b. Predictors: (Constant), Agriculture, Forestry, and Fishing, Value-Added (% of the GDP), Government Debt, total (% of the GDP), Inflation Rate %, Foreign Direct Investment, Net Inflows (% of the GDP), Export of Goods and Services (% of the GDP), Foreign Direct Investment, Net Outflows (% of the GDP), Export of Goods and Services \$, Exchange Rate Stability (LCU per US\$, the period average), Real Interest Rate %, Unemployment Rate %

Source: Authors

Table 4 ANOVA model for BRICS countries

ANOVA ^{a,b}					
Model	Sum of squares	df	Mean square	F	Sig.
1 Regression	312.722	10	31.272	7.397	.000 ^c
Residual	118.370	28	4.228		
Total	431.092	38			

a. V1 = 1

b. Dependent Variable: GDP Growth Rate %

c. Predictors: (Constant), Agriculture, Forestry, and Fishing, Value-Added (% of the GDP), Government Debt, total (% of the GDP), Inflation Rate %, Foreign Direct Investment, Net Inflows (% of the GDP), Export of Goods and Services (% of the GDP), Foreign Direct Investment, Net Outflows (% of the GDP), Export of Goods and Services \$, Exchange Rate Stability (LCU per US\$, the period average), Real Interest Rate %, Unemployment Rate %.

Source: Authors

- FDI Inflows: A 1 percentage point increase boosts the GDP growth by 0.672 percentage points, keeping the other variables constant (Sig. = 0.013).
- FDI Outflows: A 1 percentage point increase raises the GDP growth by 1.38 percentage points, keeping the other variables constant (Sig. = 0.03).
- Agriculture, Forestry, and Fishing Value-Added: A 1 percentage point increase in the GDP share adds 0.58 percentage points to the GDP growth, keeping the other variables constant (Sig. = 0.004).

Apart from the significant factors, the non-significant factors for the GDP growth in the BRICS bloc include the Inflation Rate, the Unemployment Rate, the Real Interest Rate, the Exchange Rate Stability, the Export of Goods and Services (\$), the Government Debt and the Export of Goods and Services (% of the GDP).

Based on the significant predictors, the null hypothesis (H2₀) is rejected, and the alternative hypothesis (H2₁)

is accepted. Hence, to drive growth, BRICS must concentrate on drawing FDI, managing FDI outflows, and elevating the agricultural sector's role. The model found to be significant is as follows:

$$Y = -1.911 + 0.672(X7) + 1.380(X8) + 0.580(X10)$$

Regression analysis for the G7 countries

Table 6 outlines the regression model for the GDP growth in the G7 nations. $R^2 = 0.673$ shows that 67.3% of the variation in the GDP growth is defined by the model's predictors, which is lower compared to the model applied for the BRICS countries. Still, the model demonstrates a moderate overall connection between the variables included and the GDP growth. However, with a lower adjusted R^2 , policymakers should focus on identifying and stressing the most significant predictors (e.g. FDI, exports, or agriculture) for impactful strategies.

Table 5 The regression coefficients for BRICS

Coefficients _{a,b}					
Model B	Unstandardized coefficients		Standardized coefficients	t	Sig.
	Std. error	Beta			
(Constant)	-1.911	4.268		-.448	.658
Inflation Rate%	-.213	.184	-.164	-1.154	.258
Unemployment Rate %	.130	.219	.293	.594	.557
Real Interest Rate %	-.060	.068	-.240	-.881	.386
Exchange Rate Stability (LCU per US\$, the period average)	-.014	.042	-.108	-.320	.752
Export of Goods and Services \$.000000000003539	.000	.167	.420	.677
¹ Government Debt, Total (% of the GDP)	-.019	.037	-.146	-.505	.617
Foreign Direct Investment, Net Inflows (% of the GDP)	.672	.253	.329	2.653	.013
Foreign Direct Investment, Net Outflows (% of the GDP)	1.380	.602	.423	2.293	.030
Export of Goods and Services (% of the GDP)	-.088	.210	-.174	-.419	.678
Agriculture, Forestry, and Fishing, Value-Added (% of the GDP)	.580	.185	.925	3.127	.004

a. V1 = 1

b. Dependent Variable: GDP Growth Rate %

Source: Authors

Moreover, Table 7 shows the ANOVA (Analysis of Variance) results for the regression model predicting the GDP growth rates for the G7 countries. The Regression Sum of Squares is 35.17, while the Residual Sum of Squares is 17.07, which indicates the portion of the variation in the GDP growth rates that is not explained by the model. To summarize, the independent variables are collectively significant in predicting the GDP Growth Rate. Overall, the ANOVA results indicate that the regression model is statistically significant ($F = 3.708$, $p = 0.008$), which means that the predictors account for a considerable portion of the variation in the GDP growth rates for the G7 countries. Thus, the regression model significantly explains the variation in the GDP Growth Rate.

Table 8 highlights the relationship between the GDP growth and several economic elements, offering

insights related to the G7 economies. Among the predictors, there are two statistically significant variables:

- Unemployment Rate: A 1 percentage point increase in unemployment reduces the GDP growth by approximately 0.56 percentage points, keeping the other variables constant ($p = 0.02$).
- Real Interest Rate: A 1 percentage point increase in the real interest rates corresponds to a 0.63 percentage points decrease in the GDP growth, keeping the other variables constant ($p = 0.018$).

The other variables, however, show no statistically significant influence, including the Inflation Rate, the Exchange Rate Stability, the Government Debt (% of the GDP), Foreign Direct Investment - Net Inflows,

Table 6 The regression model summary for the G7 countries

Model Summary ^a				
Model	R	R square	Adjusted R square	Std. error of the estimate
1	.821 ^b	.673	.492	.973845611784450

a. $V1 = 2$

b. Predictors: (Constant), Agriculture, Forestry, and Fishing, Value-Added (% of the GDP), Exchange Rate Stability (LCU per US\$, the period average), Real Interest Rate %, Foreign Direct Investment, Net Outflows (% of the GDP), Export of Goods and Services (% of the GDP), Inflation Rate %, Unemployment Rate %, Foreign Direct Investment, Net Inflows (% of the GDP), Government Debt, Total (% of the GDP), Export of Goods and Services \$

Source: Authors

Table 7 ANOVA model for the G7 countries

ANOVA ^{a,b}					
Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	35.170	10	3.517	3.708	.008 ^c
Residual	17.071	18	.948		
Total	52.240	28			

a. $V1 = 2$

b. Dependent Variable: GDP Growth Rate %

c. Predictors: (Constant), Agriculture, Forestry, and Fishing, Value-Added (% of the GDP), Exchange Rate Stability (LCU per US\$, the period average), Real Interest Rate %, Foreign Direct Investment, Net Outflows (% of the GDP), Export of Goods and Services (% of the GDP), Inflation Rate %, Unemployment Rate %, Foreign Direct Investment, Net Inflows (% of the GDP), Government Debt, Total (% of the GDP), Export of Goods and Services \$

Source: Authors

Table 8 The regression coefficients for the G7 countries

Model B	Coefficients _{a,b}		t	Sig.
	Unstandardized coefficients	Standardized coefficients		
	Std. Error	Beta		
(Constant)	.924	8.902	.104	.918
Inflation Rate%	.072	.284	.062	.803
Unemployment Rate %	-.558	.220	-.743	.020
Real Interest Rate %	-.625	.240	-.704	.018
Exchange Rate Stability (LCU per US\$, the period average)	-.010	.027	-.318	.721
Export of Goods and Services \$	1.075E-12	.000	.637	.529
Government Debt, Total (% of the GDP)	.002	.025	.064	.946
Foreign Direct Investment, Net Inflows (% of the GDP)	.328	.335	.257	.341
Foreign Direct Investment, Net Outflows (% of the GDP)	-.208	.184	-.263	.131
Export of Goods and Services (% of the GDP)	.029	.147	.184	.200
Agriculture, Forestry, and Fishing, Value-Added (% of the GDP)	2.355	1.960	.688	.245

a. V1 = 2

b. Dependent Variable: GDP Growth Rate %

Source: Authors

Foreign Direct Investment - Net Outflows, the Export of Goods and Services (% of the GDP), Agriculture, Forestry, and Fishing Value-Added. Overall, the results suggest that, for the G7 economies, the unemployment and real interest rates are the most critical factors impacting the GDP growth, with significant negative effects.

Based on the significant predictors, the null hypothesis (H₃₀) is rejected, and the alternative hypothesis (H_{3a}) is accepted. Hence, to drive growth, the G7 should focus on reducing the unemployment and real interest rates. The model found to be significant is as follows:

$$Y = 0.924 - 0.558(X_2) - 0.625(X_3)$$

Comparison of the two regression models

Table 9 lists the two groups with the sample sizes:

- V1 = 1 (N = 39): This group relates to the BRICS economies.

- V1 = 2 (N = 29): This group relates to the G7 economies.

Table 9 The Between-Subjects Factors test

Between-Subjects factors		
		N
V1	1	39
	2	29

Source: Authors

The results of the Tests of Between-Subjects Effects for the GDP Growth Rate (%) in Table 10 enables the comparison of the factors potentially affecting the BRICS and the G7 economies and the determination of the difference in the effects of these factors within the two models. The Real Interest Rate (F = 5.651, p = 0.021), Foreign Direct Investment (FDI) - Net Inflows (% of the GDP) (F = 10.319, p = 0.002) and

Table 10 The Tests of Between-Subjects Effects

Dependent Variable: GDP Growth Rate %					
Source	Type III sum of squares	df	Mean square	F	Sig.
Corrected Model	289.179 ^a	11	26.289	7.474	.000
Intercept	.529	1	.529	.150	.700
Inflation Rate	4.039	1	4.039	1.148	.288
Unemployment Rate	8.691	1	8.691	2.471	.122
Real Interest Rate	19.876	1	19.876	5.651	.021
Exchange Rate Stability LCU per US\$ period average	4.541	1	4.541	1.291	.261
Export of Goods and Services (\$)	3.334	1	3.334	.948	.334
Government debt total (% of GDP)	6.349	1	6.349	1.805	.184
Foreign Direct Investment net inflows (% of GDP)	36.295	1	36.295	10.319	.002
Foreign Direct Investment net outflows (% of GDP)	5.191	1	5.191	1.476	.230
Export of goods and services (% of GDP)	.275	1	.275	.078	.781
Agriculture forestry and fishing value added (% of GDP)	140.848	1	140.848	40.045	.000
V1	6.073	1	6.073	1.727	.194
Error	196.964	56	3.517		
Total	794.212	68			
Corrected Total	486.144	67			

a. R Squared = .595 (Adjusted R Squared = .515)

Source: Authors

Agriculture, Forestry, and Fishing Value-Added (% of the GDP) ($F = 40.045$, $p < 0.001$) are the statistically significant predictors in the model, suggesting they have significantly different influences on the GDP growth in the BRICS and the G7 economies. In contrast, through the individual regression models, the Real Interest Rate has negative effects on the GDP growth in both groups, although it remains an insignificant factor for the GDP growth in the BRICS countries. For FDI Net Inflows, it has a positive impact in both groups, although it is considered to be an insignificant factor for the GDP growth in the G7 countries. Particularly, the significant effect of FDI Inflows emphasizes the significance of external capital in driving growth, especially within evolving markets such as BRICS. Agriculture, Forestry, and Fishing Value-Added has a positive effect on the GDP growth and is not considered as a significant factor for the GDP growth in the G7 countries.

In contrast, the variables such as the Inflation Rate, the Unemployment Rate, the Exchange Rate Stability LCU (\$), the Export of Goods and Services \$, the Foreign Direct Investment Net Outflows of the GDP, the Export of Goods and Services % of the GDP, and the Government Debt are not statistically significant, indicating similar effects across the two groups.

Since the two groups have significantly different regression models and the p-value being less than 0.05, the null hypothesis (H_{4_0}) is rejected, and the alternative hypothesis (H_{4_a}) is accepted.

The findings for V1 show p-value = 0.194, which indicates that there is no significant difference in the GDP growth between the BRICS and the G7 countries, which means that the null hypothesis H_{4_0} can be accepted. This means there is no statistically significant difference in the effects of the predictors on

the overall GDP growth between the BRICS and the G7 countries. If going into detail, some variables have different effects between the two models, including the Real Interest Rates ($p = 0.021$), FDI Inflows ($p = 0.002$), and Agriculture, Forestry, and Fishing ($p = 0.000$). These may be considered as the factors of the different economic patterns affecting the different rates of economic growth in these two blocs.

DISCUSSION AND CONCLUSION

The comparative analysis of the GDP growth and the macroeconomic determinants between the BRICS and the G7 nations provides a nuanced understanding of the divergent economic trajectories of these two influential blocs. The BRICS nations, characterized by their emerging market status, demographic

advantages, and resource wealth, have demonstrated dynamic economic expansion in recent decades. Conversely, the G7 nations, as a coalition of advanced economies, continue to leverage their technological superiority, institutional stability, and well-established markets to maintain their global economic leadership. In Table 11, the overall conclusion on the research hypotheses is given.

The results show that the BRICS countries are growing faster compared to the G7 countries. However, at the same time, they are less coherent in their GDP growth compared to the G7. This has been proven by testing the difference and variance using t-tests. The economic rivalry between these two blocs underscores the complex interplay of the macroeconomic factors, such as inflation, unemployment, trade variables, and foreign direct investment in shaping their respective growth patterns.

Table 11 The conclusion on the hypotheses

Null hypotheses	Conclusion	Interpretation
H1 ₀ : There is no significant difference in the average GDP growth rate between the BRICS countries and the G7 countries.	Rejected	There is a difference in the GDP growth between the BRICS and the G7 nations, with a higher GDP growth in the BRICS countries with a higher variance around the mean.
H2 ₀ : The independent variables (Inflation Rate, Unemployment Rate, Real Interest Rate, Exchange Rate Stability, Export of Goods and Services, Government Debt-to-GDP Ratio, FDI Net Inflows, FDI Net Outflows, and Agriculture, Forestry, and Fishing Value-Added) have no significant effect on the GDP growth in the BRICS countries.	Accepted	The model is statistically significant in the prediction of the GDP growth in the BRICS countries with the FDI Inflows (positive), FDI Outflows (positive), Agriculture, Forestry, and Fishing Value-Added (positive) as the significant variables.
H3 ₀ : The independent variables (Inflation Rate, Unemployment Rate, Real Interest Rate, Exchange Rate Stability, Export of Goods and Services, Government Debt-to-GDP Ratio, FDI Net Inflows, FDI Net Outflows, and Agriculture, Forestry, and Fishing Value-Added) have no significant effect on the GDP growth in the G7 countries.	Accepted	The model is statistically significant in the prediction of the GDP growth in the G7 countries with the Unemployment Rate (negative), Real Interest Rate (negative) as the significant variables.
H4 ₀ : There is no significant difference in the effects of the independent variables on the GDP growth between the BRICS and the G7 countries.	Rejected (partially)	Although the overall model does not show significant differences in the effects of the predictors on the GDP growth between the BRICS and the G7 nations, several predictors still have different effects when observed individually, and they are the Real Interest Rate, FDI Net Inflows, Agriculture, Forestry, and Fishing Value-Added (% of the GDP).

Source: Authors

The findings of this research reveal that the BRICS countries' growth is heavily influenced by their ability to capitalize on demographic advantages and integrate into global trade networks. The factors such as the exchange rate stability, export performance, and the government debt management play a significant role in sustaining their economic momentum (Jakopin, 2012; Čupić & Vržina, 2024). To achieve this, the BRICS countries, especially following the conclusions of the Summit held in October 2024, intend to overcome the regulatory and systemic gaps and foster de-dollarization and cooperative initiatives (Shaarawy, 2024). Meanwhile, the G7's economic resilience is rooted in its capacity to manage inflation, maintain low unemployment rates, and foster innovation-driven growth. These macroeconomic conditions reflect the distinct economic structures and developmental stages of the two blocs, simultaneously highlighting their unique strengths and vulnerabilities. Despite progress and significant achievements in terms of innovations (Huang, 2024), the BRICS countries still partly struggle with income inequality. Coupled with an over-reliance on specific sectors and political instabilities, this poses challenges to their sustained growth path (Milanović, 2016). Confronting these issues through regulatory changes alongside directed developmental funding remains necessary for obtaining enduring development outcomes. Through improved regional partnerships, economic expansion, and the implementation of the measures oriented towards establishing their own cross-border payment system and funding, the BRICS nations intend to obtain increased resistance to market disruptions and improve their economic durability.

By analyzing a comprehensive dataset and applying statistical techniques such as regression, t-tests, and ANOVA, the research reveals significant differences in the growth patterns and the impact of the key economic variables. Characterized by higher but more variable growth rates, the BRICS nations benefit from the factors such as foreign direct investment and exports, whereas the G7 economies demonstrate slower, yet more stable growth. These findings underscore the unique challenges and opportunities each group faces in fostering economic development, offering valuable insights for policymakers and economists alike.

Particularly, some individual predictors of GDP growth demonstrate clear differences in their impact on the GDP growth between the BRICS and the G7 countries. Especially, FDI net inflows, the real interest rate, and agriculture's value-added play differential roles in driving the GDP depending on the group. These results support the notion that economic structures and growth drivers are not uniform across BRICS and the G7 and policies should be tailored accordingly.

The results demonstrate the need for the BRICS nations to expand their economic sectors beyond commodity exports while seeking alternative sources of stability that extend beyond the current period. The plans announced during the BRICS summit in October 2024 indicate a clear intention to establish the long-term stability of BRICS as a solid and well-integrated economic bloc. The propulsive development of innovation, coupled with significant investments in education, research and development, technological infrastructure investments, and the systemic policy and regulatory changes, intends to create economic resilience (Aleksić, Nestić, Huber & Ljepava, 2022; Selaković, Ljepava, Tarabasz & Stojanović, 2023) while steering the BRICS economies towards equilibrium growth paths.

Overall, policymakers' understanding of the differential impact of macroeconomic factors on GDP growth enables them to formulate the strategies that not only enhance domestic economic stability but also contribute to a more balanced and cooperative global economic order. The implementation of collaboration between blocs through exchanges of technology and green energy projects alongside financial integration practices will build stronger economic resistance and creative capacity. In the future, research needs to focus on the way regional economic agreements influence worldwide economic stability. Deeper insights regarding the future growth potential of BRICS emerge when the developing economic policies are studied in detail. The development of thorough economic approaches demands research in both social and political variables affecting economic expansion, along with the impact of digital transformation on predicted economic patterns.

While this study offers an essential analysis of the GDP growth patterns of the BRICS and the G7 countries, various limitations have been noted as well. Variations in data accessibility and reporting requirements, especially among the BRICS nations, may influence the accuracy and uniformity of macroeconomic elements. Moreover, while the study discusses the links between the economic variables and GDP growth, it does not construct direct causation, such as external forces, for instance financial crises, global conflicts, and market fluctuations which may also affect economic flows (Selaković, Ljepava, Tarabasz & Stojanović, 2020). Additionally, although helpful, the chosen decade timeline may not completely reflect the long-term economic trends or structural transformations. Regardless of these limitations, the study provides a strong foundation for future research in advancing economic competition among the BRICS and the G7 nations.

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