

THE EFFECT OF EXPORT, FOREIGN DIRECT INVESTMENT AND CURRENT ACCOUNT BALANCE ON GDP IN BRICS COUNTRIES

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Abstract: The present research endeavors to examine the effects of exports, FDI, and CAB on the GDP of the BRICS nation. The study employs a thorough empirical analysis to investigate the dynamic interactions among these factors, with data spanning from 2003 to 2022. The results show that Exports (EXP01) are the most important positive driver of GDP growth in the BRICS nations, according to the correlation research ($r=0.979$), highlighting their vital significance in economic progress. The somewhat negative correlation ($r=-0.532$) between FDI and GDP points to inefficiencies in the leverage of foreign investments. Maintaining a strong trade and financial position is crucial, as evidenced by the Current Account Balance (CAB), which shows a somewhat positive association ($r=0.653$). In these economies, increasing exports and FDI utilization stand out as crucial tactics for long-term success.

Keywords: GDP, BRICS, FDI, Exports, CAB.

I. INTRODUCTION

While interacting with other country-explicit macroeconomic factors, the multifaceted dynamic relationship between open venture, confidential speculation, and foreign direct investment (FDI) is recalled to provide a contrived example of monetary growth. This incredible association might be the result of more well thought out theories. This idea has spurred foreign direct investment (FDI) to reach notable levels in global financial elements. It has helped scholars everywhere in the globe investigate the relationship between foreign direct investment (FDI) and development, particularly in nations with low levels of capital speculation.

The purpose of this study is to investigate the complex relationships that exist between exports, FDI inflows, and CAB activities as well as how these factors affect the GDP of the BRICS countries as a whole. The study intends to provide useful insights that help educate stakeholders, investors, and policymakers on the elements influencing economic growth and development in these developing market economies by clarifying these linkages.

A. Background

The analysis predicts that the developed economies of today will account for a smaller portion of the global economy. Accordingly, the ongoing changes in expenditure might present enormous opportunities for foreign direct investment (FDI). Therefore, the foundation of leadership focuses on advanced understanding so that we can analyze the factors that influence investors in these emerging markets.

B. Overview of BRICS

Beginning approximately 2017, Brazil ranked eighth in the world with an apparent gross domestic product of US\$2.055 trillion. After nearly ten years of rapid progress (2002–2013), Brazil saw its worst downturns ever in 2015 (-3.8 percent of GDP) and 2016 (-3.6 percent). The main causes of this financial disaster were the decline in development and consumption as well as the cost of goods. In 2017, the economy bounced back, with the GDP growing by 0.7%. Strong financial conditions and monetary fluctuations have helped the recovery. 2018 could see the Brazilian economy continue to show signs of improvement, with 1.5% growth predicted (UNWESP, 2018).

Transitional economy by the United Nations 2018 World Economic Situation and Prospects report rates Russia, the 11th largest economy in the world with a GDP of more than US\$ 1,577 trillion, as a transitory economy.¹⁶ The economy had a downturn after 2008, with a typical yearly growth rate of 1.85%. A combination of falling oil prices, international authorizations, and major restrictions plunged Russia into a severe recession in 2015, with the country's GDP falling by more than 2.8%. The recession persisted until 2016, during which time the GDP declined by a further 0.2%; however, it ended in 2017 when global demand increased.

India is currently the sixth-largest economy in the world, with an apparent GDP of around US\$ 2.611 trillion. The economy has grown at a steady average rate of 7.29% during the past few years, with few downturns. The deteriorating speculation, faster rates of interest and growth, and a significant devaluation of the rupee (INR) in 2016 were the main causes of slowdowns (World Bank, 2018).

As of right moment, China's GDP is still measured in terms of purchasing power equality at US\$ 22.16 trillion, while its nominal GDP is still just US\$ 12.01 trillion. This stark difference stems from the US dollar (USD) to yuan (CNY) translation standard, which distorts China's actual performance relative to the rest of the world. Over the past ten years, the Chinese economy has grown by 8.8% year on average, but at a significantly slower rate (World Bank, 2018).

With the largest economy in Africa, South Africa ranked 33rd on the globe in 2017 with an apparent Gross domestic product of US\$ 349.29 billion. The nation's economy has grown by 2.09 percent each year on average over the past few years, but it has been steadily slowing down. The economy is greatly impacted by unfortunate gatherings, a drop in Chinese interest, and declining natural substance prices (CIA , 2018).

C. Problem Statement

The goal of this study is to thoroughly investigate, within the framework of the BRICS countries, the relationship between exports, FDI, CAB, and GDP. The study aims to provide detailed insights into the mechanisms influencing the paths of economic growth within the BRICS nations by examining the interactions between these important economic variables

II. LITREATURE REVIEW

Using a Bootstrap panel causality method, (Sahina, 2018), examines the relationship among international commerce, financial development, and foreign direct investment (FDI) in BRICS-T countries (Brazil, Russia, India, China, South Africa, and Turkey). In Brazil, India, and Turkey, financial growth promotes international commerce, according to the study, whereas in Turkey and India, FDI and trade are causally related. Furthermore, the joint impact of trade and foreign direct investment on financial development is examined, emphasizing their vital functions in fostering economic expansion and integration in these developing nations.

The link between economic development, FDI, and CAB in the BRICS countries between 1995 and 2013 is examined by (Haydaroğlu, 2016). Economic growth and the EF index have a substantial positive link, according to the study, underscoring the role that institutional and policy frameworks play in promoting development. Furthermore, FDI's crucial significance in developing countries is shown by its identification as a statistically significant driver of economic growth. In order to assure rigorous empirical analysis, the study uses the F Limer and Hausman tests together with Pooled Least Squares (PLS), Fixed Effects (FE), and Random Effects (RE) methodologies. It concludes that BRICS nations are in a good position to drive global economic development in the face of problems in advanced economies.

(Prabhakar, Azam, Bakhtyar, & Ibrahim, 2015), examine how trade, economic growth, and foreign direct investment (FDI) interact in BRICS nations, highlighting the need of matching investment and trade trends with developmental objectives. The study emphasizes how crucial it is to lower obstacles to FDI inflows and improve absorptive capacity in order to optimize economic advantages. Other BRICS countries see China's achievements in preserving the trade balance and

drawing substantial FDI inflows as a model. With an emphasis on trade, foreign direct investment, and other factors, the study combines a thorough theoretical and empirical investigation to offer policymakers in emerging economies useful information.

(Gurshev, 2019), investigates the empirical relationships between FDI and a number of economic variables in BRICS nations, such as GDP, imports, exports, trade balance, and the economic openness index. In order to find any extensions or deviations, the study assesses the associations within a thorough econometric framework using an Ordinary Least Squares (OLS) technique. Significant relationships between FDI and key economic indicators are highlighted by the findings, which also show how FDI and macroeconomic factors are intertwined in determining trade and growth patterns among BRICS states.

Using panel data analysis, (Agrawal, 2015), investigates the connection between economic development and foreign direct investment (FDI) in the BRICS nations. The analysis shows that FDI and economic growth are cointegrated at the panel level, confirming a long-term equilibrium link between the two variables. The results highlight the necessity for policymakers to lower obstacles to foreign direct investment inflows and improve these countries' ability to absorb FDI in order to fully benefit from its growth-promoting effects. This study emphasizes how important foreign direct investment (FDI) is to promoting sustainable economic growth within the BRICS framework.

(Melega, 2020), examines the development of direct productive investments in BRICS economies, emphasizing how these investments affect domestic economic and social problems as well as how they help these countries' standing in the global economy. The study emphasizes how trade and investment linkages among BRICS countries promote growth and development synergy by using a qualitative technique that involves observation, comparison, and analysis of data from literature and international sources. This study emphasizes how productive investments may significantly alter the course of emerging nations' economies.

A. Economies of BRICS

A nation with unstable macroeconomic conditions is apt to get less foreign direct investment than a nation with steady and consistent growth rates, which is likely to receive higher levels of inflows. Investors in financial assets consistently choose to place their money in economies with higher levels of stability and fewer random and vulnerable variables. Thus, it is assumed that the rate of growth of the gross domestic product, the cost of financing, and the current performance record would all have a significant impact on FDI streams.

The (Ho, 2013) research examined the effects of energy usage between 1990 and 2014 on the ecological quality of the ASEAN countries. Energy consumption clearly increases CO₂ outputs, according to the review, which included observational techniques including FMOLS and DOLS. The focus of (Shahbaz, Sbia, Hamdi, & Ozturk, 2014) analysis of Malaysia's situation was the environmental impact of energy use and financial expansion. The analysis discovered that energy use and financial development significantly increase CO₂ outflows. Furthermore, when (Jammazi & Aloui, 2010) investigated the relationship between energy usage and environmental quality in Bay economies, they discovered that energy consumption increases natural pollution.

According to (Afshan, Ozturk, & Yaqoob, 2022), nations should develop financial policies that encourage investors to support businesses while preserving the environment and streamlining operations. These findings have been verified by (Jiang & Khan, 2023), who also found that regular energy resource use is endangering our established contemporary framework and polluting the environment. Studies have also shown that nations must use renewable energy sources to safeguard business and the environment. Furthermore, a number of studies, such as those conducted by (Destek & Sarkodie, 2019), discovered favorable correlations between CO₂ emissions, economic growth, and energy consumption.

III. METHODOLOGY

Quantitative approach will be used by using the World Development Indicators (WDI) & United Nations Service Trade Statistics Database (UNCTADStat) data. Data is the most essential part of any analysis. In order to perform analysis for our model and hypothesis, we required data about the GDP, FDI, Exports and CAB data for the BRICS countries i.e. Brazil, Russia, India, China and South Africa. We used the online world bank data drive to extract data of these attributes for the BRICS countries. We gathered the data for the last 2 decades that is from 2003 to 2022. We used the world bank website and applied some filters to extract our desired data from the data bank.

In this study, panel data analysis technique was used based on econometric techniques. A collection of possible factors, including exports, FDI, and CAB, are chosen as the predictors of GDP inflows in the BRICS nations based on the literature that is currently accessible.

A. Statistical Software Used

Using Stata, we have created some line graphs to briefly analyze the nature of the data and the overview of insights we can gather from the data obtained from the world bank website.

IV. RESULT ANALYSIS

A. Data Description

Table 1: Descriptive statistics and Pairwise correlations

Statistics	GDP	EXP01	FDI	CAB
Mean	2.87E+12	6.31E+11	-3.39E+10	42.08
Median	1.68E+12	3.32E+11	-1.73E+10	-2.25
Maximum	1.80E+13	3.71E+12	4.17E+10	443.37
Minimum	1.97E+11	4.71E+10	-2.32E+11	-110.49
Std. Dev.	3.87E+12	8.06E+11	5.20E+10	113.35
Skewness	2.420	2.112	-1.754	1.56
Kurtosis	8.139	6.643	6.279	5.19
Jarque-Bera	207.68	129.70	96.14	60.77
Probability	0.00	0.00	0.00	0.00
Sum	2.87E+14	6.31E+13	-3.39E+12	4208.50
Sum Sq. Dev.	1.48E+27	6.43E+25	2.68E+23	12720
Observations	100	100	100	100

The descriptive statistics show that the dependent variables—exports (EXP01), foreign direct investment (FDI), and current account balance (CAB)—as well as the independent variable, GDP, vary significantly between the BRICS nations. With a right-skewed and leptokurtic distribution, GDP has a high mean of \$2.87 trillion and significant variance (standard deviation of \$3.87 trillion), suggesting the existence of outliers. A right-skewed distribution of exports, with an average of \$6.31 billion and a large standard deviation of \$8.06 billion, indicates that certain nations have very high export values. Conversely, FDI has a left-skewed distribution with severe negative outliers, a negative mean of -\$33.9 billion, and significant variance. With a significantly right-skewed and leptokurtic distribution, CAB's high standard deviation (\$113.35 billion) suggests significant variations despite its average of \$42.08 billion. Because every variable deviates considerably from normalcy (Jarque-Bera probability = 0.00), the linkages must be examined using sophisticated econometric approaches. While CAB and FDI are predicted to exhibit mixed impacts because to their high variability and dispersion features, exports are anticipated to have a significant positive influence on GDP.

B. Pairwise Correlation

Table 2: Pairwise Correlation

Correlation Probability	GDP	EXP01	FDI	CAB
GDP	1.000 -----			
EXP01	0.979 0.00	1.000 -----		
FDI	-0.532 0.00	-0.590 0.00	1.000 -----	
CAB	0.653 0.00	0.756 0.00	-0.406 0.00	1.000 -----

Significant correlations between GDP and the independent variables—exports (EXP01), foreign direct investment (FDI), and current account balance (CAB)—are revealed by the pairwise correlation analysis. Exports and GDP have a strong positive correlation (0.979), meaning that higher exports are directly related to higher GDP. GDP and CAB have a somewhat positive association (0.653), indicating that improved current account balance supports economic expansion. On the other hand, FDI and GDP have a moderately negative correlation (-0.532), suggesting that the type of FDI inflows into BRICS nations may not always result in GDP growth. This might be because of unfavorable investment structures or repatriated profits. FDI exhibits negative correlations with both exports (-0.590) and CAB (-0.406), but exports and CAB have a positive connection (0.756) among the independent variables. The model's robustness for additional econometric research is confirmed by the Variance Inflation Factor (VIF) mean of 2.31, which shows no severe multicollinearity.

C. Model Specification And Diagnostic Test Results

Table 3: Model Specification And Diagnostic Test Results

Diagnostic Tests	Stat	P-value
F-test	60.152	0.000
Hausman test	38.338	0.000
Groupwise heteroscedasticity test		
Modified Wald test	3.26e+05	0.000
Autocorrelation test		
Wooldridge test	96.164	0.0006
Cross sectional independence test		
Friedman’s test	27.571	0.000

The F-test and Hausman test findings show that fixed-effects (FE) models are better suited for this study than pooled Ordinary Least Squares (OLS) and random-effects (RE) models because they successfully account for unobserved heterogeneity among the BRICS countries. The fixed-effects technique was thus used for the first estimate. However, further diagnostic tests revealed that the fixed-effects model had serious problems with autocorrelation, heteroscedasticity, and cross-sectional dependence (HAC). These problems may compromise the regression estimates' accuracy and dependability. These econometric issues were addressed using the Feasible Generalized Least Squares (FGLS) model. The FGLS approach ensures more reliable and consistent parameter estimations by successfully correcting for HAC issues. By using the FGLS model, the study mitigates the reported diagnostic problems and preserves the benefits of the fixed-effects specification, improving the overall validity of the empirical findings.

The study's diagnostic tests assess the econometric model's applicability and look for important problems including heteroscedasticity, autocorrelation, and cross-sectional dependency, all of which might affect how reliable the findings are. The regression model's overall significance is confirmed by the F-test (stat = 60.152, p-value = 0.000), which indicates that exports, FDI, and CAB all together have a statistically significant impact on GDP. A fixed-effects model is more appropriate than a random-effects model, according to the Hausman test (stat = 38.338, p-value = 0.000). This is probably because the independent variables correlate with the unique characteristics of each BRICS nation.

D. Empirical Findings From FGLS Regressions

GDP is dependent variable.

Table 4: FGLS Regressions

Independent variable	Coefficient	Std. deviation	P value
Exp	4.74	0.12	0.00
FDI	1.71	0.81	0.03
CAB	-1.96e+09	4.37e+08	0.00

The results of the Feasible Generalized Least Squares (FGLS) regression, which are shown in Table 4, offer a thorough examination of the ways in which exports (ln(EXP01)), foreign direct investment (ln(FDI)), and the current account balance (ln(CAB)) affect GDP in the BRICS nations. Every one of these elements has statistical significance, demonstrating their critical function in propelling regional economic expansion.

Exports (ln(EXP01)): A p-value of 0.00 and a coefficient of 0.125 indicate that exports significantly and positively affect GDP. The significance of global trade in enhancing economic performance is demonstrated by the fact that a 1% rise in exports is linked to a 0.125% increase in GDP. By creating foreign exchange profits, boosting domestic industries through increased demand, and allowing economies to attain economies of scale, exports assist economic growth. Sustainable economic development can result from export promotion tactics include diversifying export products, increasing access to international markets, and improving product quality for the BRICS nations, which are major participants in international commerce.

FDI, or foreign direct investment, is: With a p-value of 0.035 and a correlation of 0.810, FDI and GDP are strongly positively correlated. The importance of foreign investment in economic growth is demonstrated by the fact that a 1% rise in FDI is associated with a 0.81% increase in GDP. By bringing cutting-edge technologies, generating jobs, encouraging innovation, and lending money for infrastructure and industrial growth, FDI makes a positive impact. The results highlight how crucial it is to keep macroeconomic policies stable, make doing business easier, and provide investment incentives in order to draw in and keep foreign direct investment (FDI) inflows to the BRICS nations, which frequently market themselves as desirable locations for international investment.

Balance of Current Account (ln(CAB)): The current account balance has an extraordinarily substantial and highly significant impact on GDP, as evidenced by the coefficient of $4.37e+08$ and the p-value of 0.00. This suggests that stable and growing economies depend on a country's balance of payments being managed well. When a nation's exports exceed its imports, it has a positive current account balance, which promotes capital accumulation, eases the burden of external debt, and strengthens economic resilience. Maintaining strong economic growth for the BRICS nations depends on current account management strategies that lower trade imbalances, promote saving, and guarantee sustainable external borrowing.

Overall, the FGLS regression results show that the current account balance, FDI, and exports are all important factors influencing GDP growth in the BRICS nations. These results imply that policymakers in these countries have to concentrate on methods to improve trade competitiveness, draw in and hold on to foreign investment, and efficiently manage the balance of payments. This all-encompassing strategy can improve the BRICS region's economic performance and promote sustainable growth.

V. CONCLUSION

This study used World Bank data from 2003 to 2022 to investigate the relationships between GDP and three important macroeconomic indicators across the BRICS countries (Brazil, Russia, India, China, and South Africa): exports, foreign direct investment (FDI), and the current account balance (CAB). To investigate the proposed relationships between GDP and these indicators, the study used econometric models, such as fixed-effects (FE) and Feasible Generalized Least Squares (FGLS), which ensured robust analysis by addressing concerns about heteroscedasticity, autocorrelation, and cross-sectional dependence.

The empirical results show that, albeit in different amounts and in different directions, each variable has a statistically significant effect on GDP. Exports showed a robust and positive correlation with GDP, highlighting their vital role in promoting economic expansion through the creation of foreign exchange profits and the improvement of industrial production. In a similar vein, FDI has a beneficial impact on GDP, demonstrating its ability to provide cutting-edge technology, generate employment, and promote infrastructural growth. The CAB, on the other hand, demonstrated a highly substantial positive correlation with GDP, highlighting the significance of preserving balanced trade and financial inflows to guarantee economic stability. Interestingly, there was variation in the FDI-GDP connection, indicating that the kind and quality of investments determine how effective FDI is.

These results highlight the various effects of exports, foreign direct investment, and CAB on GDP among the BRICS countries, demonstrating the need to customize economic policies to each nation's particular structural and developmental circumstances. The importance of exports emphasizes the necessity of international trade policies that place a high priority on market diversity and competition. The contradictory findings about FDI imply that enhancing the investment climate through infrastructural improvements and regulatory changes might increase its beneficial impacts. Because CAB has a

significant impact on GDP, managing external debt and engaging in sensible trade are necessary to improve economic resilience.

In light of these findings, the report advises BRICS authorities to concentrate on export promotion tactics, such as product diversification and market growth, in order to boost their economies. Additionally, by creating investor-friendly settings and lowering administrative barriers, efforts should be made to draw in high-quality FDI. Lastly, to maintain balanced current accounts and protect long-term economic development and stability, sustainable trade and fiscal policies should be put into place. The BRICS nations may improve their chances for sustainable growth and negotiate the intricacies of the global economy by utilizing these focused policy initiatives.

Limitations:

First off, the study uses data from the World Bank, which is a reliable and extensive database but may have built-in flaws with regard to timeliness, quality, and completeness. Revisions and updates are common for economic data, which could have an impact on our regression analysis's findings. Additionally, the data covers from 2003 to 2022, and while this gives a considerable temporal scope, it may not fully reflect longer-term trends and cyclical economic patterns that stretch beyond this period.

Secondly, while the study focuses on important emerging economies, its scope is restricted to the BRICS countries, which limits the findings' applicability. It's possible that the economic dynamics of the BRICS countries are very different from those in other developed or developing countries. Therefore, without additional validation, the conclusions from this investigation might not be applicable to a wider range of nations.

In summary, despite the fact that this thesis offers valuable insights into the economic dynamics of the BRICS nations, these drawbacks imply that care should be taken when interpreting the findings. By using more advanced econometric tools, examining the links in a wider variety of countries, and extending the range of economic variables taken into consideration, future study could solve these limitations.

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