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DETERMINANTS OF CURRENT ACCOUNT BALANCE IN BRICSIV COUNTRIES: PANEL DATA ANALYSIS 2000–2024

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Abstract

The current account balance is a primary indicator of the external sector that reflects the economic stability of a country and is of significant concern amid increasing global economic imbalances. Although various studies have examined the determinants of the current account balance, no research has comprehensively analyzed the BRICSIV group of countries-a combination of BRICS members with Indonesia and Vietnam-within a single panel framework over a 25-year period. This study aims to analyze the effect of the official exchange rate, total exports, total imports, foreign exchange reserves, foreign direct investment (FDI), and gross domestic product (GDP) on the current account balance of BRICSIV countries for the period 2000-2024. The study employs a quantitative approach using balanced panel data comprising 175 observations sourced from the World Bank World Development Indicators (WDI). Estimation was conducted through three approaches-Common Effect Model, Fixed Effect Model, and Random Effect Model-with the Chow test and Hausman test used to determine the best model, resulting in the Fixed Effect Model (FEM) as the most appropriate model. The estimation results indicate that total imports have a significant negative effect, total exports have a significant positive effect, and GDP has a significant positive effect on the current account balance, while the official exchange rate, foreign exchange reserves, and FDI do not have a significant effect. Simultaneously, all independent variables have a significant effect with a model explanatory power of 41.98%. These findings confirm that international trade performance and export-oriented economic growth are the main determinants of current account balance, so the governments of BRICSIV countries need to prioritize export diversification, control of non-essential imports, and growth strategies that support national export competitiveness

INTRODUCTION

The development of economic globalization has increased interaction and interdependence among countries through international trade, foreign investment, and cross-border capital flows (Camarero et al., 2025). In an increasingly integrated global economy, external sector stability is an important factor for the sustainability of economic growth (Das, 2016). One of the main indicators for assessing the performance of the external sector is the current account balance (*current account balance*), which reflects the difference between a country's receipts and expenditures in international economic transactions (Altayligil and Çetrez, 2020a). The current account balance reflects the difference between a country's receipts and expenditures in international economic transactions, encompassing trade in goods and services, primary income, and current transfers (Wang, 2025). A current account surplus indicates that receipts exceed expenditures, while a deficit indicates the opposite. Therefore, the current account balance is an important indicator of a country's competitiveness and economic stability (Castrillo-carreira, 2026).

The current account balance (*current account balance*) is the primary indicator of the external sector that records transactions in goods and services, income, and transfers between a country and the rest of the world within a given period (Liu and Jianwu Ren, 2024). A surplus current account condition indicates that a country's foreign exchange receipts from abroad are greater than its expenditures, while a deficit indicates the opposite. The current account balance is frequently used as an important indicator in assessing the level of international trade competitiveness, a country's ability to generate foreign exchange, macroeconomic stability, and the degree of dependence on external financing (Monamodi, 2024).

In the global economy, current account imbalances among countries are frequently of concern because they can affect international economic stability (Altayligil and Çetrez, 2020b). Such imbalances can arise from various factors such as differences in economic structure, changes in international commodity prices, exchange rate fluctuations, and differences in economic policies implemented by each country (Das, 2016). International financial institutions such as the International Monetary Fund frequently highlight that global current account imbalances can trigger economic instability if not properly managed (Braimah and Oytun, 2024). In recent decades, technological developments, trade liberalization, and increasing international capital mobility have also influenced the dynamics of the current account balance in various countries (Wang, 2025). This indicates that analysis of the current account balance is not only related to international trade, but also to a broader range of macroeconomic factors (Altayligil and Çetrez, 2020).

In the context of developing countries, several countries with relatively rapid economic growth play an important role in global economic dynamics (Afridi et al., 2025). One group of countries that frequently receives attention in international economic studies is the group referred to in this research as BRICSIV, consisting of Brazil, Russia, India, China, South Africa, Indonesia, and Vietnam (Chen and Zhang, 2025). These countries are developing nations with relatively high economic growth rates and significant contributions to international trade (Xing and Imran, 2025). Furthermore, these countries have diverse economic characteristics in terms of natural resources, industrial structure, level of industrialization, and economic policies (Qi and Yang, 2023). These differences in characteristics cause each country to have a different pattern of economic development, including in terms of current account balance conditions (Agarwal and Kumar, 2023).

The current account balance of BRICSIV countries shows diverse dynamics. World Bank data indicates that China and Vietnam have recorded high current account surpluses on several occasions, supported by strong manufacturing exports (Augustyniak et al., 2023). Conversely, countries such as

India and South Africa have experienced current account deficits in several periods, caused by high imports of goods and services and the need for external financing to support domestic economic growth domestik (Behera, 2019). Meanwhile, Brazil, Russia, and Indonesia have experienced fluctuations in the current account balance due to changes in commodity prices, global trade conditions, and domestic economic policies (Monamodi, 2024). These differences in dynamics indicate that a country's current account balance condition is not only influenced by international trade activities, but also by various other macroeconomic factors (Castrillo-carreira, 2026).

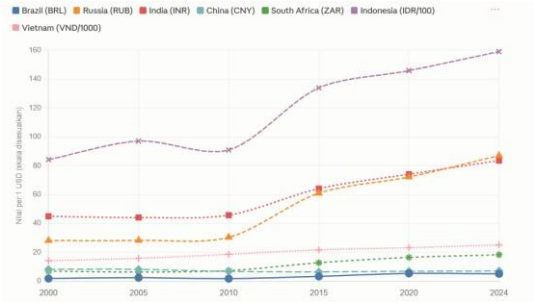
Based on data from World Bank DataBank, the current account balance of BRICSIV countries during the period 2000-2024 shows fluctuating developments. China and Vietnam tend to record surpluses due to strong export performance, while India and South Africa more frequently experience deficits due to high imports. Indonesia, Brazil, and Russia have experienced shifts between surplus and deficit influenced by global commodity price fluctuations and international trade dynamics.

Exchange rate developments also show different dynamics among BRICSIV countries. Exchange rate depreciation in some countries has been able to increase export competitiveness, thereby driving current account surpluses (ÇETREZ, 2022). However, excessive depreciation can also increase import costs and trigger domestic inflation (Eriksson, 2024). Furthermore, the increase in foreign direct investment in some BRICSIV countries has also had an impact on the current account through the enhancement of national production capacity and exports (Kumar and Yadav, 2025). These findings are consistent with the study by Idialis and Anggraini (2025) Those findings indicate that the current account condition of BRICSIV countries is influenced by various macroeconomic factors. Therefore, empirical analysis is needed to comprehensively explain the influence of these factors on the current account balance.

In the past two decades, the global economy has experienced a series of major successive shocks, ranging from the 2008 global financial crisis, the COVID-19 pandemic, to the escalation of geopolitical tensions triggered by the Russia-Ukraine conflict, and all of these shocks have been directly or indirectly reflected in the exchange rate movements of developing countries, including those belonging to the BRICSIV group (Vilela and Macdonald, 2020). Exchange rate development data during the period 2000-2024 reveals an academically intriguing yet problematic phenomenon, namely that the seven countries often regarded as representatives of the world's emerging economic powers actually show a very sharp pattern of divergence against the US dollar-the Russian Ruble weakened up to threefold, the Indonesian Rupiah and Indian Rupee depreciated consistently, the South African Rand and Vietnamese Dong weakened gradually, the Brazilian Real fluctuated with high volatility, while the Chinese Yuan actually strengthened as the sole anomaly due to strict exchange rate management-a reality that confirms that membership in a single economic bloc does not automatically produce monetary pattern convergence (Cota, 2017). This divergence raises a fundamental question about what actually distinguishes the monetary resilience of one country from another, given that theoretically all BRICSIV members face a relatively similar external environment, namely all exposed to global commodity price fluctuations, vulnerable to changes in United States monetary policy, and facing capital flow pressures of a *pro-cyclical*. Therefore, this study intends to empirically examine the factors that explain the differences in exchange rate depreciation patterns among BRICSIV countries during 2000-2024, by testing the extent of the contribution of domestic factors-such as inflation, interest rates, and current account deficits-compared to external factors-such as global commodity prices, *Federal Reserve*policy, and geopolitical pressures-in explaining this divergence, so as to provide theoretical contributions and policy implications for strengthening

the monetary stability of developing countries.

Graph 1. Exchange Rate Developments of BRICSIV Countries in 2000–2024



Source: Processed from World Bank (WDI)

Based on the data in Table 1, there is a significant research gap in the existing literature. Most previous studies analyze the current account balance only for a single country or a specific group of countries such as ASEAN, OECD, or African countries with a relatively short observation period (Yessymkhanova et al., 2025). No study has comprehensively compared the determinants of the current account balance in the BRICSIV group of countries-which combines BRICS members with Indonesia and Vietnam-within a single analytical framework over a 25-year period (Purnama et al., 2021). In fact, the seven countries have different economic characteristics, so that analysis within a single model can reveal differences in the determinants of the current account balance across countries (Chen and Zhang, 2025).

The novelty of this research lies in three aspects. First, the research forms the BRICSIV analytical group by adding Indonesia and Vietnam to the BRICS group, thus better representing the economic dynamics of developing countries. Second, the research uses a long observation period, namely 2000-2024, enabling it to capture the impact of various global events such as the 2008 financial crisis, the COVID-19 pandemic in 2020, and geopolitical pressures. Third, the research applies the Fixed Effect Model (FEM), which is capable of capturing the specific characteristics of each country, thereby producing more accurate estimates in explaining the determinants of the current account balance in BRICSIV countries.

In this study, the current account balance is used as the dependent variable because it reflects the external sector condition of a country, while the official exchange rate, exports, imports, foreign exchange reserves, foreign direct investment (FDI), and Gross Domestic Product (GDP) are used as independent variables that are presumed to affect the current account condition of BRICSIV countries (Purnama and Priyono, 2021). The exchange rate affects the current account balance through changes in the competitiveness of exports and imports. Exchange rate depreciation tends to improve the current account by increasing exports and suppressing imports, while appreciation has the opposite effect. Furthermore, exports increase foreign exchange receipts, while imports add to foreign exchange expenditures (Anwar et al., 2022).

Foreign exchange reserves reflect a country's ability to maintain external economic stability and finance international transactions, such that the greater the foreign exchange reserves, the stronger the resilience of a country's current account. Foreign direct investment (FDI) can also increase national production capacity and exports, thereby potentially improving the current account (Coulibaly and Gnimassoun, 2023). Meanwhile, Gross Domestic Product (GDP) in US$ terms indicates the magnitude of a country's economic activity, which can affect international trade, both through increased production and domestic import demand (Wahyudi and Palupi, 2023). Therefore, the exchange rate, exports, imports, foreign exchange reserves, FDI, and GDP are presumed to have an influence on the current account balance of BRICSIV countries during the period 2000-2024.

Various studies indicate that the current account balance is influenced by a number of macroeconomic variables, such as economic growth, exchange rates, trade openness, foreign direct investment, and the level of domestic savings (Coulibaly and Gnimassoun, 2023). These factors can affect the

balance between a country's receipts and expenditures in international economic transactions. Nevertheless, most previous studies still focus on analyzing the current account balance in a single country or only in a specific group of countries with a limited sample size (Aguirre et al., 2025). In addition, several studies also use a relatively short observation period, so they have not been able to describe the long-term dynamics of the current account balance in developing countries with different economic characteristics (Çetrez et al., 2022).

This research is important because BRICSIV countries are developing nations with relatively high economic growth rates and a considerable contribution to international trade (Nurifqi et al., 2024). Through an analysis of the determinants of the current account balance in BRICSIV countries, this research is expected to provide an understanding of the factors that influence external sector conditions. In addition to enriching the international economics literature, the results of this research are also expected to serve as a consideration for policymakers in maintaining the stability of the current account balance and strengthening national economic resilience.

Based on the background described above, the research problem in this study is: whether the Official Exchange Rate, Total Exports, Total Imports, Foreign Exchange Reserves, Foreign Direct Investment (FDI), and Gross Domestic Product (GDP) have a significant effect on the Current Account Balance of BRICSIV countries during the period 2000-2024, both partially and simultaneously. Therefore, this research aims to analyze the determinants of the current account balance in BRICSIV countries using the *Fixed Effect Model* (FEM) method with panel data for the period 2000-2024, and to provide contributions to the development of international economics research and the formulation of macroeconomic policy in developing countries.

LITERATURE REVIEW

International Trade Theory

International trade is an activity of exchanging goods and services between one country and another, carried out to meet the economic needs of each country (Pasupuleti, 2024). International trade activities occur because of differences in natural resources, technology levels, labor, and production capacity among countries (2016). By engaging in international trade, a country can obtain goods or services that cannot be produced efficiently domestically (Williams and Behera, 2025).

One of the theories that explains the basis of international trade is the theory of comparative advantage proposed by David Ricardo. This theory explains that a country will gain from trade if it produces and exports goods that have a lower opportunity cost compared to other countries (Altayligil and Çetrez, 2020b). Thus, each country will tend to export goods in which it has a comparative advantage and import goods that cannot be produced efficiently (Rahman, 2023). Besides the theory of comparative advantage, modern international trade theory also explains that trade can be influenced by other factors such as economies of scale, product differentiation, and technological developments. Therefore, international trade is not only influenced by differences in production factors, but also by various more complex economic factors (Picard and Tampieri, 2021).

Balance of Payments

The balance of payments is a systematic record that records all economic transactions between residents of a country and residents of other countries within a certain period. The balance of payments is used to describe the financial position of a country in relation to other countries Velic (2024). According to the International Monetary Fund, the balance of payments consists of several main components, namely the current account balance, the capital account balance, and the financial account balance (Çelgin, 2023). The balance of payments plays an important role in indicating the external sector condition of a country. Through the

balance of payments, it can be determined whether a country experiences a surplus, that is, when receipts from abroad exceed expenditures, or a deficit if the opposite occurs. (Husein et al., 2023). In practice, the balance of payments is also frequently used by governments and international financial institutions to evaluate a country's economic policies. Imbalances in the balance of payments can serve as an indicator of problems in the external sector of the economy (Bénétrix et al., 2024).

Current Account Balance

The current account balance is one of the main components of the balance of payments that records all economic transactions related to trade in goods and services, primary income, and current transfers between a country and other countries. The current account balance can indicate a country's ability to generate income from international economic activities (Siladjaja et al., 2022). The current account balance consists of four main components, namely goods trade, services trade, primary income, and secondary transfers. Goods trade includes exports and imports of goods, while services trade covers service transactions such as transportation, tourism, and financial services (Arntzen and Fiva, 2024).

A surplus current account condition indicates that a country has receipts from international transactions greater than its expenditures. Conversely, a current account deficit indicates that a country has expenditures greater than its receipts. This condition can be influenced by various factors such as exchange rates, levels of exports and imports, economic growth, and global economic conditions (Metaxas, 2023).

Exchange Rate

The exchange rate is the price of one country's currency against the currency of another country, used in international trade transactions. The exchange rate plays an important role in an open economy because it can affect the competitiveness of domestic products in international markets (Stojkov et al., 2025). The exchange rate affects the current account balance through exports and imports. Currency appreciation tends to reduce exports and increase imports, while depreciation increases exports and suppresses imports, thereby improving the current account balance (Ogawa, 2025).

Beyond the price effect, the exchange rate also influences investment decisions and short-term capital flows, which indirectly affect the current account balance. Sharp exchange rate fluctuations can create uncertainty for exporters and importers, thereby influencing international trade strategies (Burda, 2022). Empirical research shows that countries with flexible exchange rate systems tend to experience faster adjustment of the current account balance to external changes, while countries with fixed exchange rates must use foreign exchange reserves or monetary policy to maintain current account stability. Therefore, the official exchange rate becomes an important variable in analyzing a country's external balance (Cao et al., 2026).

Total National Exports

Total national exports reflect the total value of goods and services sent abroad within a given period. The greater the volume and value of exports, the higher the foreign exchange inflows to that country, thereby improving the current account balance. This is because the current account balance records the difference between exports and imports of goods and services; when exports grow faster than imports, the current account balance tends to show a surplus (Kumar et al., 2023). Furthermore, total exports also reflect the competitiveness of domestic products in international markets and macroeconomic stability, as foreign exchange inflows can support national liquidity, investment, and overall economic growth (Ezzahid and Rafik, 2024).

Furthermore, empirical research using panel data methods shows that the relationship between total exports and the current account balance is generally positive in developing countries. This

means that countries with higher total exports tend to have a better current account balance. However, this effect can vary depending on economic structure and dependence on imports (Mosikari, 2024). For example, countries that export high value-added manufactured goods and services tend to experience more stable surplus increases compared to countries that primarily export raw commodities, as commodity prices are more vulnerable to global market fluctuations. Therefore, export diversification becomes an important factor in maintaining positive current account balance performance (Kušar, 2024).

Total National Imports

Total national imports represent the total value of goods and services purchased from abroad and have a close relationship with the current account balance because imports are recorded as foreign exchange expenditures in the current account component (Umar et al., 2023). Theoretically, the higher imports are relative to exports, the more the current account balance tends toward a deficit, whereas if exports are greater, a surplus will occur. In the study "Determinants of current account balance in BRICSIV countries: panel data analysis 2000-2024", total imports are an important indicator for examining the degree of a country's dependence on foreign products, industrial raw material needs, and domestic production strength (Behar and Hassan, 2022). Countries such as India and Indonesia frequently experience deficit pressures due to high imports of energy and capital goods, while China has been able to maintain a surplus because its export value is far greater than its imports. Therefore, total imports can be used to analyze how international trade activities affect the current account balance condition of each BRICSIV country during the research period (Siddharth and Alexiou, 2024).

Foreign Direct Investment (FDI)

Foreign direct investment or *Foreign Direct Investment* (FDI) is a form of cross-border capital investment that involves not only capital flows, but also the transfer of technology, management, and control over business activities in the destination country. From the perspective of John H. Dunning's theory through the OLI Paradigm (Ownership, Location, Internalization), FDI occurs when a company possesses an ownership advantage (*ownership advantage*), perceives a location advantage in the destination country (*location advantage*), and chooses to internalize its operations rather than exporting or licensing (*internalization advantage*). Thus, FDI is not merely understood as a capital flow, but as an expansion strategy of multinational companies to maximize efficiency and long-term profits (Dunning and Lundan, 1997).

In this research, FDI plays a role in influencing the current account balance through increased production, exports, and foreign exchange. However, FDI can also increase imports and profit repatriation that may potentially suppress the current account, thus becoming one of the factors that explains differences in current account positions among BRICSIV countries(Dunning and Lundan, 1997). The findings of Idialis and Anggraini (2025) show that economic and political risk are factors that influence Foreign Direct Investment (FDI) flows in ASEAN countries. These findings indicate that FDI is greatly influenced by the macroeconomic conditions of a country and can be one of the factors that determines the performance of the external sector through increased production capacity, exports, and international economic activities.

Foreign Exchange Reserves

Foreign exchange reserves are foreign assets held by a country's central bank or monetary authority in the form of foreign currencies, gold, or international securities, used to finance international transactions and maintain national economic stability (Yoga at al., 2025). Foreign exchange reserves play an important role in supporting the stability of the current account balance because they are used to finance import needs, repay foreign debt, and maintain the stability of the domestic exchange rate. The greater the foreign exchange reserves held by a

country, the stronger that country's ability to face external pressures and maintain the stability of the external sector of the economy (Vadivel, 2025).

Foreign exchange reserves are presumed to influence the current account balance because countries with high foreign exchange reserves tend to be more capable of maintaining the stability of international transactions and reducing the risk of external deficits (Bhatt et al., 2021). In addition, increases in foreign exchange reserves often stem from trade surpluses and increased foreign exchange inflows, so they can reflect a more stable current account condition. Therefore, foreign exchange reserves become one of the important indicators in analyzing the external sector condition of BRICSIV countries during the period 2000-2024 (Thuy et al., 2023).

GDP (Gross Domestic Product)

Gross Domestic Product (GDP) is the total value of goods and services produced by a country within a given period and is used as the main indicator of the level of economic activity and economic growth of a country.(Bhattacharya and Pienknagura, 2024). In international economics research, GDP is frequently used to describe the magnitude of a country's economic strength because the higher the GDP, the greater the country's production, consumption, investment, and international trade capacity (Wuri et al., 2024).

GDP in US$ terms is used as one of the independent variables presumed to influence the current account balance of BRICSIV countries. An increase in GDP can encourage an increase in production capacity and exports, thereby potentially improving the current account balance (Kremer et al., 2021). However, an increase in GDP can also increase import demand due to rising domestic consumption and industrial raw material needs. Therefore, GDP has a close relationship with current account conditions because it reflects the magnitude of a country's economic activity and international trade during the research period (Boer et al., 2024).

Initial Hypotheses

Table 1. Initial Hypotheses

Independent Variable	Hypothesis	Direction	Meaning
Official Exchange Rate (H_1)	The official exchange rate has a significant effect on CAB	+	Depreciation ↑ then CAB ↑
Total National Imports (H_2)	Total exports have a significant effect on CAB	+	Imports ↑ then CAB ↓
Total National Exports (H_3)	Total imports have a significant effect on CAB	−	Exports ↑ then CAB ↑
Foreign Direct Investment (FDI) (H_4)	FDI has a significant effect on CAB	−	FDI ↑ then CAB ↓
Foreign Exchange Reserves (H_5)	Foreign exchange reserves have a significant effect on CAB	+	FXR ↑ then CAB ↑
Gross Domestic Product (GDP) (H_6)	GDP has a significant effect on CAB	−	GDP ↑ then CAB ↓

Source: Various journals and international economic theories (processed by researchers, 2026)

The hypotheses formulated above will subsequently be empirically tested using panel data analysis methods with the *Fixed Effect Model* (FEM) approach in the next chapter. The results of this testing are expected to provide empirical evidence regarding the direction and significance of the effect of each independent variable on the current account balance of BRICSIV countries, so as to provide relevant policy implications for the countries in the group.

RESEARCH METHODOLOGY

Type and Research Approach

This study employs a quantitative approach using panel data methods to analyze the relationships between variables based on data from BRICSIV countries over the period 2000-2024. The panel data method was chosen because it combines cross-section and time series data, thereby providing more comprehensive information, controlling for inter-country heterogeneity, and producing more efficient estimates compared to the separate use of cross-section or time series data (Thombs, 2022).

Research Location and Time Period

This study was conducted on countries belonging to the BRICSIV group, namely Brazil, Russia, India, China, South Africa, Indonesia, and Vietnam. The selection of these countries was based on the consideration that BRICSIV countries are developing nations with large and dynamic economies that play an important role in the global economy. The data used in this study covers the period from 2000 to 2024.

Type and Source of Data

The type of data used in this study is secondary data in the form of quantitative panel data. Secondary data refers to data obtained from existing sources and collected by other parties. All variable data in this study were sourced from *World Bank Open Data* (data.worldbank.org) which is publicly accessible. The data used includes annual data from 2000 to 2024 for all BRICSIV countries.

Table 2. Research Variables, Units, and Data Sources

No.	Variable	Symbol	Unit	Data Source
1	Current Account Balance	CA (BN.CAB.XOKA.CD)	Million USD	*World Bank* – WDI
2	Official Exchange Rate	ER (PA.NUS.FCRF)	LCU per USD	*World Bank* – WDI
3	Total Exports	EXP (NE.EXP.GNFS.CD)	Million USD	*World Bank* – WDI
4	Total Imports	IMP (NE.IMP.GNFS.CD)	Million USD	*World Bank* – WDI
5	Foreign Direct Investment	FDI (BX.KLT.DINV.CD.WD)	Million USD	*World Bank* – WDI
6	Foreign Exchange Reserves	FER (FI.RES.TOTL.CD)	Million USD	*World Bank* – WDI
7	Gross Domestic Product	GDP (NY.GDP.MKTP.CD)	Million USD	*World Bank* – WDI

Source: Processed from World Bank (WDI)

Research Model

The equation model used in this study is a panel data regression model with *Fixed Effect Model* (FEM). The basic equation model can be written as follows:

$$CABit = \alpha + \beta1NTit + \beta2EKSit + \beta3IMPit + \beta4FDIit + \beta5CDit + \beta6GDPit + \varepsilon it$$

Description:
CABit = Current Account Balance of country i in year t
α = Constant
β1-β6 = Regression coefficients of each independent variable
NTit = Official Exchange Rate of country i in year t
EKSit = Total Exports of country i in year t
IMPit = Total Imports of country i in year t
FDIit = Foreign Direct Investment of country i in year t
CDit = Foreign Exchange Reserves of country i in year t
GDPit = Gross Domestic Product of country i in year t
εit = Error term

In the Fixed Effect model, each country has a different intercept but the slope coefficients are assumed to be the same for all countries. The FEM equation can be written as:

$$CABit = \alpha i + \beta1NTit + \beta2EKSit + \beta3IMPit + \beta4FDIit + \beta5CDit + \beta6GDPit + \varepsilon it$$

Where αi is the specific intercept for each country i that captures the fixed effects of each country's characteristics that do not change over time.

Data Analysis Technique

The data analysis technique used in this study is panel data regression using Stata software. There are three estimation approaches in panel data analysis, namely *Common Effect Model* (CEM), *Fixed Effect Model* (FEM), and *Random Effect Model* (REM). To determine the most appropriate model, a series of tests were conducted as follows:

1. Panel Data Model Estimation

Before determining the best model, the initial stage involved estimating all three models, namely:

a. *Common Effect Model* (CEM)

CEM is the simplest approach in panel data analysis. This model assumes that the intercept and slope are the same forall individuals and all time periods, so there are no differences between individuals or across time. Estimation is carried out using the *Ordinary Least Square* (OLS) method. In Stata, CEM is estimated using the command reg or xtreg, fe.

b. *Fixed Effect Model* (FEM)

FEM assumes that each individual (country) has a different intercept but the same slope coefficients. Differences in characteristics between individuals are captured through differences in intercepts. This model uses the *Least Square Dummy Variable* (LSDV) or *within estimation*. In Stata, FEM is estimated using the command xtreg y x1 x2 x3 x4 x5 x6, fe.

c. *Random Effect Model* (REM)

REM assumes that differences between individuals are accommodated through the error term, not through the intercept. REM assumes that individual effects are not correlated with the independent variables. Estimation is carried out using the *Generalized Least Square* (GLS) method. In Stata, REM is estimated using the command xtreg y x1 x2 x3 x4 x5 x6, re.

2. Best Model Selection

To determine the best model among CEM, FEM, and REM, two tests were conducted: the Chow Test and the Hausman Test.

a. Chow Test

The Chow Test is used to choose between *Common Effect Model* (CEM) *and Fixed Effect Model* (FEM). The hypotheses used are:

H0 : *Common Effect Model* (CEM) is better than FEM

H1 : *Fixed Effect Model* (FEM) is better than CEM

Decision criterion: if the value of Prob > F < 0.05, then H0 is rejected and the appropriate model *is the Fixed Effect Model* (FEM).

b. Hausman Test

The Hausman Test is used to choose between *Fixed Effect Model* (FEM) and *Random Effect Model* (REM). The hypotheses used are:

H0 : *Random Effect Model* (REM) is better than FEM

H1 : *Fixed Effect Model* (FEM) is better than REM

Decision criterion: if the value of Prob > chi2 < 0.05, then H0 is rejected and the appropriate model is the *Fixed Effect Model* (FEM).

3. Model Selection Results

Based on the tests that have been conducted, the following results were obtained:

Table 3. Model Selection Test Results

Test	Statistical Value	Prob	Decision
Chow Test	F-statistic	0,0000 < 0,05	FEM > CEM
Hausman Test	Chi2-statistic	0,0398 < 0,05	FEM > REM

Source: Stata Output (processed by researcher, 2025)

Based on the Chow Test, the value of Prob > F was 0.0000 < 0.05, so H0 is rejected and the more appropriate model is the *Fixed Effect Model* (FEM) compared to the *Common Effect Model* (CEM). Furthermore, based on the Hausman Test, the value of Prob > chi2 was 0.0398 < 0.05, so H0 is rejected and the best model used

in this study is the *Fixed Effect Model*

(FEM). Therefore, the model used in this study is the *Fixed Effect Model* (FEM).

4. Hypothesis Testing

After the best model is determined, hypothesis testing is then conducted to examine the effect of the independent variables on the dependent variable. This testing includes:

a. **Partial Significance Test (t-Test):** The t-Test is used to examine the partial effect of the independent variables on the dependent variable. If p-value < 0.05, then H0 is rejected and the independent variable has a significant effect.
b. **Simultaneous Significance Test (F-Test):** The F-Test is used to examine the simultaneous effect of all independent variables on the dependent variable. If the value of Prob > F < 0.05, then H0 is rejected and all independent variables have a significant effect simultaneously.
c. **Coefficient of Determination (R^2):** The coefficient of determination (R^2) is used to measure the ability of the independent variables to explain the variation in the dependent variable. The larger the value of R^2, the better the model's ability to explain the dependent variable. In the Fixed Effect model, the within R^2 value is used.

RESULTS AND DISCUSSION

Descriptive Statistic

Table 4. Descriptive Statistics Results

Variable	Mean	Std. Dev	Min	Max	N
ihs.Current Account Balance	.9667495	24.40335	-26.12136	27.51083	175
ln_Official Exchange Rate	4.613074	3.313534	.5145161	10.09266	175
ln_Total Country Imports	26.13481	1.105682	23.60934	28.8002	175
ln_Total Country Exports	26.20203	1.129746	23.54516	28.95359	175
ln_Foreign Exchange Reserves	25.71844	1.618654	21.95189	28.99201	175
ihs_Foreign Direct Investment	18.33531	13.47755	-23.98799	26.83548	175
ln_GDP	27.52858	1.333171	30.56188	30.56188	175

Source: Printout (Stata17)

The ihs_Current Account Balance variable has the widest value range (-26.12 to 27.51) with a mean close to zero (0.97), indicating that the current account balance conditions of the 12 sample countries are highly varied, with some showing large surpluses and others large deficits. The other variables that are already in natural logarithm form (ln_Official Exchange Rate, ln_Total Imports, ln_Total Exports, ln_Foreign Exchange Reserves, ln_GDP) show a relatively homogeneous distribution across countries, as indicated by the small standard deviation relative to their means.

Unit Root Test

Table 5. Stationarity Test Results

Variable	First Difference (p-value	Integration
ihs_Current Account Balance	0.000	I(1)
ln_Official Exchange Rate	0.000	I(1)
ln_Total Country Imports	0.001	I(1)
ln_Total Country Exports	0.002	I(1)
ln_Foreign Exchange Reserves	0.001	I(1)
ihs_Foreign Direct Investment	0.016	I(1)
in_GDP	0.000	I(1)

Source: Printout (Stata17)

All variables are non-stationary at level, but stationary at first difference, with all p-values below 0.05 (the highest value being 0.016 for ihs_Foreign Direct Investment). This means all variables are integrated at the same degree, namely I(1), so the requirement for conducting a cointegration test is fulfilled.

Kao Cointegration Test

Table 6. Kao Cointegration Test Results

Statistic	Value	p-value
Modified Dickey-Fuller t	-4.1419	0.000
Dickey-Fuller t	-2.3994	0.0082
Augmented Dickey-Fuller t	-0.2714	0.3930
Unadjusted Modified Dickey	-6.7603	0.000
Fuller t		
Unajusted Dickey-Fuller t	-3.2643	0.0005

Source: Printout (Stata17)

The Kao cointegration test results in Table 8 indicate the existence of a long-run equilibrium relationship among the variables in the panel model. Four out of five test statistics yield p-values below $\alpha = 0.05$, namely the Modified Dickey-Fuller t, Dickey-Fuller t, Unadjusted Modified Dickey-Fuller t, dan Unadjusted Dickey-Fuller t, so the null hypothesis stating no cointegration is rejected. Although the Augmented Dickey-Fuller t statistic fails to reject H_0 with a p-value of 0.3930, the majority of results still provide sufficiently strong evidence that all variables move toward equilibrium in the long run, so further estimation using Panel DOLS or FMOLS can be methodologically justified.

FEM Panel Data Regression Results

Table 7. Panel Data Regression Results

ihs_Current Account Balance	Coefficient	Std. Error	t-Statistic	Prob.	[95% Confidence Interval]
ln_Official Exchange Rate	-2.884722	4.045225	-0.71	0.477	-10.87481 to 5.105364
ln_Total Country Imports	-130.4233	13.88002	-9.40	0.000	-159.8389 to -103.0076
ln_Total Country Exports	113.7811	11.8303	9.62	0.000	90.41405 to 137.1482
ln_Foreign Exchange Reserves	.4409111	3.984982	0.11	0.912	-7.430181 to 8.312004
ihs_Foreign Direct Investment	-.0150361	.087164	-0.17	0.863	-.1872015 to .1571294
ln_GDP	13.9539	6.786648	2.06	0.041	.548985 to 72.35881
_Constant	46.36978	4.03e+09	0.97	0.333	-48.01106 to 140.7506

R-square	0.4198
F-statistic	18.94
Prob (F-statistic)	0.0000

Source: Printout (Stata17)

The FEM model is overall significant (F = 18.94; Prob = 0.0000) with a within R-square of 0.4198, meaning that 41.98% of the variation in the current account balance is explained by the independent variables in the model, with the remainder explained by other factors outside the model. Partially, only three variables have a significant effect: ln_Total Country Imports has a significant negative effect, ln_Total Country Exports has a significant positive effect, and ln_GDP has a significant positive effect. The variables ln_Official Exchange Rate, ln_Foreign Exchange Reserves, and ihs_Foreign Direct Investment do not have a significant effect (p > 0.05).

CEM, FEM, and REM Test Results

Table 8. Model Selection Test Results

Variable	CEM	FEM	REM
ln_Official Exchange Rate	0,778 (0,530)	-2,885 (4,045)	1,738 (1,576)
ln_Total Country Imports	-93,170*** (7,932)	-130,423*** (13,880)	-122,761*** (12,663)
ln_Total Country Exports	102,655*** (8,278)	113,781*** (11,830)	111,045*** (11,093)
ln_Foreign Exchange Reserves	2,825 (3,860)	0,441 (3,985)	-0,274 (3,715)
ihs_Foreign Direct Investment	0,025 (0,100)	-0,015 (0,087)	-0,010 (0,086)
ln_gdp	-8,176* (4,275)	13,954** (6,787)	9,482 (6,301)
Constant	-105,445** (47,926)	46,370 (47,783)	38,263 (46,746)
R-squared	0,5651	0,4198 (within)	0,4298 (overall)
F-stat / Wald chi2	F = 36,39	F = 18,94	Wald chi2 = 115,52
Prob > F / chi2	0,0000	0,0000	0,0000
N (observations)	175	175	175
Number of individuals (countries)	-	12	12

Source: Printout (Stata17)

All three models consistently show that ln_Total Country Imports has a significant negative effect and ln_Total Country Exports has a significant positive effect at α = 1%, indicating that both variables are robust across all model specifications. ln_GDP is significant in CEM (negative) and FEM (positive) but not significant in REM-this directional difference Based on the previous Chow Test results (F = 8.03; Prob = 0.0000), the model selected as the final model adalah FEM.

Partial t-Test Results

Table 9. T-Test Results

Variable	Coefficient	Prob.	Conclusion
ln_Official Exchange Rate	-2.884722	0.477	not significant
ln_Total Country Imports	-130.4233	0.000	significant
ln_Total Country Exports	113.7811	0.000	significant
ln_Foreign Exchange Reserves	.4409111	0.912	not significant
ihs_Foreign Direct Investment	-.0150361	0.863	not significant
ln_GDP	13.9539	0.041	significant

Source: Printout (Stata17)

Of the six independent variables, only three are proven to have a significant effect on the current account balance, namely total country imports (negative), total country exports (positive), and GDP (positive). The other three variables-official exchange rate, foreign exchange reserves, and foreign direct investment-do not have a significant partial effect.

Simultaneous F-Test Results

Table 10. F-Test Results

Model	Test Statistic	df	Value	Prob	Conclusion
CEM	F	(6, 168)	36,39	0,0000	Significant
FEM	F	(6, 157)	18,94	0,0000	Significant
REM	Wald Chi2	(6)	115,52	0,0000	Significant

Source: Printout (Stata17)

All three models-CEM (F = 36.39), FEM (F = 18.94), and REM (Wald chi2 = 115.52)-are all significant (Prob = 0.0000), so all independent variables simultaneously affect the current account balance, and the model is suitable for use (goodness of fit is satisfied) across all three approaches.

Discussion

Effect of Official Exchange Rate on Current Account Balance

The exchange rate does not have a significant effect on the current account balance of BRICSIV countries. Theoretically, exchange rate depreciation should be able to improve the current account balance through increased export competitiveness as explained by the Marshall-Lerner condition, however this effect in practice is often only visible in the long run through the J-curve phenomenon, and therefore is not significantly detected in short-run estimates. Furthermore, this insignificance may also be attributed to the different exchange rate regimes among the sample countries, so that the sensitivity of the current account balance to exchange rate movements is not uniform and is difficult to capture by the aggregate model. This result is consistent with the findings of Anwar et al (2022) who also found that the exchange rate has a negative but inconsistently significant effect on the current account balance in ASEAN-5 countries.

Effect of Total Country Imports on Current Account Balance

Imports have a negative and significant effect on the current account balance of BRICSIV countries. This finding is consistent with the balance of payments theory, where an increase in imports means a greater outflow of foreign exchange from a country to pay for goods and services from abroad, thereby directly pressuring and worsening the current account balance position. The magnitude of this variable's coefficient also indicates that imports are the most dominant determinant among the other variables in the model, reflecting how sensitive the current account balance is to import demand dynamics in developing countries. This result is consistent with the findings of Ali and Audi (2023) who affirm that import demand is one of the main factors affecting the current account deficit in developing countries.

Effect of Total Country Exports on Current Account Balance

Exports have a positive and significant effect on the current account balance of BRICSIV countries. This result is consistent with the balance of payments theory, where exports are the main source of foreign exchange earnings for a country, so the higher the value of exports, the greater the inflow of foreign exchange and the stronger the current account balance position. Together with the import variable, this finding confirms that the trade balance of goods and services or *net export* becomes the main driver of movements in the current account balance in the sample countries, reflecting how central international trade performance is in determining the external balance of a developing country. This result is consistent with Adamu and Audu (2018)

who found that increased exports contribute positively to the *current account balance* because they directly increase the country's foreign exchange earnings.

Effect of Foreign Exchange Reserves on Current Account Balance

Foreign exchange reserves do not have a significant effect on the current account balance of BRICSIV countries. This can be explained by the fact that foreign exchange reserves are essentially an accumulation of results from past current and capital account transactions, which is a stock in nature, not a factor that directly drives changes in the current account balance in the current period which is a *flow*. In other words, the causal relationship between these two variables tends to run from the current account balance to foreign exchange reserves, not the other way around, so it is natural that its effect is not significantly detected in this model. This result is consistent with Altayligil and Çetrez, (2020a) who affirm that the current account balance is not only determined by trade factors alone, but is also influenced by broader and more complex international financial factors.

Effect of Foreign Direct Investment (*Foreign Direct Investment*/FDI) on Current Account Balance

Foreign Direct Investment (FDI) does not have a significant effect on the current account balance of BRICSIV countries. Theoretically, FDI indeed has an ambiguous effect on the current account balance, where on one hand FDI can worsen the current account balance in the short run because it is accompanied by an increase in imports of capital goods, but on the other hand it can improve it in the long run through increased production capacity and exports. This bidirectional nature is most likely what causes its net effect to not be significantly detected in this observation period, because the positive and negative effects of FDI cancel each other out in the aggregate model. This finding is consistent with Hayal (2020) who shows that foreign investor *profit outflows* have the potential to worsen the current account balance in the long run, so the net impact of FDI on a country's external balance is highly dependent on the structure and characteristics of the incoming investment.

Effect of *Gross Domestic Product* (GDP) on Current Account Balance

GDP has a positive and significant effect on the current account balance of BRICSIV countries. This finding is interesting because it differs from the classical absorption theory perspective which generally predicts a negative relationship, where economic growth drives increased consumption and imports, thereby worsening the current account balance. This positive result is actually more consistent with the characteristics of countries whose economic growth is supported by the export sector or *export-led growth*, where an increase in GDP is also accompanied by increased production capacity and export performance, ultimately strengthening the current account balance position. This indicates that BRICSIV countries in general more closely reflect an export-oriented growth pattern rather than growth driven by domestic consumption. This finding is consistent with Miguel, Siok (2021) who affirms that the relationship between GDP and the current account balance is highly dependent on the economic structure of each country, whether growth is more supported by exports or by domestic demand that leads to increased imports.

Conclusion

This study shows that of the six variables tested, three variables have a significant effect on the current account balance of BRICSIV countries for the period 2000-2024, namely total imports, total exports, and GDP. Total imports have a negative and significant effect, while total exports and GDP have a positive and significant effect on the current account balance. These findings indicate that increased exports and economic growth are able to strengthen the current account position, while increased imports tend to suppress its balance. On the other hand, the official exchange rate, foreign exchange reserves, and FDI do not show a significant partial effect. The results of this study support the balance of payments theory and the concept of export-led

growth, while also showing that economic growth in BRICSIV countries is more driven by the export sector. Therefore, governments are advised to increase export competitiveness, develop high-value-added products, and selectively implement import substitution policies to maintain external sector stability. The limitation of this study lies in the fact that institutional and geopolitical factors have not yet been included, so future research is advised to add variables such as institutional quality, financial openness, and global commodity prices, as well as to use Panel DOLS or FMOLS methods to obtain more accurate long-run relationship estimates.

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