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Article

Foreign direct investment and economic growth in developing countries: The role of international trade and foreign debt

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Abstract: The existing literature is sparse on the role of international finance in modeling the FDI-growth nexus. This study integrates the role of international trade and external debt in the FDI-economic growth nexus for Brazil, Nigeria, and Vietnam. We apply the Autoregressive Distributed Lag (ARDL) model to annual data covering the period 1990-2021. The results show that FDI and trade have positive but insignificant effects on economic growth in all three countries. In addition, our results show that external debt hampers long-term economic growth in these countries. Based on the results, we propose country-specific recommendations that take into account specific economic and financial conditions, global market dynamics, and the long-term development goals of developing countries.

Keywords: foreign direct investment, trade openness, external debt, economic growth, developing countries, external finance, autoregressive distributed lag (ARDL) model

1. Introduction

Over the past three decades, there has been a significant expansion in the globalization of capital, particularly foreign direct investment (FDI). According to Adams (2009) and Alvarado et al. (2017), FDI has grown to be a reliable and significant source of capital flows in emerging nations. As a result, FDI has become an important substitute in the process of financing development. FDI is regarded as a crucial component of global financial integration and economic progress. According to Usman et al. (2022), Osei and Kim (2020), and Alfaro (2017), FDI inflows are thought to contribute new technologies, skills, and horizontal and vertical knowledge spillovers through backward or forward linkages with local enterprises, in addition to much-needed additional foreign earnings. In simple terms, FDI has been described as a type of investment in which a foreign firm invests in a domestic firm of another country given the availability of resources including finance and technology (Osei and Kim (2020). Due to the lack of a strong financial support system for economic progress, developing countries need foreign direct investment (FDI) for economic expansion. The financial sector plays a crucial role in the relationship between FDI and economic growth. By facilitating investment, innovation, infrastructure development, and the growth of local firms, a sound financial system with access to a variety of financing options and risk mitigation strategies can enhance the benefits of FDI for economic growth (Ozili and Iorember, 2023, Usman et al., 2023).

Research has shown that foreign direct investment (FDI) inflows can have a positive impact on a receiving country through the transfer of technology and management expertise from wealthy nations (Osano and Koine, 2016). The external debt component can be incorporated into a country's economic model by integrating the role of the government in economic development. The relative importance of external public debt and foreign direct investment in development has long been a focus of the development

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literature (Agyapong and Bedjabeng, 2020). Moreover, by reducing the impact of FDI, a favorable climate for international trade can also reduce the negative impact of external public debt and FDI on economic growth. According to Osei and Kim (2020), economic policies aimed at attracting FDI are also relevant in promoting international trade and integrating the global economy into the country. The relationship between FDI and economic growth may vary across countries due to differences in economic structures, policies, and external factors. However, we focus on three developing countries, Brazil, Nigeria, and Vietnam, because of their importance in FDI flows and their unique development status.

The Brazilian economy has recently shown more promising signs than other developing countries. For example, data from the World Bank's Development Indicator show that Brazil's per capita income has not fallen below $8,200 since 1990 (World Bank, 2022). This contrasts with Nigeria and Vietnam, which have not risen to $2,700 and $3,300 respectively since 1990. While the three countries have tried to promote liberal economic systems, the Brazilian economy has not shown as much dependence on external finance. Surprisingly, Vietnam has shown a greater willingness to open up its economy. This is evidenced by the relative performance of FDI and trade openness. Average trade openness was more than five and three times higher than in Brazil and Nigeria, respectively. Again, average FDI flows to Vietnam since 1990 have been more than two and three times higher than those of Nigeria and Brazil, respectively (World Bank, 2022). This could mean that dependence on external finance may not be the best option for developing countries.

Nigeria's economic problems may be facilitated by international trade, as the country experiences simultaneous fluctuations in trade and foreign direct investment inflows (Okere et al., 2022). In addition, rising public debt may limit the government's ability to influence the economy (Agyapong and Bedjabeng, 2020). Brazil is routinely dependent on foreign savings, despite being large enough to design a growth strategy based largely on its resources (Gomes, 2020). Exogenous shocks have led to additional declines in economic performance. Given the many economic restructuring initiatives undertaken by the Vietnamese government over the past 20 years, it is also expected that international trade and FDI will promote economic expansion and reduce poverty in the context of sustainable development. This suggests that of the three countries considered in this study, only Vietnam appears to have been in a position to benefit from FDI and trade. Based on this idea, Vietnam could teach Nigeria and Brazil how to design an outward-oriented growth plan.

Considering the aforementioned, the current study analyzes the relative contributions of trade openness, foreign debt, and foreign direct investment to economic growth in the emerging nations of Brazil, Vietnam, and Nigeria between 1990 and 2021. Even though the effects of external factors on economic growth have been the subject of numerous studies, modeling these factors' influences on economic growth will reveal more information about the various country-specific differences that affect each factor, including policy settings and external and domestic factors. The study finds that foreign direct investment and trade positively influence economic growth in Brazil, Nigeria, and Vietnam in the long run, although the effect of foreign direct investment is insignificant in all three countries. Furthermore, the findings show that these countries' long-term economic progress is hampered by their external debt. This study has significant consequences that can be drawn from it. The relationship between trade openness, external debt, and foreign direct investment provides rising countries with suggestions on how to boost their economic growth. The findings indicate that certain financial domains that developing countries should prioritize are indicated by trade openness, external debt, and foreign direct investment. To influence economic growth, developing countries should take trade openness, external debt, and foreign direct investment (FDI) into account. This study and the human capital examples of Brazil and Vietnam show how

enhancing local savings, human capital, and productive capital stock can reduce reliance on foreign finance.

The study makes important contributions to the literature in several ways. First, the study contributes to the literature by integrating the role of trade openness in the FDI-growth nexus. Despite concerns about the huge inflows of FDI to developing countries over the years, which also open the doors to international trade, little has been done in the literature to consider the role of trade in modeling the FDI-growth nexus, especially in developing countries. The existing literature mainly focuses on the relationship between FDI and economic growth (Osei et al., 2020; Dinh et al., 2019; Alvarado et al., 2017; Agbloyor et al., 2016; Anwar and Nguyen, 2010). Second, this study includes external debt, which is typical of the economies of developing countries. For most developing countries, such as those selected for this study, the external debt rating is often so poor that it necessitates calls for debt forgiveness. Using data on developing countries from 1984 to 2010, Tanna et al. (2018) show that beyond a certain threshold, high debt levels prevent economies from reaping the growth benefits of FDI as they seek to reduce their debt. Our study extends these limits by using data on selected developing countries up to 2021, the most recent available. Accounting for the effects of trade and external debt in the FDI-growth nexus is a new angle in the FDI-growth literature that has not been explored in previous research.

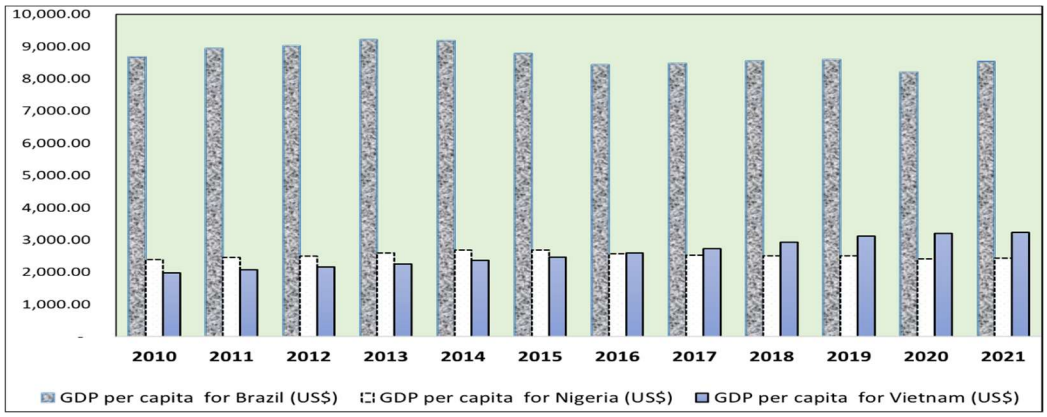
The remaining sections of the study are as follows. Section 2 reviews the existing literature on FDI, trade openness, and external debt as determinants of economic growth. Section 3 explains the data and methods used in the study. Section 4 focuses on the results and discussions and section 5 presents the conclusions and policy implications.

2. Literature review

2.1. External growth determinants in Brazil, Nigeria and Vietnam

FDI growth, trade growth, and debt growth dominate the literature, especially for developing countries. Nigeria can learn a lot about economic resource management from Brazil and Vietnam. The Brazilian economy has been a prominent feature of the international economic landscape since the 1990s. With improvements in per capita income, Brazil has shown increasing success in tackling entrenched poverty. Brazil's per capita income has been above $8,000 since 2010 and reached $9,216.14 in 2013. Nigeria and Vietnam average $2,519.34 and $2,586.94 respectively. With almost 80% of its economy dependent on oil, Nigeria is vulnerable to external shocks. After the recessions of 2014-2016 and COVID-19, the country took some time to recover.

Figure 1. Per capita income of Brazil, Nigeria, and Vietnam

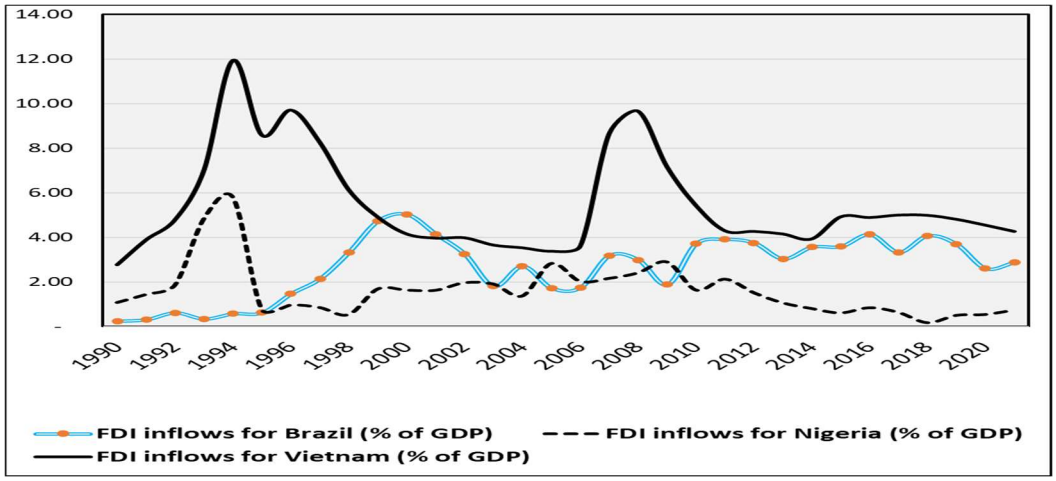


Source: World Bank Development Indicator, www.data.worldbank.org.

Although Vietnam's per capita income is less impressive than Brazil's, its economic policies and directions are more explicit and focused. Since the mid-1980s, Vietnam has

moved from a highly centralized command economy to a mixed economy. This economy is based on an open market economy, using directive and indicative planning. During this period, the economy grew rapidly. From 2000 to 2021, per capita income grew by 5.19%. In the 21st century, Vietnam is integrating into the global economy. Small and medium-sized enterprises (SMEs) make up the majority of Vietnamese businesses. As the leading agricultural exporter in Southeast Asia, Vietnam is a popular investment destination.

Figure 2. FDI net inflows for Brazil, Nigeria, and Vietnam



Source: World Bank Development Indicator, www.data.worldbank.org

Vietnam's innovative, market-oriented economic restructuring has informed international financial integration, which has improved the investment environment and attracted investment. Net FDI inflows have increased steadily and remained high from 1990 to 1994, exceeding 2.78% and 11.94% respectively, with a further sub-peak of 9.66% in 2008 (Figure 2).

Nigeria is the third largest recipient of FDI in Africa, after Egypt and Ethiopia. The country is one of the continent's most promising growth poles in the hydrocarbon, energy, construction, etc. sectors. In UNCTAD's World Investment Report 2022, Nigeria's ratio of FDI flows to GDP was 0.75% in 2021, up from 0.55% in the previous year, all above pre-pandemic levels. Nigeria's main sectors attracting FDI include oil and gas, telecommunications, manufacturing, real estate and agriculture.

Despite Brazil's market-oriented policies, net FDI inflows are marginal. From 1990 to 2000, FDI inflows averaged 1.77% of GDP. Net inflows averaged 2.72% between 2001 and 2010 and 3.51% between 2011 and 2021. The Brazilian economy does not attract FDI. As a result, foreign investment repatriates profits and dividends, which immediately reduces income balances. In 2008, the global crisis accelerated the repatriation of interest, profits, and dividends. Brazil's external accounts become vulnerable to profit remittances.

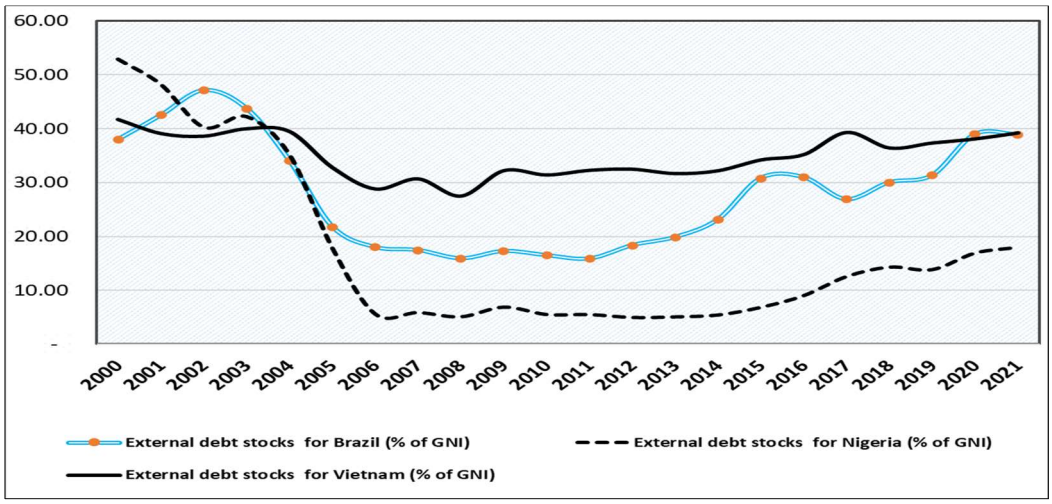
As unattractive as savings are for FDI, developing countries continue to use external debt. Opening up the economy was the most important component of Brazil's reforms, but it also plunged the economy into a debt crisis. Between 2002 and 2011, Brazil's external debt fell to 15.887%, before rising to 39.39% in 2021. The country's current economic policies have come under fire for this astronomical debt growth.

Vietnam's external borrowing has been managed effectively and the country is no longer considered a debtor by international organizations. Foreign capital sources have also contributed to Vietnam's socio-economic development through financial credit relations with international organizations. The external debt ratio recovered from 384.01% in 1990 to 41.79% in 2000. The average debt ratio between 2000 and 2021 was 35.10%.

Nigeria's main problem is debt and debt servicing, which consume a large part of government revenue. The Obasanjo administration achieved debt cancellation or reduction by reducing or canceling Nigeria's debt. In 2015, the external debt stock

increased marginally from 5.60% to 6.84% (Figure 3). In 2016, the external debt stock was 6.84% and in 2017 it was 9.02%. Between 2017 and 2021, the external debt stock will increase from 12.57% to 17.98%.

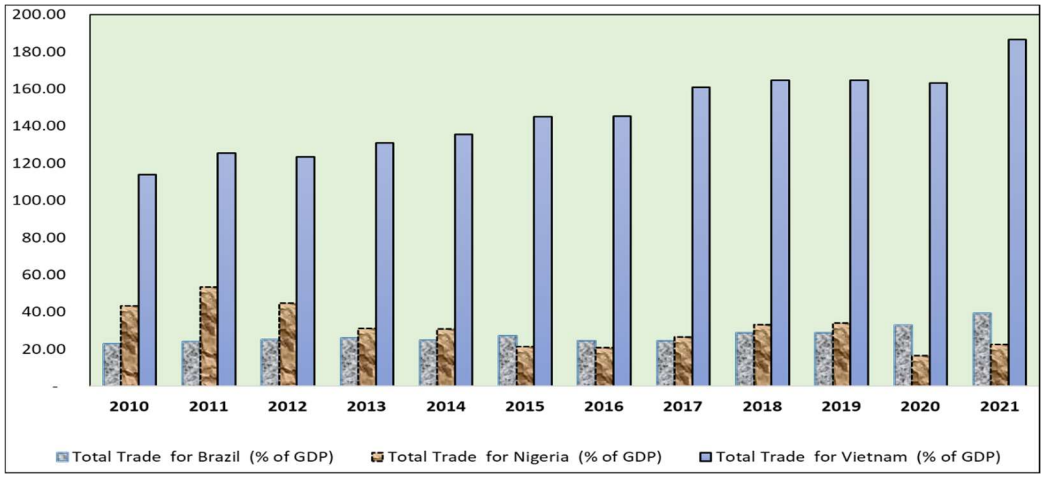
Figure 3. External debt stock for Brazil, Nigeria and Vietnam



Source: World Bank Development Indicator, www.data.worldbank.org.

Given Nigeria's inability to harness the benefits of external debt, trade policy appears to be the next option to boost economic growth. Although trade has played an important role in Nigeria's development, a strategic trade policy has been less appreciated. The country is almost entirely dependent on a single export commodity, oil. Figure 4 shows that trade will average 31.45% of GDP from 2010 to 2021 and 16.35% in 2020.

Figure 4. Total trade flows for Brazil, Nigeria, and Vietnam



Source: World Bank Development Indicator, www.data.worldbank.org.

In recent years, Vietnam has experienced impressive trade growth and development and has improved its economic governance by signing free trade agreements. From 2010 to 2021, Vietnam outperformed Nigeria and Brazil in terms of trade. Over the same period, trade increased by 146.57% from 113.98% to 186.47%. The ITC estimates Vietnam's untapped export potential at $138.4 billion. The largest gaps are in electronics ($46.3 bn), garments ($17.0 bn), and footwear ($11.3 bn). The signing of a bilateral trade agreement (BTA) between the United States and Vietnam was significant. The BTA granted Vietnamese goods "normal trade relations" (NTR) status in the US, which should help Vietnam transform into an export-oriented manufacturer. It would also attract foreign investment from Europe, Asia, and other regions, not just the US.

Brazil's economy was very closed until 1990. The 1980s saw a debt crisis and the pursuit of trade surpluses. Non-durable consumer goods, durable consumer goods, intermediate goods, and capital goods are the four main sub-sectors of import substitution industrialization. Brazil's trade improved slightly from 22.77% in 2010 to 25.79% in 2013, and then from 24.32% in 2017 to 39.18% in 2021. Overall, these indicators average 27.33% from 2010 to 2021. Brazil's regulatory environment can make it difficult to do business. Trade is often hampered by duplicative, arbitrary, or discriminatory regulations in Brazil.

2.2. Theoretical literature

The study is based on the exogenous growth theory, also known as the Solow-Swan growth model, developed by Solow (1956). According to this model, economic growth results from the accumulation of exogenous factors of production such as labour and capital stocks. The aggregate production function developed by Cobb and Douglas (1928) is typically used in empirical studies of economic growth using the exogenous model. The theory posits that foreign direct investment (FDI) increases the capital stock in the host country, which would affect economic growth. According to De Jager (2004), FDI introduces new technology, which increases the productivity of labor and capital, leading to more reliable returns on investment. Herzer et al. (2008) found that FDI supports economic growth by increasing domestic investment. Barro and Sala-i-Martin (1995) previously showed that there is a positive relationship between capital accumulation and output. The neoclassical growth model shows how FDI promotes economic growth by increasing the volume and/or efficiency of investment in the host country. The theory also suggests that the accumulation of capital stock through trade, new inputs acquired through external debt financing, and foreign technology in the host country's production function can generate economic growth.

Moreover, FDI and trade play a key role in the diffusion of technology and knowledge (Barro & Sala-i-Martin, 1997). By financing capital formation, FDI directly and indirectly increases the capital stock. In contrast, FDI can be detrimental to the host country. It may displace less productive domestic firms, make the market less competitive, or relocate some of the acquired firms abroad. The importance of knowledge spillovers makes it crucial to capitalize on them. FDI inflows and trade openness are the country's supporting capacity. Capital formation, fiscal policy, macroeconomic stability, and financial development are absorptive capacities. The idea that external debt has a significant impact on economic growth is highlighted in Ayenew (20-22), FDI and trade benefit from optimal growth when the external debt stock is sufficient to support them. However, FDI can lead to the displacement of domestic firms and resources, and high levels of external debt can lead to debt distress and lower investor confidence. Moreover, high levels of FDI can increase a country's demand for goods and services, which can ultimately lead to higher imports and worsen the country's trade balance.

2.3. Empirical literature

The literature on the determination of economic growth varies in the type of variables used. The relationship between trade openness, external debt FDI, and economic growth has received a lot of scholarly attention because of concerns about the ability of developing countries to accelerate growth. However, the combined effects of trade openness, external debt, and FDI on economic growth remain to be investigated, especially in developing countries. The direction of empirical studies has been threefold. The first is the literature that mainly focuses on FDI and economic growth (Osei and Kim, 2020; Dinh et al., 2019; Alvarado et al., 2017; Agbloyor et al., 2016; Anwar and Nguyen, 2010). This strand of literature essentially highlights the impact of FDI on economic growth, without necessarily emphasizing the role of the other influencing factors. The results of the studies are mixed. For example, while the study by Alvarado et al. (2020) shows that FDI is insufficient to boost economic growth in Latin America, Osei and Kim (2020) and Agbloyor et al. (2016) find significant evidence that FDI generally promotes growth.

Similarly, Iamsiraroj and Ulubaşoğlu (2015), using a global sample of 140 countries over the period 1970 to 2009, document that foreign direct investment has a positive impact on economic growth. Moreover, the study finds that the positive association is as strong globally as it is in developing countries.

The second strand of literature is the combined influence of foreign direct investment and trade on economic growth. On this basis, Osano and Koine (2016) argued that the combined influences of FDI and trade openness on economic growth were substitutes. From a Granger causality framework, Kumari et al. (2021) showed that FDI and economic growth were bidirectional, while trade openness was not. This strand of literature showed that economic growth did not simultaneously benefit from the interactive influences of trade openness and FDI.

On the complementary side, some studies have extended this combination to dampen economic growth. For example, Okere et al. (2022) showed that the negative interaction of total trade and FDI dampens growth, while Osei and Kim (2020) argued that the exchange rate is the reason for the negative effects of trade and FDI. Some other groups of studies found the complementary effects of trade openness and FDI in a positive direction (Radmehr et al., 2022; Saibu et al., 2022; Saleem et al., 2020). Their main position is that FDI and trade openness contribute to economic growth. While Radmehr et al. (2022) argue that it is financial development, government spending, and labor that support the positive associations in low-income countries, Saibu et al. (2022) argue that the positive effect is due to foreign aid. In an exclusive study, Omoke et al. (2021) found that while export trade has a positive impact on economic growth, import trade has a negative impact.

The third stream of literature has focused on the combined influence of FDI and external debt on the economy. The consideration of the external debt factor is not only because it is an important source of external financing for the largest economic unit (the government) in most developing countries, but also because it helps to include the government financing effect in the growth model. Analyzing this, Chaudhry et al. (2017) found that FDI and external debt had a positive effect on economic growth, although the effect of FDI was more pronounced than that of external debt in developing countries. The complementary significant positive effect was also supported by Raza and Jawaid (2014), and Tanna et al. (2018) who found that FDI-induced growth was dependent on external debt. These studies justified the government's push for external financing. In the opposite direction, Triatmanto et al. (2023) found that FDI inflows and external debt have no long-run effect on economic growth. However, Ayenew (2022) found the opposite, suggesting substitution effects.

In all the empirical studies reviewed, it is found that FDI in combination with other macroeconomic factors has produced different results. According to Raza (2015a), the endogenous growth theory supports the spillover effects of endogenous factors from positive FDI on economic growth. Despite the primary interest of this study (FDI, external debt, trade openness, and economic growth), FDI may also be relevant to the economy with other factors. For example, Alam et al. (2016) found that FDI and trade openness together increase life expectancy, and Raza et al. (2015b) found that FDI, economic growth, and workers' remittances have a positive relationship with stock market capitalization. According to Hintošová (2019), FDI is not a significant negative determinant of GDP per capita in Slovakia. For Jawaid et al. (2016), FDI and real exports were found to be complementary in Pakistan.

Furthermore, Olorogun et al. (2020) used the ARDL technique for Nigerian data series for the period 1970 to 2018. The study found that FDI combined with financial development promoted sustainable growth in the Nigerian economy. Using the ARDL approach for South African data series from 1970 to 2018, Udi et al. (2020) were able to argue that industrialization and total natural resource rents were useful enough for FDI to drive economic expansion despite the negative impact of coal consumption. Udi et al. (2022) used the ARDL technique for South Africa from 1970 to 2017 and found that South

Africa's economic growth validated FDI inflows and urbanization helped attract FDI rather than industrialization. Using the panel generalized method of moments (GMM) technique from 2000 to 2015, Xu et al. (2021) found that FDI and per capita income complement each other to exert a significant negative influence on income inequality, while trade openness together with political stability, education, rule of law and corruption increase inequality.

3. Data and methods

This study is comparative and is based on annual data from 1990 to 2021. For this study, data on foreign direct investment (FDI), external debt, trade openness, and per capita income are obtained for Nigeria, Brazil, and Vietnam. FDI is measured as direct investment equity inflows in current US dollars. External debt is measured as total external debt in constant US dollars. Trade openness is measured as imports and exports as a percentage of GDP per capita in constant US dollars. Income per capita is proxied by GDP per capita in constant US dollars. Data are from WDI (2021) and cover the period 1990 to 2021 for Nigeria, Brazil, and Vietnam. The study adopts the Autoregressive Distributed Lag (ARDL) approach, which has previously been used to examine the combined relationship between FDI and either external debt (Agyapong and Bedjabeng, 2020; Triatmanto et al., 2020) or trade openness (Okere et al., 2022) in developing countries. In addition, the study uses endogenous growth models and previous studies to determine the control variables and examine the relationship between economic growth and the variables. According to Raza (2015a), it is possible to use the ARDL technique for estimation even though the explanatory factor is endogenous. According to previous studies such as Okere et al. (2022), Kumari et al. (2021), economic growth (YG) is determined by foreign direct investment (FDI) and trade openness (TRDP), among others, which represent the other supporting and absorptive capacities in the economy such as human capital development (HCD), capital stock (KSC) (Radmehr et al., 2022) and financial development (CPS) (Radmehr et al., 2022). The dependent, independent, and control variables are all taken from the WDI and are measured in constant US dollars.

By applying the ARDL technique of Pesaran et al. (2001) to the above theoretical specification, we follow previous studies that have used this approach due to its robustness, reliability, and statistical properties (see Nwani et al., 2023, Nargiza et al., 2023; Muoneke et al., 2022; Iorember et al., 2022; Raza, 2015a). According to Goshit et al. (2022), the ARDL technique allows the estimation of both long-run and short-run dynamic relationships between FDI, trade openness, external debt, and economic growth. The ARDL method has several advantages that justify its use in this study. First, the model is suitable for data series with a mixed order of integration, such as I(0) alone, I(0) and I(1), or I(1). Second, the technique is appropriate for models with unequal lag lengths of variables. Third, the technique is appropriate for models with small sample data. Finally, the model is dynamic, capturing both short-run and long-run effects. However, it is not applied to models with the I(2) series. The stochastic form of the study model is given as;

$$\boldsymbol{YG_t = \sigma_0 + \sigma_1 YG_{t-1} + \sigma_2 FDI_{t-1} + \sigma_3 TRDP_{t-1} + \sigma_4 EXD_{t-1} + \sigma_5 HCD_{t-1} + \sigma_6 KSC_{t-1} + \sigma_7 GSV_{t-1} + \sigma_8 CPS_{t-1} + \mu_t.} \quad (1)$$

Cointegration is used to model the linear specifications in Equation (1) as follows:

$$\boldsymbol{\Delta YG_t = \beta_0 + \beta_1 \sum_{k=1}^{p} \Delta YG_{t-k} + \beta_2 \sum_{k=1}^{p} \Delta FDI_{t-k} + \beta_3 \sum_{k=1}^{p} \Delta TRDP_{t-k} + \beta_4 \sum_{k=1}^{p} \Delta EXD_{t-k} + \beta_5 \sum_{k=1}^{p} \Delta HCD_{t-k} + \beta_6 \sum_{k=1}^{p} \Delta KSC_{t-k} + \beta_7 \sum_{k=1}^{p} \Delta GSV_{t-k} + \beta_8 \sum_{k=1}^{p} \Delta CPS_{t-k} + \alpha_1 YG_{t-1} + \alpha_2 FDI_{t-1} + \alpha_3 TRDP_{t-1} + \alpha_4 EXD_{t-1} + \alpha_5 HCD_{t-1} + \alpha_6 KSC_{t-1} + \alpha_7 GSV_{t-1} + \alpha_8 CPS_{t-1} + \mu_t,} \quad (2)$$

where β_1, β_2, β_3, β_4, β_5, β_6, β_7, β_8 represents the short-run coefficients, α_1, α_2, α_3, α_4, α_5, α_6, α_7, α_8 are the long-run coefficients; Δ stands for first difference operator, and μ_t represents the stochastic random term. The null hypothesis expressed as (H0: $\alpha_1 = \alpha_2 = \alpha_3 = \alpha_4 = \alpha_5 = \alpha_6 = \alpha_7 = \alpha_8 = 0$) indicates the absence of cointegration between variables, while the alternative hypothesis stated suggests the presence of cointegration (H0: $\alpha_1 \neq \alpha_2 \neq \alpha_3 \neq \alpha_4 \neq \alpha_5 \neq \alpha_6 \neq \alpha_7 \neq \alpha_8 \neq 0$) in the model.

Pesaran et al (2001) provide upper and lower critical bounds for the null hypothesis of no cointegration among variables. When the calculated F-statistic from equation (1) exceeds the upper critical bound, the null hypothesis is rejected. When it is less than the lower bound, the null hypothesis cannot be rejected and when it falls between the lower and upper critical bounds, the test is adjudged to be inconclusive (Iorember et al., 2020; Goshit et al., 2020).

If we find evidence of a long-run relationship between FDI, external debt, trade openness, and economic growth, the ARDL directs that the error correction model (ECM) be estimated, where the error correction term (ECT) is included. As a result, the ECM, being the model for short-term dynamics, captures the following:

$$\Delta \boldsymbol{YG_t} = \emptyset_0 + \emptyset_1 \sum_{k=1}^{p} \Delta \boldsymbol{YG_{t-k}} + \emptyset_2 \sum_{k=1}^{p} \Delta \boldsymbol{FDI_{t-k}} + \emptyset_3 \sum_{k=1}^{p} \Delta \boldsymbol{TRDP_{t-k}} + \emptyset_4 \sum_{k=1}^{p} \Delta \boldsymbol{EXD_{t-k}} + \emptyset_5 \sum_{k=1}^{p} \Delta \boldsymbol{HCD_{t-k}} + \emptyset_6 \sum_{k=1}^{p} \Delta \boldsymbol{KSC_{t-k}} + \emptyset_7 \sum_{k=1}^{p} \Delta \boldsymbol{GSV_{t-k}} + \emptyset_8 \sum_{k=1}^{p} \Delta \boldsymbol{CPS_{t-k}} + \boldsymbol{\varphi ECT_{t-1}} + \boldsymbol{\mu_t}, \quad (3)$$

where, ECT denotes the error correction term derived from equation (1), and φ = the speed of adjustment.

In the case where all variables remain the same as before, the coefficient for the speed of adjustment should normally be negative and significant to confirm the presence of a cointegrating relationship. Finally, ECM is the error correction term.

4. Results and discussions

4.1. Unit root test (augmented Dickey-Fuller test)

As a basic requirement for the use of the ARDL, we first examine the unit root properties of the series using the Augmented Dickey-Fuller (ADF) test. The results of the ADF test, presented in Table 1, show that the data series used for Brazil, Nigeria, and Vietnam have a mixed order of integration at the level [I(0)] and at the first difference [I(1)]. In other words, the series are integrated of order zero as well as of order one. This situation fulfills the basic requirements for the use of the ARDL technique. As a rule of thumb, a series is free of a unit root or stationary if the p-value of the test statistic is less than 0.05 at the significance level. Therefore, the study finds it appropriate to apply the ARDL bounds test procedure to examine the cointegration among the variables.

4.2. The autoregressive distributed lag (ARDL) bounds test for cointegration

To determine the long-run relationship between economic growth and its determinants (trade, FDI, and external debt), the study proceeds to perform the ARDL bounds test for cointegration. The results are presented in Table 2. The results show F-statistic values of 14.0553, 3.9726, and 18.6795 for the growth models of Brazil, Nigeria, and Vietnam respectively. In all cases, the F-statistic values are greater than the upper bound critical values at the 5% significance level. This suggests the existence of a long-run relationship between growth and FDI, external debt, and trade determinants in Brazil, Nigeria, and Vietnam.

Table 1. Unit root test

	Variable	Level Form		First Difference form		Order of integration
		ADF test Statistic	p-value	ADF test statistic	p-value	
Brazil	YG	-1.1111	0.6987	-4.3029***	0.0021	I(1)
	FDI	-2.7495	0.0774	-6.0832***	0.0000	I(1)
	TRDP	-0.8738	0.7830	-4.6441***	0.0008	I(1)
	EXD	-2.5678	0.1107	-3.3653**	0.0206	I(1)
	HCD	-2.8676	0.0608	-4.7226***	0.0007	I(1)
	KSC	-4.6331***	0.0010	-3.7217	0.0088	I(0)
	CPS	-2.5884	0.1072	-3.9439***	0.0051	I(1)
Nigeria	YG	-0.8842	0.7793	-2.9197**	0.0422	I(1)
	FDI	-2.4858	0.1285	-6.6098***	0.0000	I(1)
	TRDP	-2.7160	00827	-5.2232***	0.0002	I(1)
	EXD	-1.3855	0.5759	-3.9561***	0.0050	I(1)
	HCD	-2.7387	0.0795	-6.8857***	0.0000	I(1)
	KSC	-1.5779	0.4792	-3.4694***	0.0016	I(1)
	CPS	-2.2972	0.1791	-4.9835***	0.0003	I(1)
Vietnam	YG	-1.1928	0.6637	-5.1887***	0.0002	I(1)
	FDI	-2.9994***	0.0046	-4.1173	0.0033	I(0)
	TRDP	-0.5640	0.8647	-7.2892***	0.0000	I(1)
	EXD	-4.0184***	0.0041	-5.1905	0.0002	I(0)
	HCD	-5.2619***	0.0002	-5.6384	0.0001	I(0)
	KSC	-1.9724	0.2968	-4.6599***	0.0008	I(1)
	CPS	-2.0107	0.2808	-5.1343***	0.0003	I(1)

Note: *, **, and *** denote significance at 10%, 5%, and 1% respectively. ADF – Augmented Dickey-Fuller. P-value implies probability values.

Table 2. ARDL bounds test

	F-statistic	I(1)			
		10%	5%	2.5%	1%
Brazil	14.0553***	2.89	3.21	3.51	3.90
Nigeria	3.9726***	2.89	3.21	3.51	3.90
Vietnam	18.6795***	2.89	3.21	3.51	3.90

Note: *, ** and *** denote significance at 10%, 5% and 1% respectively

4.3 ARDL Long-run and error correction model estimations

Table 3 presents the results of the long-run and short-run relationships between economic growth, FDI, trade, external debt, and the control variables. The long-run results (upper part of Table 3) show that FDI and trade have a positive effect on economic growth in Brazil, Nigeria, and Vietnam. However, the effect of FDI is not statistically significant in all three countries, as the probability values of FDI in all three countries are greater than the 0.05 significance level. This may be due to the profit repatriation tendencies of multinational companies, which account for the majority of FDI inflows to developing countries. If the profits earned by foreign companies are repatriated to the companies' home countries rather than reinvested in the host countries, the impact of the inflow on the economy of the host country is likely to be small. These insignificant effects are consistent with the findings of Ayenew (2022). The evidence on FDI shows that the FDI framework for developing countries is not conducive to their growth process, especially the remittance policy, which repatriates profits after substituting local industries. The negative effects are more pronounced in Vietnam than in Brazil.

Table 3. ARDL model estimations: Long-run, ECM, and short-run coefficient estimates

	Brazil		Nigeria		Vietnam	
Long-Run Model Estimates						
Variable	Coefficients	Prob.	Coefficients	Prob.	Coefficients	Prob.
FDI	0.0052	0.3429	0.0804	0.6157	0.0552	0.3504
TRDP	0.0973	0.0039	1.0497	0.4650	0.4965	0.0028
EXD	-0.0526	0.0030	-0.0868	0.7933	-0.0696	0.1757
HCD	0.3556	0.0000	1.9610	0.3430	0.7824	0.0000
KSC	0.1868	0.0000	-0.2402	0.6940	0.7144	0.0000
GSV	0.1293	0.0005	-0.5639	0.4714	0.0567	0.7470
CPS	0.0306	0.0028	-0.2328	0.7073	-0.7403	0.0000
C	-1.6555	0.0072	-0.4579	0.9640	-2.6521	0.0000
Short-Run Model Estimates						
FDI	0.0143	0.0012			0.0946	0.0004
TRDP	-0.0744	0.0004	0.0481	0.0185	0.0905	0.1200
EXD	-0.0462	0.0002	-0.0395	0.0092		
HCD	1.7677	0.0000	-0.7257	0.0024	0.6731	0.0629
KSC	0.0979	0.0001			0.6878	0.0000
GSV	0.0463	0.0063			0.7979	0.0000
CPS	0.0874	0.0000	0.0631	0.0102	-0.2044	0.0013
ECT(-1)	-0.7705	0.0000	-0.0940	0.0000	-0.2518	0.0000
Model Joint Tests						
R-Square	0.9745		0.6625		0.9934	
D.W. Statistics	2.6117		2.0941		2.9376	
Diagnostic Tests						
Jarque-Bera	0.1453	0.9299	1.5123	0.4695	0.7785	0.6776
Breusch Godfrey	2.0271	0.2125	0.4397	0.6534	0.4862	0.5658
Breusch-Pagan-Godfrey	1.2099	0.4111	0.4103	0.9480	0.3586	0.9683

Note: Variables are considered statistically significant at 5% with a probability value of less than 0.05.

More importantly, the finding of a positive effect of trade on economic growth in all three countries is consistent with the findings of Radmehr et al. (2022), Saibu et al. (2022), and Omoke and Opuala-Charles (2021), who found a positive relationship between trade and economic growth. Brazil, the country has gone through phases of expansion driven by exports, especially in the mining and agriculture industries. Exporting goods like iron ore, meat, and soybeans has helped the economy grow and generate foreign cash. By diversifying its export items and markets, Brazil has lessened its reliance on a small number of commodities and trading partners. This diversity has improved resistance to shocks from the outside world and reduced hazards. Moreover, Brazil's FDI has been attracted by international trade, particularly in industries such as manufacturing, services, and the automotive sector. In addition to capital, FDI brings technology and managerial know-how, which boosts the country's economic growth and productivity. Nigeria, the nation is a major exporter of oil, and the growth of the economy has been greatly influenced by the global oil trade. Government revenue and infrastructure development have benefited from oil export earnings. Nigeria's exports are dominated by oil, however, efforts have been made to diversify the economy by pursuing non-oil export opportunities. Export-oriented industries like industry and agriculture are supported by initiatives aimed at diversifying and expanding the economy. Furthermore, Vietnam has grown as an export-driven economy, with a focus on electronics and manufacturing. It has become a major participant in global value chains with exports of textiles, electronics, and footwear. Vietnam's open trade policy has attracted significant foreign direct

investment, particularly in the industrial sector. The establishment of production facilities by foreign companies in Vietnam has increased productivity, transferred technology, and created jobs. Vietnam's economic reforms have been driven by international trade. As the country has become more integrated into international markets, trade liberalization and other investment-friendly policies have been implemented, creating an environment conducive to growth.

Regarding external debt, the results show that external debt impedes economic growth in Brazil, Nigeria, and Vietnam in the long run. The negative effect on economic growth in Brazil is statistically significant at 5% with a probability value of less than 0.05 at the critical level, while the negative effect on economic growth in Nigeria and Vietnam is statistically not significant with probability values greater than 0.05 at the critical level. The negative effect of external debt on economic growth in these countries may be associated with the huge debt servicing burden that external debt creates on the economies of the developing countries. The majority of the external debt incurred by these countries is not self-regulating, implying that they depend on lean revenue sources for repayment or servicing. This creates financial burdens on the economies of these countries and may impact their growth negatively in the long run. This finding concurs with the findings of Tanna et al., (2018), who establish that external debt impedes economic growth.

One striking result of the long-run estimates is that the impact of all three factors on the economy is not statistically significant. There are several reasons and difficulties facing Nigeria that could explain the finding that trade, external borrowing, and FDI do not have a significant impact there. Nigeria's historical dependence on oil exports can make the economy vulnerable to changes in world oil prices. Economic diversification has been hampered by the dominance of the oil sector, which often overshadows the contribution of non-oil industries to trade and FDI. Also, inadequate energy, transport, and logistics infrastructure can make trade and FDI less effective. Inadequate infrastructure can lead to higher production costs, delays in the flow of goods, and a less desirable business climate for potential investors. More specifically, Nigeria has consistently struggled with issues of governance and corruption. These elements have the potential to undermine investor confidence, hinder the efficient use of FDI, and increase inefficiencies in trade processes. More recently, security issues have hurt economic activity. These issues include insurgency and communal conflict. A climate of insecurity can make investors reluctant to commit capital, affecting trade and FDI.

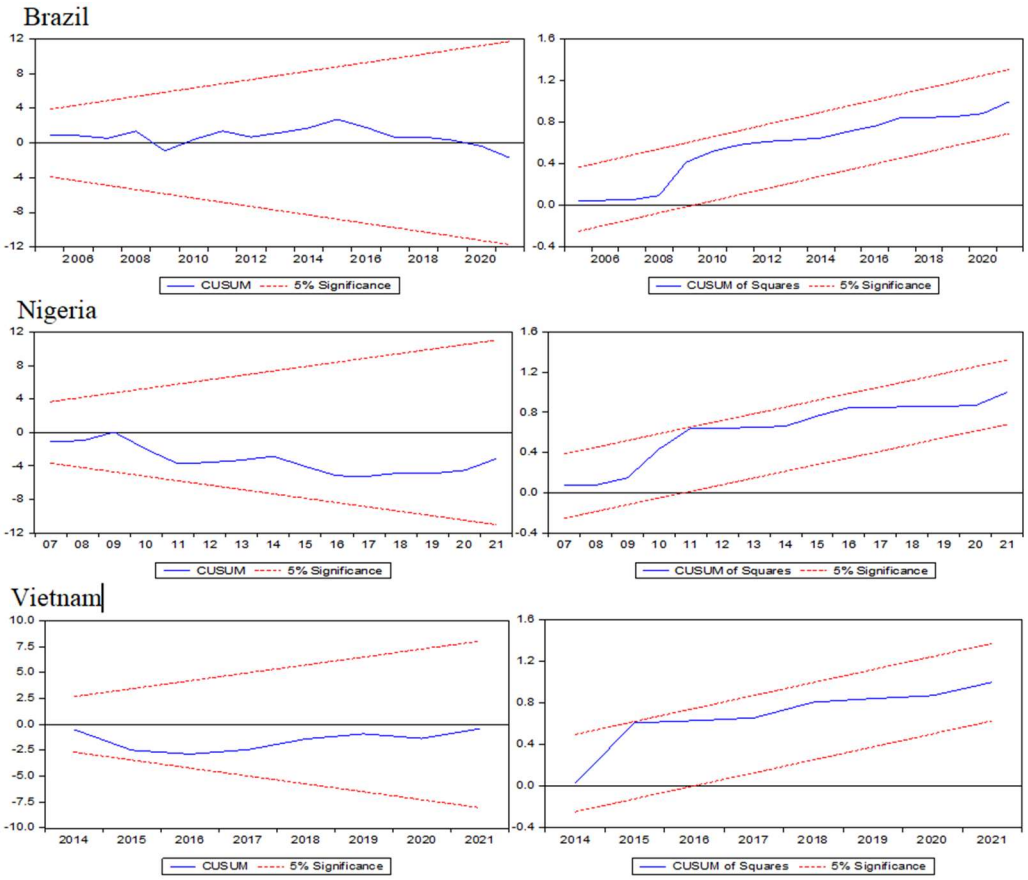
Patterning to the short-run analysis (second part of the results in Table 3), the Error Correction Term (ECT) coefficients of -0.7705, -0.0940, and -0.2518 for Brazil, Nigeria, and Vietnam, respectively, meet the theoretical expectations of being negatively signed and statistically significant. Therefore, about 77.05%, 9.40%, and 25.18% of the short-run shocks to fiscal policy in Brazil, Nigeria, and Vietnam will be corrected annually for the economy to return to equilibrium in the long run. In the short run, FDI exerts a positive and statistically significant effect on economic growth in Brazil and Vietnam. The effect of trade on economic growth is negative in Brazil but positive in Nigeria and Vietnam. Similarly, external debt exerts a negative effect on economic growth in Brazil and Nigeria. The control variables exert various degrees of impact on economic growth in all three countries.

The R-squared values for the country-specific models show that about 97.45% of the changes in Brazil's economic growth are due to FDI, trade, external debt, and the included control variables. 66.25% of the variation in Nigeria's economic growth is due to FDI, trade, external debt, and the included control variables. Then 99.34% of the changes in Vietnam's economic growth are due to FDI, trade, external debt, and the included control variables. The Durbin-Watson statistics of 2.6117, 2.0941, and 9284 for Brazil, Nigeria, and Vietnam respectively indicate that the country-specific models are free from severe cases of first-order autocorrelation.

4.4. Diagnostic tests

The results of the diagnostic tests (see the lower part of Table 3) reveal that the residual series are normally distributed, homoskedastic, and serially uncorrelated. These findings are based on the residual tests of Jacque Bera, Berusch-Godfrey, and Berusch-Pagan-Godfrey, respectively. We fail to reject the null hypotheses in all the tests, thereby supporting the robustness of the estimates. Furthermore, the results of the stability tests using the recursive residuals with the cumulative sum (CUSUM) and CUSUM of square (see Figure 5) suggest that the coefficients of the model are stable, hence the estimates are reliable and robust for policy decisions.

Figure 5. CUSUM and CUSUM of squares tests for Brazil, Nigeria, and Vietnam



5. Conclusion and policy implications

The study's ultimate goal is to determine the effect on economic growth in Brazil, Nigeria, and Vietnam. The study applies the Autoregressive Distributed Lag (ARDL) modeling technique to annual time series data covering the period 1990–2021. The study finds that foreign direct investment and trade positively influence economic growth in Brazil, Nigeria, and Vietnam in the long run, although the effect of foreign direct investment is insignificant in all three countries. Additionally, the results reveal that external debt impedes long-run economic growth in these countries. There are appreciable implications that can be obtained from this study. The relationship between FDI, external debt, and trade openness provides a guide on how developing countries can enhance economic growth. FDI, external debt, and trade openness suggest specific finances that developing countries can concentrate on. Developing countries can reflect on the roles of FDI, external debt, and trade openness and the different ways they interact to influence economic growth. This study has shown that building domestic savings, human capital,

and productive capital stock can reduce reliance on external finances, as is the case with Brazil and human capital in Vietnam. Indeed, Nigeria can learn a lot from improving domestic capital to reduce the adverse effects of external capital that make the country more susceptible to external finance. Developing countries have been shown not to depend so much on external finance.

Based on the findings, the study makes some country-specific policy recommendations that would guide policy decisions in developing countries. In particular, given the significant impact of external debt and international trade on economic growth in Brazil and the insignificant impact of FDI, we recommend promoting export product diversification away from traditional commodities and maintaining transparency on debt service and borrowing. To reassure investors and demonstrate prudent fiscal management, we also recommend providing timely and clear information on debt-related measures. Tailor-made investment incentives should also be provided to attract FDI in key industries. These incentives could take the form of tax rebates, favorable regulatory structures, or other measures that make countries more attractive to foreign investors. In addition, Brazil's continued cooperation with foreign organizations and strategic alliances could support the country's efforts to maximize the benefits of FDI.

For Nigeria, given the insignificant impact of FDI, international trade, and external debt on economic growth, policymakers may consider implementing targeted policies to address the challenges and unlock the potential positive impact of these factors. The study recommends reducing regulatory barriers, increasing transparency, and improving the ease of doing business to strengthen the business environment. This can attract more international capital. We also recommend broadening export commodities beyond oil by supporting non-oil industries such as manufacturing, services, and agriculture. Investment in trade facilitation initiatives to reduce barriers to trade, such as improving logistics, transport infrastructure, and customs procedures, is strongly encouraged. In addition, the use of innovative financing options to convert part of the external debt into investment in specific development initiatives, such as debt-for-development swaps, should be encouraged.

For Vietnam, given that the impact of international trade is significant while those of FDI and external debt are not, the study recommends continued participation in regional trade blocs and negotiations to open up new opportunities, as well as active engagement in bilateral and multilateral trade agreements to secure preferential access to key markets. In addition, it encourages regular evaluation and adjustment of policies to address the evolving dynamics of global trade and ensure sustainable economic growth. Given the insignificant impact of FDI and external debt, the study recommends that Investment Promotion Agencies (IPAs) be strengthened and streamlined to successfully market countries as attractive locations for FDI. IPAs are essential in facilitating investor-friendly legislation and informing potential investors. In addition, prudent borrowing techniques and regular assessments of debt sustainability help prevent the build-up of excessive debt, which could reduce the benefits of FDI and limit economic growth.

One of the limitations of this study is that countries' external finances are multi-dimensional. This study focuses on three of them: FDI, trade openness, and external debt. Other dimensions of external finance have not been studied and may be important in explaining countries' economic growth. As a suggestion for future research, other researchers can analyze the influences of other sources of external finance on the economic growth of different countries. Such studies can also use a panel or cross-sectional approach to analyze the long-term effects of these external financing sources. This recommended approach will also allow more countries to be included in the study. Despite the limitations of this study, the proven relationship between FDI, external debt, trade openness, and economic growth has been empirically demonstrated in Nigeria, Brazil, and Vietnam, representing developing countries.

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