

**EMPIRICAL ANALYSIS OF THE EFFECT OF GDP RATE, CPI, AND STOCK MARKET  
ON BRICS COUNTRIES WITH THE ARDL APPROACH**

**Reetika Verma** Research Scholar, Department of Financial Administration, Central University of Punjab Bathinda, Punjab, India. Email: [reetikaverma20@gmail.com](mailto:reetikaverma20@gmail.com)

**Eronimus A.** Assistant Professor, Department of Financial Administration, Central University of Punjab Bathinda, Punjab, India. Email: [aeronimus@gmail.com](mailto:aeronimus@gmail.com)

**Krishan M.com** Student, Department of Financial Administration, Central University of Punjab Bathinda, Punjab, India. Email: [krishany339@gmail.com](mailto:krishany339@gmail.com)

**Abstract**

*This paper aims to investigate the effect of GDP rate, CPI, and stock market in BRICS economies. This research investigates the relationship among variables within BRICS countries' economies during geopolitical and global events like covid 19 and Russia's war conflict. Quarterly data from 2017 to 2023 has been utilised. For analysis and suitability of data, the researcher has utilised statistical tools like the ARDL model, Granger causality test, long bound test, ECT test and the Wald test. Taking different variables as dependent variables, cointegration test revealed mixed outcomes. Overall, significant association was found among most of the studied variables. Furthermore, Granger's causality reveals the unidirectional relationship between some variables. The ARDL model defines the model as having positive and negative long-term effects on each GDP rate, CPI, and stock market index. Additionally, the Wald test analyses independent variables that have significantly affected dependent variables in the long term. The ECT test determines that CPI and the stock market have a short-term positive impact on the GDP rate in BRICS countries. The speed of adjustment or long-run equilibrium is rapid. However, the Stock market Index and CPI have mixed significant short-run relationships. Additionally, in the short run, the Wald test analyses that independent variables considerably impact the dependent variables but not all variables. This analysis may be helpful to different stakeholders like investors, policymakers, consumers, academic researchers, and the government. Some areas need to be explored in terms of other countries' groups, time, and macroeconomic variables. It provides valuable insight into BRICS nation's economic conditions and Stock market indices.*

**Key-words:**

*BRICS; GDP rate; Consumer Price Index (CPI); Stock market indices; ARDL model.*

**Introduction**

In emerging economies, BRICS countries have a high potential. As per studies, Brazil, Russia, India, China, and South Africa are pivotal players at the global level. The average growth of BRICS countries is 3.6%, higher than that of G7 countries. ([visualcapitalist](#), 2024). As per the IMF report for 2024, the GDP growth of BRICS countries is in India (6.8), China (4.6), Russia (3.2), Brazil (2.2), and South Africa (0.9). BRICS countries are using the dollar as the currency of exchange. ([carnegieendowment](#), 2023). BRICS nation overtaking the G7 economic at the end of 2027. Furthermore, in the 2050s, it would cover most of the world. (Rao et al., 2022). GDP rate, CPI, and stock market are closely related. According to the World Bank GDP definition, it is the value of goods and services manufactured in a particular nation or country. However, CPI is the price of products and services manufactured in the nation. Thus, the macroeconomic variables share significant linkages with each other. If CPI is changed, there is a possibility that GDP also change. The stock market Index has played an essential role in economic growth. The stock market index helps investors invest in different indices or stocks to enhance the GDP growth of a nation. GDP rate, CPI, and Stock market indices have been affected. The Stock market performance influences the economic condition. These variables are closely related and indicate the economic health or condition.

GDP is a significant indicator of a country's economic growth. GDP is the only variable that most of the variables of a country. That's why the GDP rate is influenced by various factors that can

increase or decrease the GDP growth of any country. Many studies were conducted to understand the effect of variables on GDP growth. Melnyk and Hrytsenko et al. (2024) identified that energy efficiency played a positive significant role in the development and growth of countries. Monamodi and Emmanuel (2024) and Chien et al. (2021) analysed that COVID-19 negatively impacted the economic growth of South Africa, the USA, Europe, China, and other countries. COVID had adverse effects on different variables. Grbić (2021) and Osamwonyi and Kasimu (2013) analysed that the stock market performance had a significant positive impact on the GDP growth of countries. Li et al. (2021) indicated that the GDP rate had been significantly impacted by economic variables. Saleem, Shabbir, and Khan (2020) determined that trade openness and FDI play a significant role in developing South Asian countries in the long term. Naumova et al. (2020) explored that Russia's economic security indices considerably impacted Russia's GDP. Ahmad et al. (2019) concluded that financial development and carbon emissions had a significant bidirectional relationship with GDP growth. Still, international trade and GDP had a mixed causal relationship in different regions of China. This study also concluded that natural resources significantly affected GDP growth in countries. Babatunde et al. (2017) assessed that tax revenue had positively impacted the economic growth of African countries. However, Kromtit et al. (2017) identified that exporting non-oil products also helped enhance economic growth. Taghizadeh-Hesary et al. (2015) studied the impact of oil price change on GDP growth in countries. Mahmoud (2015) analysed that CPI had a significantly positive impact on GDP growth. Osamwonyi and Kasimu (2013) explored that the listed securities had negative and positive impacts on GDP growth. Kolapo and Adaramola (2012) found a complex relationship between Nigeria's Stock market and GDP growth. Ake (2010) identified that market capitalization and trade value impacted countries' GDP.

Investors get exposure to investment in the equity markets across BRICS countries. The BRICS market has a high potential for investors. Furthermore, it gains profit from the market. (Panda & Thiripalraju, 2021). BRICS countries' equity markets are China at 164%, Russia at 87%, and Brazil at 67%. However, India and South Africa had the lowest liquidity markets. (Adu et al. 2014). Now, it is still a growing market. The stock exchange is now an integral part of people's lives today. Most ads on smartphones deal with the stock exchange and stock-related apps. There are a lot of people who invest money in securities, being aware that stocks behave erratically. After COVID-19, many people invested in stocks, mutual funds and SIPs. They were some of the variables that affected the stock market's performance. Several studies were carried out in this direction to analyse which factors have positive or negative impacts on the performance of these markets. Asaad et al. and Asad (2021) argued that global, financial, and health crises negatively impacted the stock market. While oil, gold prices, and forex rates were significant influencers. Abdo et al. (2021) found that GDP had a positive impact, but inflation and interest rates significantly negatively impacted the Amman Stock Exchange, with Arab governments playing a significant role in controlling the stock market. Rabhi (2020), Chien et al. (2021), and Gormsen and Kojjen estimated that Covid had negatively affected the USA, Europe, China, and Asia indices. Chang (2020) observed that oil prices had an inconsequential impact on Indonesia, India, and Russia's indices. In the short run, it had a significant effect. Huy et al. (2020) assumed that CPI had a negative impact on STB Stock. Singh and Dhamija (2019) observed that the CPI significantly impacted Indian, American, and English market stocks. Oktavia and Handayani (2018) reported that the exchange rate, GDP growth, and the Dow Jones index positively affected Indonesia's Composite Stock Price Index. Jurkšas and Paškevičius (2017) found that FDI and money supply had positive effects, but inflation plus interest rates carried major negative significance for the stock price. Nevertheless, Shehab (2014), Kirui et al. (2014), and Osamwonyi & Osagie (2012) noted that money supply, foreign exchange reserves, and oil prices greatly influence stock market returns. Donadelli & Persha (2013) estimated that sectors in industry governance indicators macroeconomic policy uncertainty played significant roles in emerging securities exchanges. According to Paramati et al. (2011), industrial production and the GDP index significantly influenced the BSE and NSE Stock Indexes. For instance, Hsing and Hsieh (2011) examined the government borrowing/GDP ratio, treasury bill, exchange rate, inflation rate, etc, which had a negative significant effect. Vazakidis and Adamopoulos (2009) looked at the association between economic growth and inflation, which

negatively affects the stock market Index. Again, Maysami et al. (2004) also showed that all macroeconomic variables positively or negatively affect all sectors of the Stock Index in Singapore.

The CPI index and inflation rate measure the purchasing power of consumers. To understand the stability of economic CPI is the barometer. Russia has the highest inflation rate of all BRICS countries. ([worldbank](http://worldbank.org)) The consumer price Index is the barometer of the economic activity. CPI is the indicator of inflation. This helps to understand the purchasing power of the consumer. As a measure tracked by governments and observed closely by central banks, CPI reflects the prices of goods and services essential to households. Various factors and policies influenced it. Many studies have conceded that there is a need to understand how variables impact CPI. Sadikin R and Lutfi (2022) analysed the composite Stock price Index's impact on the exchange rate and inflation rate, while Ye et al. (2023) highlighted the role of global supply chain and oil price inflation. Zhenyang He and Huang (2023) discovered covid-19 significantly impacted the US market's CPI. China's economic stability during the crisis. Joshi, B. (2022) identified that GDP had an adverse impact on CPI or inflation. Zhang et al. (2022) analysed GDP, Per capita disposable income, and fixed investment had the most significant impact on CPI. Ali et al. (2022) estimated that monetary policy and transportation prices had a highly positive and significant impact on food inflation. Mbah and Wasum (2022) highlighted that the Russia-Ukraine war considerably affected the global economy and that inflation increased due to oil, natural gas, and food prices. In a similar study, Huy et al. (2020) estimated that oil price fluctuation significantly impacts ASEAN-5 economies' inflation. Meo et al. (2018) identified Egypt's Stock market index's significant impact on the consumer price Index. Barakat et al. (2015) in Egypt and Tunisia revealed that the Stock market had a causal relationship with CPI. Parker (2016) assessed the impact of macroeconomic variables on inflation during periods of economic shocks, such as natural disasters. Additionally, Cavallo (2020) and Parker (2016) significantly impacted the Covid-19 pandemic on CPI and inflation rates. Guzzetti et al. (2016). They were reported that the COVID-19 pandemic had significant changes in consumer expenditure patterns, resulting in a higher inflation rate than the official CPI. The external shock was the change in consumer behaviour. Rasu et al. (2015) and Basnet and Upadhyaya (2015) explored the relationship between oil prices, exchange rates, and inflation. However, oil prices have a limited direct impact on inflation. Saravanan Venkadasalam (2015) examined GDP of Malaysia had a positive significant effect on the CPI. Yoon et al. (2014) studied demographic change's impact on inflation. Patro, Jeyashree, and Gupta (2012) found that the BI rate, money supply, oil price, and gold prices have a positive and significant effect on the level of inflation. Tamimi et al. (2011) and Subhani & Osman (2011) identified that the Stock market in Karachi had a negative relationship with CPI. Poterba (2000) analysed the Stock market's positive relation with consumer buying behaviour. Bryan and Cecchetti (1993) estimated that inflation has a higher correlation with past money growth and delivers improved forecasts of future inflation relative to the CPI.

### **Research gap**

Several studies were conducted on each variable. The various variables affected GDP rate, CPI and Stock market. COVID-19, the global crisis, and oil prices had significant impacts on each variable (Melnyk & Hrytsenko et al., 2024; Monamodi & Emmanuel, 2024; Saleem, Shabbir, & Khan, 2020; Mbah & Wasum, 2022; Cavallo 2020 and Parker 2016, Rabhi 2020, Chien et al.). However, many variables have impacted the countries' GDP rate, CPI, and stock market index. Unexpectedly, not even a single study was conducted on the impact of among variables in the context of BRICS countries. This study investigates the relationship among variables in the context of BRICS countries to fill the gap. As per sources, BRICS has played a significant role in the global economy. Now, many countries have become BRICS countries. BRICS countries have large land areas, populations, and scopes in all sectors. That's the reason for studying BRICS countries. This study helps enhance understanding of the GDP, CPI, and Stock market impact each other within BRICS countries.

### **Statement of problem**

Previous studies have been done on the different factors that impact each variable. In other existing articles in different countries. The existing studies need to identify the relationship among GDP rate, CPI, and stock market indices within the context of BRICS countries. As per studies and news, BRICS plays a significant role in global economic development and emerging economies. There is a need for further exploration to understand the financial condition and the pattern of stock market investing. This study may be helping fill the gap or problem of other studies.

### **Need and significance**

These various reason needs to be studied. The world is becoming a small village with the use of the internet. Investors and policymakers make decisions using the country's economic conditions. Various variables have directly or indirectly impacted these countries' investors, policymakers, or other stakeholder's decisions. The war between Russia and Ukraine impacted the world economy. With the help of such analysis, policymakers can design optimum policies to mitigate the negative impact on the country. BRICS countries need to be explored more because BRICS has a large part of the world village. This study provides valuable insight to policymakers, investors, governments, and other stakeholders and enhances knowledge.

### **Research Question**

- How do changes in GDP rate, CPI, and Stock Index affect each other over the long term within the BRICS countries?
- How do GDP rate, CPI, and Stock Index cooperate in the short term within BRICS countries?

### **Objective of the study**

- To investigate the long-run relationship between GDP rate, stock index, and CPI within the BRICS countries.
- To analyse the short-run impact of the GDP rate Stock Index and CPI in the context of BRICS countries. Moreover, it understands the interaction among variables.

### **Hypothesis**

- There isn't a significant long-run relationship between the GDP rate, stock index, and CPI within the framework of the BRICS countries.
- There isn't a significant short-run relationship or interaction between the GDP rate stock index and CPI in the context of BRICS countries.

### **Methodology**

This study investigates the effect of GDP rate, CPI, and Stock market indices in the context of BRICS nations. Utilising secondary data from 2017 to 2023 to understand the objective. And analyse quarterly data's GDP rate, CPI, and stock market index. Time series data will be taken from different authentic websites. GDP rate and consumer price index were taken from the World Bank and the Organization for Economic Co-operation and Development (<https://databank.worldbank.org/>) and (<https://www.oecd.org/>). Stock market Index price data is taken from (<https://in.investing.com/>) of BRICS countries' main index.

This study uses different methods to understand the effect. ADF test helps check variables' time series data stationarity at level or first difference. An ADF test is necessary to select statistical tools further and analyse the time series data.

ADF Equation:

$$\Delta X_t = \alpha + \beta_t + \gamma X_{t-1} + \gamma_1 \Delta X_{t-1} + \gamma_2 \Delta X_{t-2} + \dots + \gamma_p \Delta X_{t-p} + \epsilon_t$$

X = GDP rate, CPI, and Stock market indices.  $\epsilon_t$  = Error term

$\alpha$ ,  $\beta$ , and  $\gamma$  = coefficients.

The Granger causality test helps to understand causal relationships among variables. It is used to estimate whether one time series can be periodic in another series. Like X series change impact on Y series. It helps to deepen knowledge of one variable's impact over another variable.

The equation for the dependent variable  $Y_t$ :  
 $Y_t = \alpha_1 + \beta_{11}Y_{t-1} + \beta_{12}X_{t-1} + \beta_{13}X_{t-2} + \dots + \beta_{1m}X_{t-m} + \epsilon_{1t}$   
 $\epsilon_{1t}$   
 $X$  and  $Y$  = GDP rate, CPI, and Stock market indices.

The equation for the dependent variable  $X_t$ :  
 $X_t = \alpha_1 + \beta_{21}X_{t-1} + \beta_{22}Y_{t-1} + \beta_{23}Y_{t-2} + \dots + \beta_{2m}Y_{t-m} + \epsilon_{2t}$   
 $\epsilon_{2t}$   
 $\alpha$  and  $\beta$  = coefficients.  
 $\epsilon_{1t}$  and  $\epsilon_{2t}$  = Error term

Many studies conducted the ARDL approach to analyse the relationship among variables. ARDL test analyses the relationship between two or more and lagged effects on dependent variables. Understand the long-run effect on variables on dependent variables. After that, the long-run relationship among variables must be understood. This study uses the long-bound test to define the long-run relationship between GDP rate, CPI, and stock market index variables. Moreover, this establishes the cointegration existing. If there is, a long-run relationship exists. Then, the ECM model will be applied to determine the short-run relationship among variables and the model's long-term equilibrium or speed of adjustment. These tests help investigate the effect on dependent variables in the long and short run. Melnyk & Hrytsenko and Monamodi & Emmanuel. (2024), Triantoro et al. (2023), Asad et al. and Asaad (2021), Saleem, Shabbir & Khan, and Menyari and Rabhi (2020) used this method to analyse the effect of variables.

ARDL Equation:

$$\begin{aligned} \text{GDP rate}_t &= \alpha + \sum_i \beta_{1i} \text{GDP rate}_{t-i} + \sum_k \gamma_{1k} \text{Stock}_{t-k} + \sum_j \gamma_{2j} \text{CPI}_{t-j} + \epsilon_t \\ \text{Stock Index}_t &= \alpha + \sum_i \beta_{1i} \text{Stock Index}_{t-i} + \sum_k \gamma_{1k} \text{CPI}_{t-k} + \sum_j \gamma_{2j} \text{GDP rate}_{t-j} + \epsilon_t \\ \text{CPI}_t &= \alpha + \sum_i \beta_{1i} \text{CPI}_{t-i} + \sum_k \gamma_{1k} \text{GDP rate}_{t-k} + \sum_j \gamma_{2j} \text{Stock index}_{t-j} + \epsilon_t \end{aligned}$$

ECM Equation:

$$\begin{aligned} \Delta \text{GDP rate}_t &= \alpha + \sum_i \beta_{1i} \Delta \text{GDP rate}_{t-i} + \sum_k \gamma_{1k} \Delta \text{Stock}_{t-k} + \sum_j \gamma_{2j} \Delta \text{CPI}_{t-j} + \delta \text{ECT}_{t-1} + \epsilon_t \\ \Delta \text{Stock Index}_t &= \alpha + \sum_i \beta_{1i} \Delta \text{Stock Index}_{t-i} + \sum_k \gamma_{1k} \Delta \text{CPI}_{t-k} + \sum_j \gamma_{2j} \Delta \text{GDP rate}_{t-j} + \delta \text{ECT}_{t-1} + \epsilon_t \\ \Delta \text{CPI}_t &= \alpha + \sum_i \beta_{1i} \Delta \text{CPI}_{t-i} + \sum_k \gamma_{1k} \Delta \text{GDP rate}_{t-k} + \sum_j \gamma_{2j} \Delta \text{Stock index}_{t-j} + \delta \text{ECT}_{t-1} + \epsilon_t \end{aligned}$$

$\Delta$  Variables = Difference of dependent or independent variable  
 $\alpha, \beta, \gamma,$  and  $\delta$  = coefficients  
 $\delta \text{ECT}_{t-1}$  = speed of adjustment or long-run equilibrium  
 $i, j,$  and  $k$  = lag of variables.  
 $\epsilon_t$  = Error term

Some studies used the Wald test to identify the variables that significantly impact dependent variables. It is helpful in hypothesis testing. Wald test helps estimate the significance of the ARDL model.

### Analysis and interpretation

This study has applied the ADF to examine the stationarity of variables. This statistical tool helps to determine whether the data series has a stable pattern over time. It is crucial for further analysis.

Table 1 shows Augmented Dickey-Fuller test results. It helps to ascertain data stationarity about BRICS countries. The test is employed to determine the presence of a unit root, indicative of non-stationarity, in the dataset.

**Table: 1 Unit Root Test**

	AT LEVEL			AT FIRST			
	CONSTANT	TREND AND CONSTANT	NON	CONSTANT	TREND AND CONSTANT	NONE	NOT
	T	T	E	T	T		E
<b>Brazil</b>							
<b>GDP RATE</b>	-5.598 (0)**	-5.584 (0.001)**	-5.411 (0)**	-6.228 (0)	-6.099 (0)	-6.366 (0)	I(0)

<b>CONSUMER PRICE INDEX</b>	-1.992 (0.288)	-4.065 (0.02)*	-0.689 (0.409)	-3.344 (0.023)*	-3.311 (0.087)	-3.412 (0.001)	I(I)
<b>BVSP INDEX</b>	-2.041 (0.269)	-3.914 (0.025)*	1.154 (0.931)	-8.227 (0)**	-8.067 (0)	-7.93 (0)**	I(I)
<b>RUSSIA</b>							
<b>GDP RATE</b>	-3.94 (0.006)**	-3.861 (0.028)*	-3.863 (0)**	-7.038 (0)	-6.918 (0)	-7.176 (0)	I(0)
<b>CONSUMER PRICE INDEX</b>	-1.342 (0.591)	-2.349 (0.393)	-0.009 (0.669)	-5.381 (0)**	-5.33 (0.001)**	-1.777 (0.072)	I(I)
<b>MOEX INDEX</b>	-2.761 (0.078)	-2.772 (0.219)	-0.048 (0.658)	-3.262 (0.028)*	-3.223 (0.102)	-3.28 (0.002)*	I(I)
<b>INDIA</b>							
<b>GDP RATE</b>	-7.231 (0)**	-5.136 (0.002)**	-6.821 (0)**	-6.871 (0)	-6.718 (0)	-7.037 (0)	I(0)
<b>CONSUMER PRICE INDEX</b>	-2.981 (0.051)	-2.77 (0.22)	0.16 (0.724)	-7.29 (0)**	-7.712 (0)**	-7.285 (0)**	I(I)
<b>BSE INDEX</b>	0.017 (0.952)	-2.19 (0.476)	1.936 (0.985)	-5.89 (0)**	-5.946 (0)**	-5.11 (0)**	I(I)
<b>CHINA</b>							
<b>GDP RATE</b>	-7.343 (0)**	-7.184 (0)**	-5.758 (0)**	-6.424 (0)	-6.29 (0)	-6.569 (0)	I(0)
<b>CONSUMER PRICE INDEX</b>	-1.527 (0.505)	-2.946 (0.168)	-1.144 (0.224)	-4.402 (0.002)**	-4.451 (0.008)**	-4.466 (0)**	I(I)
<b>SSEC INDEX</b>	-2.234 (0.2)	-2.242 (0.449)	-0.385 (0.536)	-6.522 (0)**	-6.392 (0)**	-6.647 (0)**	I(I)
<b>SOUTH AFRICA</b>							
<b>GDP RATE</b>	-7.744 (0)**	-7.593 (0)**	-7.854 (0)**	-7.116 (0)	-6.952 (0)	-7.276 (0)	I(0)
<b>CONSUMER PRICE INDEX</b>	-1.716 (0.412)	-2.439 (0.353)	-0.647 (0.428)	-5.116 (0)**	-5.042 (0.002)**	-5.24 (0)**	I(I)
<b>FTWIZAF L INDEX</b>	-2.674 (0.092)	-3.353 (0.079)	0.26 (0.754)	-6.871 (0)**	-6.723 (0)**	-6.939 (0)**	I(I)

Note: \*\*and \* indicated 1% and 5% significance levels.

Author computation with Eviews

GDP growth rates of Brazil, Russia, India, China, and South Africa are stationary at their original level (I(0)), implying a lack of a unit root in these series. Brazil's Consumer Price Index (CPI) and index price series exhibit stationarity at a level with constant and linear trend components. Consumer Price Index (CPI) and index prices show stationarity after taking the first difference (I(1)).

The data set is mixed with stationary at levels I(0) and the first difference I(1). ADF test results suggest the ARDL test is appropriate for investigating the relationships among the variables and the impact on each variable. The ARDL model allows the estimation of short-term fluctuations and long-term equilibrium dynamics or relationships among variables with different orders of integration. And understand the profound relationship between variables.

Table 2 presents Granger causality test results, which show how the GDP rate, CPI, and Stock market of BRICS countries affect each other. In this table, we only see a few cases where one variable causes change in another. Understanding the relationship between the GDP rate, CPI, and stock market index variables.

**Table: 2 Granger causality test**

Null hypothesis	obs	F-statics	Prob*
<b>BRAIL</b>			
BVSP INDEX does not Granger Cause GDP Rate	26	7.264	0.004***
GDP Rate does not Granger Cause BVSP INDEX		0.603	0.556
Consumer Price Index does not Granger Cause GDP Rate	26	0.149	0.862
GDP Rate does not Granger Cause Consumer Price Index		0.051	0.950
Consumer Price Index does not Granger Cause BVSP INDEX	26	0.197	0.823
BVSP INDEX does not Granger Cause Consumer Price Index		5.532	0.012***
<b>RUSSIA</b>			
MOEX INDEX does not Granger Cause GDP Rate	26	3.253	0.059*
GDP Rate does not Granger Cause MOEX INDEX		0.546	0.588
Consumer Price Index does not Granger Cause GDP Rate	26	1.377	0.274
GDP Rate does not Granger Cause Consumer Price Index		3.547	0.047
Consumer Price Index does not Granger Cause MOEX INDEX	26	0.455	0.641
MOEX INDEX does not Granger Cause Consumer Price Index		11.032	0.001***
<b>INDIA</b>			
BSE INDEX does not Granger Cause GDP Rate	26	13.639	0.000***
GDP Rate does not Granger Cause BSE INDEX		0.612	0.552
Consumer Price Index does not Granger Cause GDP Rate	26	1.624	0.221
GDP Rate does not Granger Cause Consumer Price Index		0.061	0.941
Consumer Price Index does not Granger Cause BSE INDEX	26	1.189	0.324
BSE INDEX does not Granger Cause Consumer Price Index		0.235	0.793
<b>CHINA</b>			
SSEC INDEX does not Granger Cause GDP Rate	26	0.173	0.842
GDP Rate does not Granger Cause SSEC INDEX		0.557	0.581
Consumer Price Index does not Granger Cause GDP Rate	26	2.624	0.096*
GDP Rate does not Granger Cause Consumer Price Index		0.615	0.550
Consumer Price Index does not Granger Cause SSEC INDEX	26	3.460	0.050**
SSEC INDEX does not Granger Cause Consumer Price Index		0.098	0.907
<b>SOUTH AFRICA</b>			
FTWIZ AFL INDEX does not Granger Cause GDP Rate	26	8.488	0.002***
GDP Rate does not Granger Cause FTWIZ AFL INDEX		0.461	0.637
Consumer Price Index does not Granger Cause GDP Rate	26	0.808	0.459
GDP Rate does not Granger Cause Consumer Price Index		0.326	0.725
Consumer Price Index does not Granger Cause FTWIZ AFL INDEX	26	0.755	0.482

FTWIZAFL INDEX does not Granger Cause Consumer Price Index 5.055 0.016\*\*

Note: \*\*\*, \*\*, and \* indicated the significance level 1%, 5% and 10%.

**Author computation with Eviews**

Brazil's BVSP Index is causing the GDP rate and CPI to reach a significant level of 1%. Russia's MOEX index is causing the GDP rate and CPI to be significant at 10% and 1%, respectively. However, Russia's GDP rate causes the CPI to have a 5% significance. In the case of India, its stock market only causes India's GDP rate to have a 1% significance. China's CPI affects China's GDP and stock market at 10% and 5% significance levels, respectively. The South African stock market causes South Africa's CPI and GDP rate to reach a 1% significance level. The remaining variables do not cause each other and accept the null hypothesis. This test helps to understand the effect of each variable on another variable.

Table 3 presents ARDL cointegration test results, which are used to identify the long-run relationships among economic indicators and stock index prices within BRICS countries. In this test, each variable is alternately treated as a dependent variable, with others acting as independent variables. Different models are used for the analysis of the relationship among variables. The ARDL test helps to understand the dependent variable's lag value, independent value, and lag long-run impact on the dependent variable. And how much of an effect is there on the dependent variable. Long-bounds tests help to understand cointegration exists among variables.

**Table 3 ARDL Model, Long Bond Test, and Cointegration**

COUNTRY	ARDL MODEL				LONG BOUNDS TEST			
	MODE L	R-sq.	Adj. R-sq.	F-stat	DW stat	F-stat	t-stat	COINT .*
<b>BRAZIL</b>								
GDP/INDEX CPI	(2,2,0)	0.634 2	0.5187	5.4913 (0.0019)	2.5637	19.76 8	- 7.61 8	YES *
INDEX / CPI GDP	(2,0,1)	0.658 6	0.5733	7.718 (0.0003)	2.365	3.546	- 0.63 2	NO
CPI/GDP INDEX	(2,0,1)	0.898 3	0.8728	35.3201 (0)	2.3389	4.647	- 3.08 9	YES*
<b>RUSSIA</b>								
GDP/ INDEX CPI	(1,2,1)	0.672	0.568	6.485 (0.001)	2.206	16.72 1	- 7.02 1	YES*
INDEX/CPI GDP	(2,0,0)	0.796	0.757	20.484 (0)	2.292	3.085	- 1.39 6	NO
CPI/GDP INDEX	(1,1,2)	0.936	0.916	46.166 (0)	2.59	17.59	- 2.65 5	YES*
<b>INDIA</b>								
GDP/ INDEX CPI	(2,2,2)	0.769 4	0.6608	7.0891 (0.0004)	2.1445	28.55 6	- 9.10 1	YES*
INDEX / CPI GDP	(2,2,1)	0.933 2	0.9073	35.95 (0)	1.7041	2.585	0.31 6	NO



CPI/GDP INDEX	(2,0,0)	0.488 8	0.3915	5.0206 (0.0053)	2.0338	2.611 2	- 2.39 6	NO
<b>CHINA</b>								
GDP/ INDEX CPI	(1,1,1)	0.450 1	0.3191	3.4372 (0.02)	2.5053	22.32 7	- 8.13 0	YES*
INDEX / CPI GDP	(1,0,0)	0.483 3	0.4159	7.17 (0.0014)	2.1392	2.515	-2.3	NO
CPI/GDP INDEX	(1,0,0)	0.667	0.6236	15.3578 (0)	1.8528	3.858	- 1.68 0	NO
<b>SOUTH AFRICA</b>								
GDP/ INDEX CPI	(2,2,1)	0.697 7	0.5802	5.9359 (0.0011)	2.2055	15.64 4	- 6.25 3	YES*
INDEX / CPI GDP	(1,0,0)	0.298 8	0.2073	3.2665 (0.0396)	1.9654	2.631	- 2.31 6	NO
CPI/GDP INDEX	(2,0,2)	0.864 2	0.8213	20.15 (0)	2.1513	6.168	- 2.59 6	YES*

**Note: \* indicated cointegration and long run.**

**Author computation with Eviews**

Model lag is identified with the ARDL test. Optimal lag selected by VAR test. Brazil, Russia, India, South Africa, and China have optimal lags of 2, 2, 2,2, and 1, respectively. With the help of optimal lag, this table identifies the model selection: R-squared, adjusted R-squared showing the model goodness of fitness, F-statistic and prob(F-statistic) showing the significance of the model, and Durbin-Watson stat showing the presence of autocorrelation. A long-bound test identifies whether the long-run relationship and cointegration exist. In this table, Brazil's, Russia's, and South Africa's GDP rates are compared with stock market prices, and the Consumer Price Index dependent variable model shows a significant and long-run relationship among variables. However, in the case of the GDP rate as a dependent variable, the goodness of fitness is around 50% to 65%. In the other case, the goodness of fitness is greater than 80%, which defines the relevant relationship between variables. India and China have a long-term relationship in the GDP rate with the index price and consumer price index. India has a better fitness rate than other countries. But China has worse fitness than other countries. Stock index models are significant, but there is no long-run relationship or cointegration in BRICS countries. CPI is the dependent variable in Brazil, Russia, and South Africa. The model is highly significant, and the goodness of fitness is also high. In this model, cointegration exists. Other models are significant, but there is no cointegration. Most of the models have positive autocorrelation in their residuals.

The ARDL test suggested that there is a long-term relationship among some variables.

Tables 4, 6, and 8 present the current value and lag impact on the dependent variable, and with the Wald test analysis, there is a significant impact on that dependent variable. The Wald test helps to assess the significant impact on the model. Table 4 shows the independent variables' effect on BRICS countries' GDP rates.

**Table 4 ARDL TEST and WALD TEST Long Run Relation GDP Rate as Dependent**

<b>BRAZIL</b>		<b>RUSSIA</b>		<b>INDIA</b>	
GDP R		GDP R		GDP R	
GDP R(-1)	-0.28 (0.076)*	GDP R(-1)	-0.173 (0.313)	GDP R(-1)	-0.609 (0)***

GDP R(-2)	-0.425 (0.01)***	MOEX INDEX	-0.002 (0.149)	GDP R(-2)	-0.38 (0.012)***
BVSP INDEX	0.0001 (0.02)**	MOEX INDEX(-1)	0.006 (0.01)***	BSE INDEX	0 (0.062)*
BVSP INDEX(-1)	0.0001 (0.034)**	MOEX INDEX(-2)	-0.004 (0.042)**	BSE INDEX(- 1)	0.001 (0.017)**
BVSP INDEX(-2)	0.0001(0)***	CPI	0.982 (0.001)***	BSE INDEX(- 2)	-0.001 (0)***
CPI	0.302 (0.103)*	CPI(-1)	-0.933 (0)***	CPI	0.34 (0.701)
C	-1.937 (0.454)	C	0.225 (0.917)	CPI(-1)	1.227 (0.178)
				CPI(-2)	-1.904 (0.029)**
				C	0.26 (0.955)

**WALD TEST**

C(1)=C(2)=0	10.495 (0.005)***	C(1)=0	1.075 (0.3)	C(1)=C(2)=0	23.301 (0)***
C(3)=C(4)=C(5)=0	25.408 (0)***	C(2)=C(3)=C(4)=0	9.793 (0.02)**	C(3)=C(4)=C(5)=0	32.875 (0)***
C(6)=0	2.941 (0.086)*	C(5)=C(6)=0	20.63 (0)***	C(6)=C(7)=C(8)=0	5.871 (0.118)

**CHINA**

**SOUTH AFRICA**

	GDP R		GDP R
GDP R(-1)	-0.406 (0.029)**	GDP R(-1)	-0.364 (0.035)**
SSEC INDEX	0.002 (0.4)	GDP R(-2)	-0.297 (0.063)*
SSEC INDEX(-1)	-0.004 (0.159)	FTWIZAFL INDEX	0.001 (0.53)
CPI	-1.844 (0.01)***	FTWIZAFL INDEX(-1)	0.006 (0.043)**
CPI(-1)	1.01 (0.201)	FTWIZAFL INDEX(-2)	-0.007 (0.013)**
C	8.934 (0.332)	CPI	2.226 (0.027)**
		CPI(-1)	-2.091 (0.02)**
		C	-0.526 (0.961)

**WALD TEST**

C(1)=0	5.518 (0.019)**	C(1)=C(2)=0	6.252 (0.044)**
C(2)=C(3)=0	2.134 (0.344)	C(3)=C(4)=C(5)=0	12.301 (0.006)***
C(4)=C(5)=0	8.391 (0.015)**	C(6)=C(7)=0	7.114 (0.029)**

**Note: \*\*\*, \*\*, and \* indicated the significance level 1%, 5% and 10%.**

**Author computation with Eviews**

Brazil's current GDP rate is significantly negative and impacted by a first and second lag of the GDP rate; the BVSP index's current, first, and second lag have a significant and positive impact on the GDP rate. The consumer index price does not impact the GDP rate. Russia's GDP rate is significantly positively impacted by the current lag of the MOEX index's first and consumer price indexes. However, the consumer price index's first lag has a significant negative impact. GDP rate lag does have a significant impact. India's GDP rate first and second lag, BSE index second, and CPI second lag significantly have a negative impact on the current GDP rate. BSE index current and first lag have a significantly positive impact on India's GDP rate. China's GDP rate is at first, and the current CPI lag significantly negatively impacts China's current GDP rate. The Chinese stock index does not impact it significantly. South Africa's current GDP rate is significantly negatively impacted by the

GDP rate first and second and CPI current and first lag. However, the FTWIZAFI index's first lag positively impacts South Africa's GDP rate. In addition, this table also shows the Wald test results, which describe the BRICS country's independent variable significant impact on a primary dependent variable. According to the Wald test, Brazil's dependent variable lag, independent variable stock, and CPI significantly impact the dependent variable. Russia's stock index and CPI significantly impact the GDP rate. As India's GDP rate lags, the stock index significantly impacts the GDP rate. China's GDP rate lags, and CPI has a significant impact on China's GDP rate. South Africa's GDP rate lag, the stock index, and CPI significantly impact South Africa's GDP rate. According to Naumova et al. (2020), Grbić (2021), Osamwonyi and Kasimu (2013), Kolapo & Adaramola (2012), and Ake (2010) defined that the Stock market had a significant impact on GDP. Mahmoud (2015) and Li et al. (2021) revealed that CPI significantly impacted GDP.

After understanding the long-run relationship and impact of all variables on a dependent variable, this study uses the ECM error correction approach to understand the speed of adjustment of dependent variables on a monthly, quarterly, and yearly basis. Along with the short-run relationship among variables, the Wald test helps to understand that, in the short run, this variable significantly impacts the dependent variable. Tables 5, 7, and 9 show a short-run relationship among variables in the BRICS countries.

**Table 5 ECM TEST and WALD TEST For Short-Run Relationship GDP Rate as Dependent**

<b>BRAZIL</b>		<b>RUSSIA</b>		<b>INDIA</b>	
	<b>GDP R</b>		<b>GDP R</b>		<b>GDP R</b>
CointEq(-1)*	-1.705 (0)***	COINTEQ*	-1.173 (0)***	COINTEQ*	-1.989 (0)***
D(GDP R(-1))	0.425 (0.007)***	D(MOEX INDEX)	-0.002 (0.099)*	D(GDP R(-1))	0.38 (0.007)***
D(BVSP INDEX)	0.0001 (0.01)***	D(MOEX INDEX(-1))	0.004 (0.002)***	D(BSE INDEX)	0 (0.041)**
D(BVSP INDEX(-1))	0.0001 (0)***	D(CPI)	0.982 (0)***	D(BSE INDEX(-1))	0.001 (0)***
C	-1.937 (0)***	C	0.225 (0.502)	D(CPI)	0.34 (0.636)
				D(CPI(-1))	1.904 (0.021)**
				C	0.26 (0.787)
<b>WALD TEST</b>					
C(2)=0	8.207 (0.004)***			C(2)=0	8.012 (0.005)***
C(3)=C(4)=0	19.514 (0)***	C(2)=C(3)=0	9.096 (0.011)**	C(3)=C(4)=0	32.573 (0)***
		C(4)=0	4.771 (0.029)**	C(5)=C(6)=0	27.264 (0)***
<b>CHINA</b>		<b>SOUTH AFRICA</b>			
	<b>GDP R</b>		<b>GDP R</b>		
COINTEQ*	-1.406 (0)***	COINTEQ*	-1.661 (0)***		
D(SSEC INDEX)	0.002 (0.321)	D(GDP R(-1))	0.297 (0.04)**		
D(CPI)	-1.844 (0.005)***	D(FTWIZAFI INDEX)	0.001 (0.46)		
C	8.934 (0)***	D(FTWIZAFI INDEX(-1))	0.007 (0.001)***		
		D(CPI)	2.226 (0.007)***		

		C	-0.526 (0.347)
<b>WALD TEST</b>			
		C(2)=0	3.918 (0.048)**
C(2)=0	0.739 (0.39)	C(3)=C(4)=0	6.717 (0.035)**
C(3)=0	2.127 (0.145)	C(5)=0	7.645 (0.006)***

Note: \*\*\*, \*\*, and \* indicated the significance level 1%, 5% and 10%.

**Author computation with Eviews**

Countries have more than 100% (ECT), which shows strong significance. The error correction terms for India (198%), Brazil (170%), South Africa (166%), China (140%), and Russia (117%) indicate the quarterly speed at which these economies adjust back to their long-term equilibrium. India is the fastest, and Russia has the slowest speed of adjustment. Brazil's GDP rate is significantly positively impacted by the GDP rate first and the BVSP index current and first lag. Russia's CPI has a positive and significant impact on a dependent variable. India's GDP rate first, BSE index current and first, and CPI current lag significant impact on GDP rate in short-run. However, China's CPI has a significant negative impact. South Africa's GDP rate is first, the FTWIZAFI index is first, and the CPI current lag impacts the dependent variable. The Wald test defines in short-run variables have a significant effect on the GDP rate of BRICS countries. Brazil's, Russia's, India's, and South Africa's stock indexes significantly impact the GDP rate in the short run. Aside from Russia, India's and South Africa's CPIs have a significant impact on the GDP rate. Brazil's, India's, and South Africa's GDP rate lag has a significant impact. China's stock index and CPI do not significantly impact the GDP rate in the short term.

**Table 6 ARDL TEST and WALD TEST Long Run Relation STOCK INDEX as Dependent**

BRAZIL		RUSSIA		INDIA	
BVSP INDEX		MOEX INDEX		BSE INDEX	
BVSP INDEX(-1)	0.182 (0.395)	MOEX INDEX(-1)	1.235 (0)***	BSE INDEX(-1)	0.399 (0.138)
BVSP INDEX(-2)	0.703 (0.004)***	MOEX INDEX(-2)	-0.408 (0.107)	BSE INDEX(-2)	0.623 (0.03)**
CPI	-1495.129 (0.19)	CPI	-13.36 (0.527)	CPI	-818.49 (0.321)
GDP R	2510.071 (0.027)**	GDP R	-29.941 (0.26)	CPI(-1)	-1334.38 (0.116)
GDP R(-1)	1408.837 (0.134)	C	595.056 (0.066)*	CPI(-2)	1587.616 (0.051)*
C	21288.69 (0.169)			GDP R	389.343 (0.03)**
				GDP R(-1)	248.46 (0.078)*
				C	3882.88 (0.367)
<b>WALD TEST</b>					
C(1)=C(2)=0	25.117 (0)***	C(1)=C(2)=0	68.029 (0)***	C(1)=C(2)=0	213.862 (0)***
C(3)=0	1.841 (0.175)	C(3)=0	0.413 (0.52)	C(3)=C(4)=C(5)=0	6.094 (0.107)
C(4)=C(5)=0	7.19 (0.027)**	C(4)=0	1.341 (0.247)	C(6)=C(7)=0	6.113 (0.047)**

CHINA		SOUTH AFRICA	
SSEC INDEX		FTWIZAFL INDEX	
SSEC INDEX(-1)	0.602 (0.002)***	FTWIZAFL INDEX(-1)	0.451 (0.07)***
CPI	-42.98 (0.29)	CPI	41.025 (0.437)
GDP R	7.978 (0.57)	GDP R	-7.506 (0.588)
C	1314.865 (0.037)**	C	1752.801 (0.021)**
WALD TEST			
C(1)=0	12.068 (0.001)***	C(1)=0	3.608 (0.058)*
C(2)=0	1.172 (0.279)	C(2)=0	0.625 (0.429)
C(3)=0	0.332 (0.565)	C(3)=0	0.302 (0.583)

Note: \*\*\*, \*\*, and \* indicated the significance level 1%, 5% and 10%.

**Author computation with Eviews**

The intercept coefficient value is too high, which indicates that many variables impact the stock index. Brazil's Stock Index second lag and current GDP rate positively impact the BVSP index. However, CPI does not. Russia's stock index first has a significant positive impact on the MOEX index. Though others don't. India's stock index, CPI second lag, and GDP rate current and first lag have a significant positive impact on the BSE index's current value. China and South Africa's stock indexes first lag positively impacts China's SSEC Index and South Africa's FATWIZAFL Index, respectively. However, other variables are not. As Wald test, CPI does not have a significant impact on the BRICS countries' indexes. Only Brazil's and India's GDP rates have a significant impact. BRICS countries' index lag significantly impacts their index value in the long term. According to Chien et al. (2021), Li et al. (2021), and Flannery & Protopapadakis (2002), CPI had a significant impact on the Stock market. As well Gormsen & Koijen (2020), Abdo et al. (2021), Oktavia & Handayani (2018), Paramati et al. (2011), and Hsing & Hsieh (2011) defined GDP had a significant positive and negative relationship with the Stock market.

**Table:7 ECM TEST and WALD TEST For Short Run Relationship index as Dependent**

BRAZIL		RUSSIA		INDIA	
BVSP INDEX		MOEX INDEX		BSE INDEX	
CointEq(-1)*	-0.115 (0.003)***	COINTEQ*	-0.173 (0.004)***	COINTEQ*	0.022 (0.008)
D(BVSP INDEX(-1))	-0.703 (0.001)***	D(MOEX INDEX(-1))	0.408 (0.018)**	D(BSE INDEX(-1))	-0.623 (0.019)**
D(GDP R)	2510.071 (0.009)***	C	595.056 (0.004)***	D(CPI)	-818.49 (0.242)
C	21288.69 (0.001)***			D(CPI(-1))	-1587.616 (0.033)**
				D(GDP R)	389.343 (0.013)**
				C	3882.88 (0.001)**
WALD TEST					
C(2)=0	10.724 (0.001)***	C(2)=0	2.831 (0.092)*	C(2)=0	5.566 (0.018)**
				C(3)=C(4)=0	5.907 (0.052)*
C(3)=0	1.841 (0.175)			C(5)=0	4.364 (0.037)**

CHINA		SOUTH AFRICA	
SSEC INDEX		FTWIZAFL INDEX	
COINTEQ*	-0.398 (0.008)***	COINTEQ*	-0.549 (0.007)***
C	1314.865 (0.009)***	C	1752.801 (0.007)***

Note: \*\*\*, \*\*, and \* indicated the significance level 1%, 5% and 10%.

**Author computation with Eviews**

Brazil and India's GDP rates have a highly positive significant impact on the stock index. Still, India's CPI significantly adversely impacts the stock index. Brazil and India's stock first lag have a positive impact, and Russia's stock index first lag has a negative impact. In the short run, other variables also impact the stock index short run. According to Table 3, the stock index doesn't have cointegration in all BRICS countries. The Wald test shows that Brazil, Russia, and India's stock indexes lag significantly on the BVSP, MOEX, and BSE indexes. India's CPI and GDP rate significantly impact in the short run. Brazil, Russia, China, and South Africa have significant negative coefficients, indicating the long-run equilibrium variable quarterly speed of adjustment of 11%, 17%, 39.8%, and 54.9%.

**Table 8 ARDL TEST and WALD TEST Long Run Relation CPI as Dependent**

BRAZIL		RUSSIA		INDIA	
CPI		CPI		CPI	
CPI(-1)	1.25 (0)***	CPI(-1)	0.807 (0)***	CPI(-1)	0.356 (0.084)*
CPI(-2)	-0.502 (0.004)***	GDP R	0.44 (0.001)***	CPI(-2)	0.295 (0.138)
GDP R	0.127 (0.126)	GDP R(-1)	0.162 (0.154)	GDP R	0.019 (0.556)
BVSP INDEX	0 (0.269)	MOEX INDEX	0.001 (0.462)	BSE INDEX	0 (0.563)
BVSP INDEX(-1)	0 (0.016)**	MOEX INDEX(-1)	-0.003 (0.02)**	C	2.507 (0.024)**
C	-1.057 (0.437)	MOEX INDEX(-2)	0.004 (0.001)***		
		C	-1.706 (0.23)		
WALD TEST					
C(1)=C(2)=0	107.296 (0)***	C(1)=0	123.403 (0)***	C(1)=C(2)=0	19.903 (0)***
C(3)=0	2.548 (0.11)	C(2)=C(3)=0	16.37 (0)***	C(3)=0	0.357 (0.55)
C(4)=C(5)=0	7.104 (0.029)**	C(4)=C(5)=C(6)=0	17.101 (0.001)***	C(4)=0	0.346 (0.556)
CHINA		SOUTH AFRICA			
CPI		CPI			
CPI(-1)	0.752 (0)***	CPI(-1)	0.92 (0)***		
GDP R	-0.127 (0.01)***	CPI(-2)	-0.214 (0.21)		
SSEC INDEX	0 (0.572)	GDP R	0.112 (0.007)***		
C	1.708 (0.429)	FTWIZAFL INDEX	0 (0.849)		
		FTWIZAFL INDEX(-1)	0.001 (0.384)		
		FTWIZAFL INDEX(-2)	0.001 (0.117)		
		C	-3.543 (0.075)*		
WALD TEST					
C(1)=0	26.057 (0)***	C(1)=C(2)=0	41.074 (0)***		
C(2)=0	7.947 (0.005)***	C(3)=0	9.011 (0.003)***		

C(3)=0	0.329 (0.566)	C(4)=C(5)=C(6)=0	7.2 (0.066)*
--------	---------------	------------------	--------------

Note: \*\*\*, \*\*, and \* indicated the significance level 1%, 5% and 10%.

**Author computation with Eviews**

Brazil's CPI and the stock index's first lag have a positive impact, but CPI's second lag has a negative impact on CPI's current value. GDP rate doesn't impact the CPI. Russia's CPI first lag, GDP rate current, and stock index second lag have a significant positive impact. However, the stock index first lags significantly, negatively impacting CPI. India's CPI first lag has a significant positive impact. However, other variables do not impact CPI in the long term. China's CPI first and the current GDP rate lag significantly, with positive and negative impacts on CPI. South Africa's CPI and GDP currently lag a significant positive impact on South Africa's CPI. Wald test describes that Russia, China, and South Africa's GDP rates have a significant impact; besides, the stock index of Brazil, Russia, India, and South Africa has a significant impact, and the CPI's lag value of BRICS countries has a significant impact on the country's CPI. According to Sadikin, R. and Lutfi (2022), Joshi (2022), Zhang et al. (2022), Meo et al. (2018), and Saravanan Venkadasalam (2015) reported that GDP had a considerable impact on CPI. Barakat et al. (2015), Subhani & Osman (2011), Al-Tamimi et al. (2011) and Poterba (2000) Stock market had a significant impact on CPI.

**Table 9 ECM TEST and WALD TEST for Short-Run Relationship CPI as Dependent**

BRAZIL		RUSSIA		INDIA	
	CPI		CPI		CPI
COINTEQ*	-0.252 (0.001)**	COINTEQ*	-0.193 (0)***	COINTEQ*	-0.349 (0.008)***
D(CPI(-1))	0.502 (0.002)***	D(GDP R)	0.44 (0)***	D(CPI(-1))	-0.295 (0.1)*
D(BVSP INDEX)	0 (0.198)	D(MOEX INDEX)	0.001 (0.391)	C	2.507 (0.005)***
C	-1.057 (0.007)***	D(MOEX INDEX(-1))	-0.004 (0)***		
		C	-1.706 (0)***		
WALD TEST					
C(2)=0	10.356 (0.001)***	C(2)=0	14.461 (0)***	C(2)=0	2.378 (0.123)
C(3)=0	2.548 (0.11)	C(3)=C(4)=0	2.376 (0.305)		
China		SOUTH AFRICA			
	CPI		CPI		
COINTEQ*	-0.248 (0.002)***	COINTEQ*	-0.294 (0)**		
C	1.708 (0.003)***	D(CPI(-1))	0.214 (0.166)		
		D(FTWIZAFL INDEX)	0 (0.831)		
		D(FTWIZAFL INDEX(-1))	-0.001 (0.091)*		
		C	-3.543 (0)***		
WALD TEST					
		C(2)=0	1.685 (0.194)		
		C(3)=C(4)=0	9.085 (0.011)**		

Note: \*\*\*, \*\*, and \* indicated the significance level 1%, 5% and 10%.

**Author computation with Eviews**

Brazil's first lag in CPI significantly impacts CPI in the short run. Russia's GDP rate and stock index first lag positively and significantly impact Russia's CPI. India's first lag has a significant

negative impact on India's CPI. China's variables don't have an impact in the short run. South Africa's stock index first lags with a significant negative impact on CPI, but Brazil's, Russia's, and India's stock indexes do not impact the country's CPI. Wald test defines, Brazil's CPI, Russia's GDP rate, and South Africa's stock index significantly impact the country's CPI in the short run. Others do not impact countries' CPI.

### **Conclusion**

This study analyses the effect of GDP rate, CPI, and stock market Index within Brazil, Russia, India, South Africa and China BRICS countries. Previous studies have been conducted on GDP rate, CPI, and stock market index variables. They significantly define the GDP impact on the Stock Index, Stock market impact on the economy, CPI impact on GDP or economic growth of the country, and other variables that impact GDP rate, CPI, and stock market index in different nations or countries and BRICS nations. This study complied with the GDP rate, CPI, and stock market Index. This study utilised the ARDL approach to define the effect and other statistical tools like the ADF test, granger causality test, long bound test, error correction model, and Wald test. Augmented Dickey-Fuller test reveals that GDP has stationarity at level  $I(0)$ . However, CPI and Indices have stationarity at first difference  $I(1)$ . Granger's causality test concludes that unidirectional relationship. Indices have a unidirectional relationship with GDP in Brazil, Russia, and India. South Africa. However, Brazil, Russia, and South Africa have a unidirectional relationship with CPI. China's CPI has a unidirectional relationship with GDP and Indices. GDP has a long relationship with other variables. Cointegration exists in this model. CPI has a long-term relationship and cointegration in Brazil, Russia, and South Africa. The index does have a long-term relationship and cointegration with variables in BRICS. All model has a goodness of fitness of more than 50% in BRICS countries except China. Brazil, Russia and South Africa's GDP are significantly affected by GDP, Indices and CPI in the long term and short term. Russia's Index and CPI have impacted GDP. However, GDP and CPI have impacted China's GDP. BRICS indices have been significantly impacted by the countries' indices. Only India is significantly affected by GDP and CPI. CPI significant positive impact on BRICS's CPI. Russia, China, and South Africa's GDP have a significant impact on CPI. However, only Brazil's and Russia's indices have a significant impact on CPI in the long term. In the short term, BRICS countries' CPI affects the CPI except Russia. Russia and South Africa Index and Russia's GDP have significant effects on CPI. Wald test analysis that only a few variables do not have a significant effect on the dependent variable. The speed of adjustment is rapid in the GDP and Index models. However, the CPI model speed of adjustment is less than 35 % in BRICS countries. Most of the variables have a significant effect on dependent variables. This research finds that GDP rate, CPI, and stock market index variables have considerable positive and negative effects on each other in BRICS countries. Additionally, many variables affect the GDP rate, CPI, and stock market. These linkages affect the economic and financial planning of investors.

### **Implication**

This research may have multiple uses and significant implications. Firstly, this study gives valuable insight to policymakers for formulating economic policies and strategies. Policymakers understand the interaction of GDP rate, CPI, and Stock market performance with this research. They stabilised the economic conditions and attracted investment in BRICS countries. Furthermore, it gives valuable insight and knowledge that help design effective fiscal and monetary policy for sustainable economic growth. For investors and financial institutions, this research provides valuable knowledge of the impact of variables on the stock index. Provide opportunities for investments within BRICS nations. They make more effective decisions to gain an advantage from investment portfolios and capitalise on emerging market trends. Furthermore, it supports researchers and academics in understanding the interaction of the variables in BRICS countries, which will add benefits to future research on BRICS countries or nations. This study has been utilised by other stakeholders like



consumers and governments to control inflation in the nation. This study may be useful to all stakeholders.

### **Limitation**

It may contribute valuable knowledge to understanding the economic condition and investment pattern. However, this paper has acknowledged certain limitations. The first acknowledgement is time. Time varies on a daily, weekly, and monthly basis. Secondly, the variables used in this research are GDP rate, CPI, and stock market index variables. Many variables need to be studied, like the exchange rate, Employment rate, Inflation Rate, Interest Rates, Balance of Payments, etc. The third and most important limitation is that it is limited to the BRICS countries Brazil, Russia, India, South Africa and China. It does not cover other BRICS nations like Egypt, the United Arab Emirates, Iran, or Ethiopia. Additionally, SAARC, ASEAN, NATO, European Union, etc. This research doesn't cover all things to provide a deeper understanding. This may help to further future exploration.

### **References**

1. Abdo, K. K., Al-Qudah, H. A., Al-Qudah, L. A., & Qudah, M. Z. A. (2023). The effect of economic variables (workers' diaries abroad, bank deposits, gross domestic product, and inflation) on stock returns in the Amman Financial Market from 2005/2018. *Journal of Sustainable Finance & Investment*, 13(1), 59-72.
2. Ahmad, M., Zhao, Z. Y., Irfan, M., & Mukeshimana, M. C. (2019). Empirics on influencing mechanisms among energy, finance, trade, environment, and economic growth: a heterogeneous dynamic panel data analysis of China. *Environmental Science and Pollution Research*, 26, 14148-14170.
3. Ake, B. (2010). The role of stock market development in economic growth: evidence from some Euronext countries. *International Journal of Financial Research*, 1(1), 14-20.
4. Al Shehab, A. (2023). Macroeconomic determinants of stock market returns: Evidence from Oman. *Asian Economic and Financial Review*, 13(11), 801-817.
5. Ali, C. I., Ullah, S., Ahmed, U. I., Baig, I., Iqbal, M. A., & Masood, A. (2022). Can Food Inflation Be Stabilized By Monetary Policy? A Quantile Regression Approach. *Journal of Economic Impact*. <http://doi.org/10.52223/jei4032207>
6. Asaad, Z. (2021). Oil price, gold price, exchange rate and stock market in Iraq pre-during COVID-19 outbreak: An ARDL approach. Asaad, ZA (2021). Oil Price, Gold Price, Exchange Rate and Stock Market in Iraq Pre-During COVID19 Outbreak: An ARDL Approach. *International Journal of Energy Economics and Policy*, 11(5), 562-671.
7. Asad, M., Tabash, M. I., Sheikh, U. A., Al-Muhanadi, M. M., & Ahmad, Z. (2020). Gold-oil-exchange rate volatility, Bombay stock exchange and global financial contagion 2008: Application of NARDL model with dynamic multipliers for evidences beyond symmetry. *Cogent Business & Management*, 7(1), 1849889.
8. Babatunde, O. A., Ibukun, A. O., & Oyeyemi, O. G. (2017). Taxation revenue and economic growth in Africa. *Journal of accounting and taxation*, 9(2), 11-22.
9. Al-Tamimi, H., Alwan, Ali A., & Rahman, A. Abdel. (2011). Factors Affecting Stock Prices in the UAE Financial Markets. *Journal of Transnational Management* , 16 , 19 - 3 . <http://doi.org/10.1080/15475778.2011.549441>
10. Basnet, H. C., & Upadhyaya, K. (2015). Impact of oil price shocks on output, inflation and the real exchange rate: evidence from selected ASEAN countries. *Applied Economics*, 47, 3078-3091. <http://doi.org/10.1080/00036846.2015.1011322>
11. Barakat, M., Elgazzar, S., & Hanafy, Khaled M.. (2015). Impact of Macroeconomic Variables on Stock Markets: Evidence from Emerging Markets. *International journal of economics and finance* , 8 , 195 . <http://doi.org/10.5539/IJEF.V8N1P195>

12. Bryan, M. F., & Cecchetti, S. G. (1993). Measuring Core Inflation. NBER Working Paper Series. <http://doi.org/10.3386/W4303>
13. Cavallo, A. (2020). Inflation with Covid Consumption Baskets. NBER Working Paper Series. <http://doi.org/10.2139/ssrn.3622512>
14. Chang, B. H. (2020). Oil prices and E7 stock prices: an asymmetric evidence using multiple threshold nonlinear ARDL model. *Environmental Science and Pollution Research*, 27(35), 44183-44194.
15. Chien, F., Sadiq, M., Kamran, H. W., Nawaz, M. A., Hussain, M. S., & Raza, M. (2021). Co-movement of energy prices and stock market return: environmental wavelet nexus of COVID-19 pandemic from the USA, Europe, and China. *Environmental Science and Pollution Research*, 28(25), 32359-32373.
16. Donadelli, M., & Persha, L. (2014). Understanding emerging market equity risk premia: Industries, governance and macroeconomic policy uncertainty. *Research in International Business and Finance*, 30, 284-309.
17. El Menyari, Y. (2021). Effect of tourism FDI and international tourism to the economic growth in Morocco: Evidence from ARDL bound testing approach. *Journal of Policy Research in Tourism, Leisure and Events*, 13(2), 222-242.
18. Flannery, M. J., & Protopapadakis, A. A. (2002). Macroeconomic factors do influence aggregate stock returns. *The review of financial studies*, 15(3), 751-782.
19. Gormsen, N. J., & Koijsen, R. S. (2020). Coronavirus: Impact on stock prices and growth expectations. *The Review of Asset Pricing Studies*, 10(4), 574-597.
20. Grbić, M. (2021). Stock market development and economic growth: The case of the Republic of Serbia. *Post-Communist Economies*, 33(4), 484-499.
21. Gunasekarage, A., Pisedtasalasai, A., & Power, D. M. (2004). Macroeconomic influence on the stock market: evidence from an emerging market in South Asia. *Journal of Emerging Market Finance*, 3(3), 285-304.
22. Guzzetti, M. C., Bartolo, N., Liguori, M., & Matarrese, S. (2016). Gravitational waves from inflation. *Rivista Del Nuovo Cimento*, 39, 399-495. <http://doi.org/10.1393/ncr/i2016-10127-1>
23. HISMENDI, H., Masbar, R., NAZAMUDDIN, N., Majid, M., & SURIANI, S. (2021). Sectoral stock markets and economic growth nexus: Empirical evidence from Indonesia. *The Journal of Asian Finance, Economics and Business*, 8(4), 11-19.
24. Hsing, Y., & Hsieh, W. J. (2012). Impacts of macroeconomic variables on the stock market index in Poland: new evidence. *Journal of Business Economics and Management*, 13(2), 334-343.
25. Huy, D., Dat, P. M., & Anh, P. (2020). BUILDING AND ECONOMETRIC MODEL OF SELECTED FACTORS' IMPACT ON STOCK PRICE: A CASE STUDY. *Journal of Security and Sustainability Issues*. [http://doi.org/10.9770/jssi.2020.9.m\(7\)](http://doi.org/10.9770/jssi.2020.9.m(7))
26. Huy, D. T. N., Dat, P. M., & Anh, P. T. (2020). BUILDING AN ECONOMETRIC MODEL OF SELECTED FACTORS IMPACT ON STOCK PRICE: A CASE STUDY. *Journal of Security & Sustainability Issues*, 9.
27. Joshi, B. (2022). Impact of Remittance on Consumer Price Index in Nepal. *The Harvest*, 1(1), 15-28.
28. Jurkšas, L., & Paškevičius, A. (2017). The Relationship Between Macroeconomy and Asset Prices: Long Run Causality Evidence From Lithuania. *Organizations and markets in emerging economies*, 8(1), 63-85.
29. Kapaya, S. M. (2020). Stock market development and economic growth in Tanzania: an ARDL and bound testing approach. *Review of Economics and Political Science*, 5(3), 187-206.
30. Kirui, E., Wawire, N. H., & Onono, P. A. (2014). Macroeconomic variables, volatility and stock market returns: a case of Nairobi securities exchange, Kenya. *International Journal of Economics and Finance*; Vol. 6, No. 8.

31. Kromtit, M. J., Kanadi, C., Ndingra, D. P., & Lado, S. (2017). Contribution of non oil exports to economic growth in Nigeria (1985-2015). *International Journal of Economics and Finance*, 9(4), 253-261.
32. Kurniawan, W., & Kadir, K. (2023). International Trade Price Index: A Leading Indicator for Indonesia's Inflation?. *Economics Development Analysis Journal*, 12(2), 182-193.
33. Kyshakevych, B., Melnyk, O., Hrytsenko, K., Voronchak, I., & Nastoshyn, S. (2024). ANALYSIS OF COINTEGRATION AND CAUSALITY BETWEEN INDICATORS OF ECONOMIC GROWTH AND ENERGY EFFICIENCY OF EUROPEAN COUNTRIES. *Financial & Credit Activity: Problems of Theory & Practice*, 1(54).
34. Kolapo, F. T., & Adaramola, A. (2012). The Impact of the Nigerian Capital Market on Economic Growth (1990-2010). , 1 , 11-19 .
35. Li, W., Chien, F., Waqas Kamran, H., Aldeehani, T. M., Sadiq, M., Nguyen, V. C., & Taghizadeh-Hesary, F. (2022). The nexus between COVID-19 fear and stock market volatility. *Economic research-Ekonomska istraživanja*, 35(1), 1765-1785.
36. Lutfi, M. (2022). The Effect of Exchange Rate and Inflation on the Composite Stock Price Index. *Almana: Jurnal Manajemen dan Bisnis*, 6(2), 399-409.
37. Maysami, R. C., Howe, L. C., & Hamzah, M. A. (2004). Relationship between macroeconomic variables and stock market indices: ... Cointegration evidence from stock exchange of Singapore's All-S sector indices. *Jurnal pengurusan*, 24(1), 47-77.
38. Mbah, R. E., & Wasum, D. F. (2022). Russian-Ukraine 2022 War: A Review of the Economic Impact of Russian-Ukraine Crisis on the USA, UK, Canada, and Europe. *Advances in Social Sciences Research Journal*. <http://doi.org/10.14738/assrj.93.12005>
39. Meo, M., Chowdhury, M. A. H., Shaikh, G. M., Ali, M., & Sheikh, S. M. (2018). Asymmetric impact of oil prices, exchange rate, and inflation on tourism demand in Pakistan: new evidence from nonlinear ARDL. *Asia Pacific Journal of Tourism Research*, 23, 408-422. <http://doi.org/10.1080/10941665.2018.1445652>
40. Mahmoud, L. O. M. (2015). Consumer price index and economic growth: a case study of Mauritania 1990–2013. *Asian Journal of Empirical Research*, 5(2), 16-23.
41. Monamodi, N. E. (2024). The Impact of Current Account Balance on Economic Growth in South Africa. *Economies*, 12(2), 39.
42. Naumova, O.A., Svetkina, I.A., Korneeva, T.A. (2020). The Impact of Digitalization on the Economic Security Index of GDP. *ISCDTE 2019. Lecture Notes in Networks and Systems*, vol 84. Springer, Cham. [https://doi.org/10.1007/978-3-030-27015-5\\_20](https://doi.org/10.1007/978-3-030-27015-5_20)
43. Oktavia, S., & Handayani, W. (2018). Effect of Rupiah Exchange Rate, GDP Growth, and Dow Jones Index on Composite Stock Price Index in Indonesia Stock Exchange. *Journal of Accounting and Strategic Finance*, 1(1), 23-32.
44. Osamwonyi, I. O., & Evbayiro-Osagie, E. I. (2012). The relationship between macroeconomic variables and stock market index in Nigeria. *Journal of Economics*, 3(1), 55-63.
45. Osamwonyi, I. O., & Kasimu, A. (2013). Stock market and economic growth in Ghana, Kenya and Nigeria. *International Journal of Financial Research*, 4(2), 83-98.
46. Oskooe, S. A. (2010). Emerging stock market performance and economic growth. *American journal of applied sciences*, 7(2), 265.
47. Paramati, S. R., & Gupta, R. (2011). An empirical analysis of stock market performance and economic growth: Evidence from India. *Paramati, SR and Gupta*, 133-149.
48. Parker, M. (2016). The Impact of Disasters on Inflation. *Economics of Disasters and Climate Change*, 2, 21-48. <http://doi.org/10.1007/S41885-017-0017-Y>
49. Patro, B., Jeyashree, K., & Gupta, P. (2012). Kuppuswamy's Socioeconomic Status Scale 2010—The Need for Periodic Revision. *The Indian Journal of Pediatrics*, 79, 395-396. <http://doi.org/10.1007/s12098-011-0517-7>

50. Poterba, J. M. (2000). Stock market wealth and consumption. *Journal of economic perspectives*, 14(2), 99-118.
51. Podobnik, B., Shao, J., Njavro, D., Ivanov, P. C., & Stanley, H. E. (2008). Influence of corruption on economic growth rate and foreign investment. *The European Physical Journal B*, 63, 547-550.
52. Pradhan, R. P., Arvin, M. B., & Ghoshray, A. (2015). The dynamics of economic growth, oil prices, stock market depth, and other macroeconomic variables: Evidence from the G-20 countries. *International Review of Financial Analysis*, 39, 84-95.
53. Risyafli, I. Q., & Chaerudin, C. (2021). The Impact From Return Of Equity (ROE), Return Of Asset (ROA), AND Earning Per Shares (EPS) on Primary Consumer Sector (Consumer Non-Cyclicals) Companies On The Idx During 2014-2019. *Dinasti International Journal of Digital Business Management*, 2(4), 706-715.
54. Rabhi, A. (2020). Stock market vulnerability to the COVID-19 pandemic: Evidence from emerging Asian stock market. *Journal of Advanced Studies in Finance (JASF)*, 11(22), 126-131.
55. Rasu, R., Bawa, W. A., Suminski, R., Snella, K. A., & Warady, B. (2015). Health Literacy Impact on National Healthcare Utilization and Expenditure. *Political Economy: National*. <http://doi.org/10.15171/ijhpm.2015.151>
56. Saleem, H., Shabbir, M. S., & Bilal khan, M. (2020). The short-run and long-run dynamics among FDI, trade openness and economic growth: using a bootstrap ARDL test for co-integration in selected South Asian countries. *South Asian Journal of Business Studies*, 9(2), 279-295.
57. Singh, K., & Dhamija, A. (2019). Macroeconomic Factors as a Predictor of Stock Market: Empirical Evidences from India, U.S. and U.K. *International Journal of Recent Technology and Engineering (IJRTE)*, 8(2S10). <https://doi.org/10.35940/ijrte.b1133.0982s1019>
58. Saravanan, V. (2015). The Determinant of Consumer Price Index in Malaysia. *Journal of Economics, Business and Management*, 3(12).
59. Subhani, M. I., & Osman, M. A. (2011). Stock Market Reactions due to Announcements of Consumer Price Index and the Investigation of Endogeneity.
60. Taghizadeh-Hesary, F., Yoshino, N., Mohammadi Hossein Abadi, M., & Farboudmanesh, R. (2016). Response of macro variables of emerging and developed oil importers to oil price movements. *Journal of the Asia Pacific Economy*, 21(1), 91-102.
61. Vazakidis, A., & Adamopoulos, A. (2009). Stock market development and economic growth. *American Journal of Applied Sciences*, 6(11), 1932.
62. Verma, R. K., & Bansal, R. (2021). Impact of macroeconomic variables on the performance of stock exchange: a systematic review. *International Journal of Emerging Markets*, 16(7), 1291-1329.
63. Yoon, J., Kim, J., & Lee, J. (2014). Impact of Demographic Changes on Inflation and the Macroeconomy. *Korea Development Institute (KDI) Research Paper Series*. <http://doi.org/10.23895/KDIJEP.2018.40.1.1>
64. Zhang, D., & Mu, H. (2022). Analysis and Research on the Influencing Factors of Regional CPI Based on CVM-AHP Coupling Perspective. *Highlights in Business, Economics and Management*, 2, 51-59.