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Trade openness, Foreign Direct Investment and economic growth: case of Southern African Development Community

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Abstract: This study's primary objective is to examine the impact of trade liberalization and foreign direct investment on the economic growth of the Southern African Development Community. This study contributes significantly to the ongoing discussion of the effects of trade liberalization and foreign direct investment (FDI) on the economic development of the Southern African Development Community. The study employs World Development Indicator (WDI) quarterly data from 1970(1) to 2022(1) and uses panel regression and Dumitrescu-Hurlin (DH) panel causality methodologies. According to empirical evidence, economic growth is positively and substantially influenced by trade openness and human capital. On the other hand, foreign direct investment (FDI) may harm economic growth. The results of the Dumitrescu-Hurlin (DH) panel causality tests indicate that the community does not support the existence of a causal relationship between foreign direct investment (FDI) and economic development. The tests show, however, that there is bidirectional causality between trade openness and economic growth in the Southern African Development Community (SADC). According to the research findings, significant infrastructure improvements are required to maximize the benefits of foreign direct investment inflows in the Southern African Development Community (SADC). It is essential to establish stringent regulations and policies to supervise the repatriation of the largest foreign direct investment profits while also addressing the issue of their absorption capacity.

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Introduction

Trade openness (TO) and Foreign Direct Investment (FDI) have been identified as crucial factors in economic development. Specifically, it has been asserted that TO and FDI play vital roles in economic growth (EG) and job creation (Jian, Fan, Zhao, & Zhou, 2021). Foreign direct investment plays a crucial function in stimulating economic activity. This is due to the belief that FDI is an economy's primary source of capital and means of technological innovation. Despite the theoretical impacts and benefits of FDI, FDI is not distributed uniformly and is not attracted to all economies. The openness of commerce is a significant factor in attracting and distributing foreign direct investment (Jahanger, Usman, Murshed, Mahmood, & Balsalobre-Lorente, 2022). Economic transparency is also believed to facilitate technology transmission and knowledge acquisition. These two advantages can enhance an economy's capacity to maximize the advantages associated with comparative advantage due to its increased exposure to global competition.

Following the works of Scalamonti (2023), an increasing amount of economic research has examined the effects of trade on the expansion of Gross Domestic Product (GDP). The trade-led growth hypothesis focuses on determining the extent to which international commerce influences EG. The empirical evidence suggests that increased trade liberalization can boost economic growth over the long term by increasing individuals' access to goods and services, refining resource allocation, and boosting total factor productivity through disseminating novel technologies and ideas. Accessing products and services, optimizing resource allocation, and sharing knowledge and innovative technologies have numerous advantages (Lanzolla et al., 2020). Therefore, nations that are more receptive to commerce will perform better than those less receptive to it. From this perspective, it is possible to argue that underdeveloped nations stand to gain a great deal by engaging in trade with more developed nations. International institutions and donor governments frequently advise developing nations to implement trade liberalization policies in the hope that doing so will facilitate the opening of their economies to global trade and enable them to integrate into global value chains (Anderson, 2022). The adoption of export-oriented policies was prompted by the inadequacy of the import-substitution industrialization strategy and evidence indicating superior EG in these economies. The issues mentioned above represented significant roadblocks to achieving import-substitution industrialization. In addition, Wang, Wang, and Ma (2021) identified the early implementation of trade liberalization policies in East Asian economies as a significant factor in the region's remarkable achievements. Numerous developing nations' adoption of trade liberalization policies towards the end of the 1970s is not unexpected. The changes included a reduction in both tariff and non-tariff barriers.

The research conducted by Amanda, Akhyar, and Ilham (2023) indicates that an increase in TO may negatively affect EG due to the rise in inflation and a decline in exchange rates. The Iranian government supported this topic's research. According to Arndt, Diao, Dorosh, Pauw, and Thurlow (2023), nations that primarily produce low-quality goods may experience a decline in EG due to an increase in their TO. Nations that rely heavily on the exportation of fundamental commodities are extremely susceptible to fluctuations in trade conditions. Emerging nations stand to benefit from increased economic expansion through greater participation in global commerce (Tröster & Küblböck, 2020). While there may be differing opinions on the subject, the consensus is that emerging nations stand to benefit from increased economic expansion.

FDI is a significant determinant of EG in developing nations such as Bangladesh, where deficient domestic private and public savings contribute to a lack of capital. According to Haraguchi, Martorano, and Sanfilippo (2019), investments play a vital role in the industrialization process of a country. According to Appiah, Gyamfi, Adebayo, and Bekun (2023), the influx of FDI from developed nations has compensated for the inadequacy of domestic investment, thereby accelerating the industrialization of developing nations, creating employment opportunities, and enhancing economic growth (EG). According to research conducted by Vargas-Hernández (2023), the effectiveness of FDI in host countries is contingent on the efficiency of domestic investment.

Globalization has resulted in a gradual increase in the openness of nations to free trade and greater integration to accelerate EG (Carayannis, Acikdilli, & Ziemnowicz, 2020). The liberalization of trade policies and increased FDI flows contribute to expanding international production. The primary drivers of this phenomenon are economic and technological factors. According to Audi, Ali, and Al-Masri (2022), globalization has given developing nations a unique opportunity to promote and attain economic development through trade and investment. Numerous nations, particularly those with low economic status, are instituting free-market economic strategies to attract increased investment from developed nations (Korle, Amoah, Hughes, Pomeyie, & Ahiabor, 2020).

Recent years have witnessed an increase in the significance of FDI due to its facilitation of technology transfer and market networks. According to studies conducted by Pandey, de Coninck, and Sagar (2022), this can subsequently lead to more cost-effective production and sales on a global scale. In recent decades, developing nations have experienced a substantial increase in FDI inflows. According to Razzaq, An, and Delpachitra (2021), the beneficiaries of FDI are anticipated to benefit from access to technologies and participation in global trade networks. Foreign investors are expected to benefit from the more efficient utilization of their assets and resources. Considering if and to what extent these FDI inflows affect regional development is reasonable. According to Closa (2021), the issue necessitates a thorough and meticulous scientific investigation. This study aims to examine the relationship between FDI and GDP in Bangladesh, as GDP is a measure of a country's level of development.

In academic literature, the significance of FDI in driving EG is widely acknowledged (Nguyen, Pham, & Tram, 2020). The preponderance of empirical research has examined the potential influence of FDI on EG and the resulting causal relationship between the two variables. Su, Li, Umar, and Lobonț (2022) assert that additional research is necessary to comprehend the feedback mechanism and the causal relationship between FDI and EG. The emphasis should be placed on the orientation of the relationship between the knowledge spillover effect associated with FDI and EG, as it has been discovered that the former stimulates the latter, attracting more FDI.

It has been empirically and theoretically demonstrated that TO and FDI are significant mechanisms of EG. Several empirical research studies have shown that trade and FDI

positively and substantially affect EG (Tabash, Mesagan, & Farooq, 2022). However, the magnitude of the impact differs by country and depends on several macroeconomic factors, such as domestic investment, human capital, macroeconomic stability, and infrastructure development, among others. The debate on the role of FDI and trade in EG has remained a central position in the literature on international trade. However, studies have been inconclusive, and the evidence is primarily contradictory. For instance, Muse and Mohd (2021) confirmed the positive impact of TO and FDI on EG. While Muse and Mohd (2021) argued that FDI and TO have no significant effect on EG in India, we found the opposite true. The potential explanation for the negative impact of TO and FDI on EG, among others, could be that TO can exacerbate macroeconomic instability and increase a country's susceptibility to external shocks, thereby harming the FDI-growth nexus. This lack of consensus is believed to be the primary reason so many developing countries cannot devise innovative growth-stimulating policies; consequently, more empirical research efforts are attracted. Even though much research has been conducted on the subject, empirical studies concentrating on SADC are still scarce; hence, the study.

The uncertainties caused by the COVID-19 pandemic led to a significant decline in FDI in Africa in 2020, with total inflows to the continent decreasing by 16%. According to the world investment report of 2021, accumulating economic and health challenges associated with the pandemic and other factors significantly impacted foreign investment in the continent (Agu, 2022). In particular, FDI to Southern Africa decreased by 16% to $4.3 billion, with South Africa accounting for the majority of the region's inflows. Southern African Development Community (SADC) was founded in 1980 to attain sustained EG and sustainable development for the prosperity and well-being of the people in the region through improved living standards and job opportunities. Several policies and strategies have been developed to accelerate EG and development by integrating regional members (World Health Organization, 2020).

This research aims to examine the effects of TO and FDI on EG in the Southern African Development Community (SADC). This study contributes specifically to empirical studies in Africa by concentrating on the Southern African Development Community while also contributing to the literature on the impacts of TO and FDI on EG by examining the role of human capital (Letsoalo & Ncanywa, 2021). Another contribution of this study is that the analysis uses recent data, as the data set includes information from the first quarter of 2022. The remainder of our discussion is organized as follows; section two provides an overview of empirical efforts. The methodology is described in section three. The fourth segment discusses the empirical findings, while the final section offers a conclusion.

Review of Literature

Trade Openness and Economic Growth

The theoretical and empirical discourse surrounding the correlation between trade liberalization and economic growth has received considerable scholarly scrutiny over the past three decades. Divergent opinions exist regarding the potential for increased trade liberalization to stimulate economic expansion. When two nations engage in trade, the nation with a comparative advantage in producing a particular good will specialize in its production and export it to the other country, which will prioritize the production of goods in which it has a comparative advantage over the former nation. The company produces a limited variety of interests but concentrates on economic sectors with a comparative advantage regarding production factors. Consequently, the industry will be able to increase its production output and exports, thereby fostering EG. Others in the discipline of economics have developed this concept further. Trade liberalization, according to Akcigit and Ates (2021), promotes specialization in industries that receive the benefits of economies of scale, resulting in enhanced long-term efficiency and productivity.

The correlation between TO and economic development can be explained by the new endogenous growth models (Yao, Zhang, Wang, & Ou, 2019), which postulate that the global diffusion of advanced technologies is responsible for this phenomenon. The emergence of these models is attributable to the worldwide proliferation of advanced technologies. An economy more receptive to trade and investment will likely benefit from the technological advances made by more developed economies. This leads to an acceleration of EG. According to Di Vaio, Palladino, Hassan, and Escobar (2020), the cost of imitation is an additional factor in the correlation between international trade and economic growth. If the costs associated with replicating innovative practices are relatively lower in developing nations, these nations will experience faster economic growth than their more developed counterparts. This phenomenon will likely result in a convergence trend.

According to the preceding lines of reasoning, emergent economies can gain substantial benefits by engaging in commerce with advanced economies. However, some counterarguments assert that unrestricted trade could be detrimental to the development of a nation. Maliszewska, Mattoo, and Van Der Mensbrugghe (2020) provide an instance in which a nation's competencies are concentrated in domains that receive insufficient research and development funding. According to Shahzad, Ferraz, Doğan, and do Nascimento Rebelatto (2020), the significance of the goods' composition in international trade rests in its impact on the EG. Research conducted by Das, Kundu, and Bhattacharya (2020) indicates that a nation's ability to adapt foreign technologies to its specific conditions is crucial in determining its gains from international trade.

Many empirical studies investigate the connection between international trade and EG. Inconsistent results across diverse research methodologies and geographic locations are notable characteristic of the relevant literature. Numerous studies provide evidence that business has a positive effect on EG. The study by Anetor, Esho, and Verhoef (2020) demonstrates that international trade has a significant and predominantly negative impact on household incomes. Shahzad et al. (2020) investigate the correlation between trade and EG across 150 nations in their research. The findings indicate that developing countries benefit more from trade than developed nations. Assi, Isiksal, and Tursoy (2020) studied 82 countries and discovered a positive correlation between economic freedom and GDP growth. Shahzad et al. (2020) examined 61 nations using the instrument-variable threshold regression technique. According to their findings, a threshold of income exists above which increased trade has a positive effect on EG. The abovementioned threshold was determined by analyzing the relationship between increased business and the development of EG. However, when the growth rate declines below a certain point, the negative effects of trade liberalization become more apparent. According to a study conducted by Ciftci and Durusu-Ciftci (2022), Pakistan's EG is unaffected by its exports and imports.

Nevertheless, it should be noted that the trade-led growth hypothesis has been confirmed for Pakistan, which contradicts the above conclusion. This research employs the quantile regression technique that Shahzad et al. (2020) developed to examine the correlation between EG and international trade in 75 developing countries. According to the research, the effect of openness on the EG of nations is more pronounced in nations with lower growth rates than in nations with greater growth rates. Low-growth economies on every continent have significant representation in Latin America. The study by Fatima, Chen, Ramzan, and Abbas (2020) employs instrumental variable threshold regressions to investigate the effect of changes in GDP per capita on the trade-income correlation.

According to the findings of their study, nations with high levels of per capita income can benefit from a pro-trade attitude because it promotes economic growth, the accumulation of capital, and the development of financial systems. However, the impact is more pronounced and negative in nations with a reduced per capita income. The findings of Fatima et al. (2020) indicate that trade liberalization has a positive effect on the economies of established nations but a negative effect on the economies of developing nations. Trade's impact is contingent on economic growth and the inflation rate. In countries with inadequate financial systems, the impact of trade liberalization on EG exhibits a negative trajectory, whereas it is indistinguishable in countries with robust economic systems. The positive relationship between EG and TO is evident in nations with modest inflation rates. However, this correlation cannot be observed in governments with significant inflation rates. Increased trade benefits countries with comparatively fewer non-agricultural sectors than those with low incomes, high inflation rates, and large agricultural sectors. According to the findings of Krifka (2023), this assertion is accurate. The extent of stock market development influences the relationship between commerce and EG, according to Huang and Chang's (2014) study of 46 nations. After a nation's stock market has attained a certain level of development, international trade can positively affect its economic growth.

In a study involving 115 developing nations, Dhrifi, Jaziri, and Alnahdi (2020) discovered a causal relationship between trade and EG that is mutually reinforcing. The causal connection is demonstrated in both directions. According to Were Hye, Wizarat, and Lau (2016), marketing exerts a positive and significant influence on the incidence of EG in both developed and developing nations. However, the economic effects of this phenomenon are negligible, if not nonexistent, in the least developed countries, the majority of which are located on the African continent. The research conducted by Hye et al. (2016) on China reveals a positive correlation between TO and EG, which remains true for both short- and long-term periods.

FDI and Economic Growth

Kahouli and Chaaben (2022) conducted empirical investigations to examine the relationship between FDI and EG. Numerous scholars have emphasized the significance of various mechanisms, such as technological advancement, investment in human capital, absorptive capacity, and the trade policy of the host country, in facilitating the prospective positive impact of FDI on EG (Haq, Hussain, & Amin, 2022). The findings of these studies, which typically involved multiple nations, imply that FDI may have a positive, albeit indirect, effect on the economic growth of a given country. Su, Sun, Ahmad, and Mirza (2021) postulate that FDI, public capital, and private investment significantly influenced EG in India. The study's authors warned about the negative effects of extravagant expenditures of public capital, which may reduce a country's appeal to prospective foreign investors.

ESCAP argues that the free flow of capital and technology is the primary catalyst for the rapid economic development of underdeveloped nations (UN.ESCAP, 2021). This discovery confirms the findings of other researchers who have reached similar conclusions. Su et al. (2021) have established a correlation between EG in developing nations and several variables, including consistent FDI inflows and essential macroeconomic and financial adjustments. The claim that FDI promotes or accelerates EG lacks constant empirical support. According to Haq et al. (2022), economies with higher growth potential and liberalized trade policies are more likely to experience favorable EG FDI and foreign trade outcomes. According to Das et al. (2020), the financial market is a complex and interdependent system comprised of an extensive network of interconnected components. Within the framework of neoclassical models, FDI has facilitated the transmission of technology and the advancement of EG in developing countries. The models mentioned above developed by Akram, Chen, Khalid, Huang, and Irfan (2021) postulate that the increase of FDI inflows in host nations requires the initial implementation of a policy involving the liberalization and stabilization of their financial markets.

According to the findings of Jatobá, Ferreira, Fernandes, and Teixeira (2023), the presence of multinational corporations is positively associated with an increase in human capital and a faster rate of economic expansion. Literature indicates that FDI has generally contributed to EG, albeit with regional and temporal variations. Temporal dynamics are responsible for the diversity of FDI effects. Assi et al. (2020) concluded that FDI in Cyprus is Granger-caused by GDP per capita, but their findings do not corroborate the reverse causality. This conclusion was reached after investigating the relationship between these two variables. Abdurakhmanova and Rustamov (2020) assert that a nation's economic development can be gauged by its capacity to attract foreign investment. According to Jatobá et al. (2023), economic reforms, non-state sector growth, and infrastructure development must be implemented for host economies to exploit the benefits of FDI effectively.

According to the internationalization theory, a nation's ability to attract FDI depends on multinational corporations' transition from external to internal markets. Due to the inconsistent findings of empirical research, this topic has been the subject of much debate. Several studies have produced contradictory results or failed to reach definitive conclusions (Fulcher-Rood, Castilla-Earls, & Higginbotham, 2019). Foreign direct investment has been designated a significant driver of economic growth in emerging economies. In comparison to established countries, underdeveloped nations have fewer resources. Foreign direct investment can improve a country's human capital, capital accumulation, organizational skills, managerial aptitude, and technology diffusion. Despite much empirical data, the causal relationship between FDI and EG remains inconclusive. According to Y. Chen, Kumara, and Sivakumar (2021), academics and policymakers can investigate the correlation between the two using the most recent econometric modelling developments.

The expansion of trade liberalization and the influx of FDI are crucial economic growth drivers, particularly in developing nations where capital is scarce. There have been numerous empirical investigations, but the results have been inconsistent. H. Chen, Gangopadhyay, Singh,

and Chen (2023) examined the effect of FDI and TO on the EG of five Asian nations, namely South Korea, China, the Philippines, Thailand, and Malaysia, over 26 years, from 1980 to 2006. The study conducted by the researchers identifies a co-integration relationship between the variables. The relationship between FDI, TO, and EG was positive only in Thailand, Korea, and China, while negative in the Philippines and Malaysia. This occurrence has only been documented in Thailand, Korea, and China.

The objective of Agyapong and Bedjabeng's (2020) study was to investigate the lasting effects of FDI and trade liberalization on the EG of Ghana from 1970 to 2011. The researchers concluded that FDI and trade liberalization are significant factors in accelerating EG. Hussain and Haque (2016) compared the effects of foreign direct investment, trade liberalization, and GDP growth on Bangladesh. Proponents argued that the expansion of EG and TO would positively impact Bangladesh's economy. Despite established evidence of the benefits of TO, Adekunle, Tella, Subair, and Adegboyega (2022) assert that the relationship between FDI and EG is negative. The study by Islam, Tareque, Wahid, Alam, and Sohag (2022) investigates the variables of trade openness, foreign direct investment, domestic investment, and GDP growth in Bangladesh from 1976 to 2014. The authors raise questions about these aspects. The empirical evidence indicates that both trade liberalization and FDI have a significant causal effect on GDP growth.

Furthermore, it was determined that there is a bidirectional causal relationship between the degree of TO and GDP expansion. Gardiner and Hajek (2020) examined the relationship between FDI, TO, and EG in a sample of eight developing countries in Europe and eight developing countries in Asia using a panel causality analysis. In Asian nations, empirical evidence confirms a causal relationship between FDI and EG, with FDI as the causal factor. The data do not, however, corroborate the reverse causal relationship. On the contrary, a bidirectional causal relationship between economic openness and EG in European nations has been confirmed. In addition, evidence supports a bidirectional causal connection between TO and EG.

Sahoo and Sethi (2023) analyzed the effect of trade liberalization and FDI on the GDP growth of twenty-four Asian nations. The empirical research indicates that FDI has a constraining impact on economic growth. In terms of investigating the relationship between FDI and economic development in Tunisia, the study by Bakari and Bouchoucha (2021) is comparable to the present study. The author concludes that it is impossible to establish a causal relationship between EG and FDI or vice versa. He was unsuccessful despite his efforts to establish a correlation between increased trade liberalization and rising GDP.

According to Alfadda and Mahdi's argument from (2021), there exists a positive correlation between TO and EG, but not the reverse. The authors support their claim with empirical evidence from a sample of 158 nations encompassing 1970 to 2009. According to Fulcher-Rood et al. (2019), a positive correlation exists between increased TO and elevated levels of EG and genuine income in developing nations. A negative correlation between TO and GDP growth is observed in developed nations. This statement is consistent with the claims made by Kirikkaleli, Adedoyin, and Bekun (2021) and other scholars, who stress the significance of FDI and trade liberalization in fostering economic development in Southeast Asian nations. There is a correlation between EG and both FDI and TO, according to the evidence provided. The assertion mentioned above contradicts the findings of Jahanger et al. (2022), who hypothesized that greater economic liberty is associated with slowing EG. According to Jahanger et al. (2022), there is a positive correlation between increased economic openness and increased EG rates. The results, however, are inconclusive. Empirical evidence indicates that some studies showing a positive correlation between trade liberalization and EG may have methodological flaws. This discovery is consistent with the findings of other investigations. The argument asserts that macroeconomic instability necessitates a deceleration in the growth process caused by TO and FDI, which is a foreseen consequence. Examining the effects of trade liberalization and FDI has been a contentious issue in international finance due to several factors, one of which is highlighted here.

Multiple academicians have concluded that the effects of increased trade liberalization and FDI should be positive. Incorporating novel technologies and knowledge into an economy and exploiting comparative advantages are among the benefits. Amade, Mohammed, Ibisanmi, Owolabi, and Joshua (2022) used the Granger causality test to examine the relationship between FDI, trade, and EG across multiple countries. It has been observed that all three variables exhibit a positive correlation. The researchers have concluded that the relationship between GDP and trade varies among nations. In addition, they have observed that there is no correlation between FDI and GDP for the majority of countries. According to Akadiri, Gungor, Akadiri, and Bamidele-Sadiq (2020), FDI and TO have a direct and causal relationship with GDP growth. However, the opposite effect was not discovered. It can be inferred that FDI and the degree of trade openness have no negative impact on GDP growth. According to the research of Jahanger et al. (2022), FDI may facilitate EG through two distinct mechanisms. The observations mentioned above imply that the discourse surrounding the impact of trade liberalization and FDI on economic growth remains contentious.

In the ongoing discussion regarding the relationship between FDI and EG, recent research has provided novel insights. Using the Autoregressive Distributed Lag (ARDL) method, Tilahun (2021) evaluated the efficacy of foreign aid in Ethiopia from 1985 to 2019, focusing on the period from 1985 to 2019. The authors conclude that foreign aid positively influences economic growth over the long term, while its effect on growth over the short period is negligible. Shabbir and colleagues' (2021) study examines the causal relationship between domestic and foreign private investment and its effect on Pakistan's economy. For this purpose, the Autoregressive Distributed Lag (ARDL) method is utilized. This methodology is used to investigate the causal relationship by scrutinizing data analysis. Based on their research findings, it has been determined that private foreign investment has a negligible and negative effect on the long-term growth of Pakistan's GDP. In contrast, private domestic investment substantially and positively impacts Pakistan's GDP growth.

The research conducted by Chishti, Ahmed, Murshed, Namkambe, and Ulucak (2021) investigates the long-lasting and causal relationship between FDI inflows, TO, and EG in India. Utilizing the Johansen co-integration and Vector Autoregression (VAR) model, is the methodology employed. The empirical research findings support the conclusion that there is no stable relationship between the three factors mentioned above over time. The argument asserts that expanding economies are more likely to attract FDI. According to their research, the relationship between trade liberalization and GDP growth is unidirectional.

The objective of the research conducted by Chishti et al. (2021) is to examine the relationship between fiscal growth, trade liberalization, and environmentally sustainable economic growth in South Asian nations. To analyze the data, the Autoregressive Distributive Lag method was utilized. Recent academic research indicates that increased trade liberalization is associated with an overall stronger economy. Kumari, Oad Rajput, Soomro, Ali, and Ghumro (2022) conducted a study investigating the short- and long-term relationships between foreign direct investment, exports, and GDP growth in Sri Lanka. Both international trade and foreign direct investment (FDI) contribute to economic growth in Sri Lanka, according to the findings of this study. Tan, Xu, Qiao, and Wu (2023) investigate the endogeneity of foreign direct investment, GDP growth, and stock market performance. The authors argued that there is a positive correlation between the growth of GDP, FDI inflows, and the stock market's expansion over both the short- and long-term. The economists in question have posited that there is a unidirectional causal relationship between the growth of GDP, FDI, and the stock market. The study's findings indicate that FDI partially moderates the relationship between the increase in GDP and the increase in stock market values. Udemba (2019) applied the Granger causality test to the 1970-2018 data pertinent to Nigeria's GDP, oil price, FDI, and trade. The researcher established a correlation between FDI and oil prices and FDI and trade.

Methodology

Data measurement and sources

We examined the influence of TO and FDI on EG in the Southern African Development Community (SADC). For estimation purposes, the study utilized quarterly panel data from the World Development Indicator (WDI) for countries in the Southern African Development Community (SADC) from 1970 to the first quarter of 2022. We measured EG using the GDP logarithm. Following the OECD definition, the openness index is calculated by dividing the total value of imports and exports by the total GDP.

Econometric Strategy

The econometric strategy involves estimating linear panel model and panel casualty tests. The economy's growth is assumed to be a function of foreign capital inflow in the form of FDI and trade flows while accounting for the role of human capital development. The conventional panel data models are briefly summarized: The Pooled Ordinary Least Squares (POLS). In the analysis of POLS, the effects of time and individuals' dimensions are unimportant. The POLS model can be stated as:

$$y_{it} = \alpha + \beta x_{it} + u_{it} \quad (1)$$

α and β are parameter and common slope effects, respectively, and u_{it} is normally distributed with zero mean. The commonest among these assumptions is that there is no individual effect but parameter homogeneity.

However, this is not likely to be obtainable in reality. Hence, individual heterogeneity specification requires that one assume that the error term has two separate components. This is known as the unobserved effects model and can be specified as follows:

$$y_{it} = \alpha_i + \beta x_{it} + u_{it} + \varepsilon_{it} \quad (2)$$

For the current study, the econometric model is:

$$GDP_{it} = \alpha_i + \beta_1 FDI_{it} + \beta_2 TO + \beta_3 HC_{it} + u_{it} + \varepsilon_{it} \quad (3)$$

The acronyms GDP, FDI, TO, and HC refer to economic growth, foreign direct investment, trade output, and human capital. The expression "Foreign Direct Investment" can also denote the aggregate amount of all Foreign Direct Investment. When devising a suitable estimation approach for this model, it is crucial to consider the characteristics of the two error components. The idiosyncratic error is commonly perceived as uncorrelated with either predictor variable. Conversely, the variable u_it denotes an individual element of residual variance. Conversely, the individual component may exhibit autonomy from the explanatory factors.

If the components exhibit correlation, the OLS estimator will lack consistency, and u_it will be regarded as an extra group of n parameters necessitating estimation. The variables that remain constant in the model are called "fixed effects."

In contrast, the OLS estimator parameter is consistent only when the individual component u_it does not correlate with the data's explanatory variables, also known as random effects.

A correlation may exist between the composite error terms due to the shared error component among individuals. Generalized Least Squares (GLS) estimators may be more suitable for the particular task, particularly the impracticality of OLS estimation. In Generalized Least Squares (GLS) calculations, the variance of the two error components is approximated. The present study compares the outcomes produced by the methodologies mentioned above directly. Due to the magnitude disparity between "T" and "N", a static panel analysis was employed. Also observed is the use of Dumitrescu-Hurlin (DH) panel causality tests. To establish no causal relationship between the variables, the results must indicate the rejection of the null hypothesis. If the results suggest that the null hypothesis has been rejected, it can be inferred that there is some degree of association between the variables.

Empirical Results

Table 1 provides a summary of the variable characteristics. All variable means and standard deviations are close to "0". The observed standard deviations indicate that the variables are relatively stable. Furthermore, the adoption of the null hypothesis of the Jacque Berra statistic for all variables demonstrates that the variables exhibit a normal distribution, which is supported by the use of descriptive statistics. Table 2 displays the results of the unit root tests (LLC, IPS, ADF, and PP), which indicate that all variables exhibit level-stationarity. Therefore, the level-based estimation method is used for a linear panel model.

Table 1: Summary statistics of the Variables

	GDP	FDI	HC	TO
Mean	2.51	1.85	1.43	3.27
Median	10.01	10.03	10.72	13.27
Maximum	15.09	14.53	15.5	13.98
Minimum	4.65	7.43	7.79	12.22
Std. Dev.	0.66	0.36	0.55	0.47
Skewness	0.15	0.25	0.23	0.33
Kurtosis	1.64	1.64	1.65	2.31
Jarque-Bera	19.9	21.6	20.94	9.27
Probability	0.60	0.23	0.260	0.11
Observation	2512	2512	2512	2512

Table 2: Panel unit root tests

Variable	Level	LLC	P-v	IPS	P-v	ADF	P-v	PP	P-v
$lnGDP$	0	479	0.00*	-4.66	0.00*	318	0.00*	193	0.00*
	1	-315	0.00*	-73.4	0.00*	274	0.00*	386	0.00*
$lFDI$	0	-3.11	0.00*	0.73	0.00*	27.8	0.00*	29.1	0.00*
	1	-3.52	0.00*	-8.17	0.00*	155	0.00*	203	0.00*
lHC	0	-0.21	0.00*	0.29	0.00*	41.2	0.00*	45.8	0.00*
	1	-9.43	0.00*	-10.44	0.00*	202	0.00*	450	0.00*
TO	0	-3.72	0.00*	1.11	0.00*	40.9	0.00*	46.5	0.00*
	1	-5.79	0.00*	-7.39	0.00*	146	0.00*	311	0.00*

* represents 1% level of significance, while P-v indicates the probability value

The panel regression results for the estimated model are presented in Table 3A. In each of the three estimated models (Pooled Regression, Fixed Effect, and Random Effects) in Table 3A, the results indicate that FDI has a negligible effect on EG in the Southern African Development Community. In the entire estimated model, expenditures on human capital development have a significant positive impact on EG. In addition, it is confirmed that TO has a considerable positive impact on the development of EG in Southern Africa. Table 3B presents the outcomes of FGLS. Intriguingly, the FGLS outcomes resemble those of panel OLS. This is due to the discovery that human capital development and TO significantly affect EG. The Hausman Test was employed to choose between the Fixed and Random Effect Models. The p-value of the Hausman Test is statistically significant; consequently, we reject the null hypothesis of the random effect model and base our conclusion primarily on the fixed effect model.

With the exception of the South African economy, the negative impact of FDI in SADC may be primarily attributable to the lack of infrastructure in these nations. It could also be the consequence of the operations of various multinational corporations in these economies, such as the repatriation of profits and the use of inappropriate technology. In addition, the pollution issue may be accountable for the negative impact of FDI on SADC's economic growth. Most developed nations' polluting industries have been relocated to developing nations. In developing regions such as SADC, FDIs have also been accused of corrupting top officials and political leaders.

It is discovered that opening the economy to the rest of the world significantly impacts the growth economy. This is consistent with several studies that have confirmed the positive impact of TO on economic growth, as no nation can endure isolation from the rest of the world. Human capital expenditures in education and health are believed to have a substantial positive effect on economic growth (EG).

Table 3A: Panel Model Result

Variables	Pooled Regression	Fixed Effect	Random Effect
GDP			
FDI	-0.03667	-0.151016	-0.0156738
	0.06641	0.088660	0.074533
HC	0.024664	0.493634	0.439565
	0.02337 *	0.002113 **	0.003515 **
TO	0.075837	0.039561	0.143318
	2.2e-16 ***	2.2e-16 ***	2.2e-16 ***
Intercept	11.701982	-	15.678333
	5.956e-13 ***	-	6.437e-10 ***
observations	2512	2512	2512
R^2	0.15282	0.11877	0.12116
Hausman Test		357.49(2.2e-16 ***)	

Table 3B: Panel Model Results (FGLS)

Variables	Fixed Effect FGLS	Random Effect FGLS
GDP		
FDI	-0.01899357	-0.024211
	3.888e-15 ***	0.000885 ***..
HC	0.5026839	0.0283600
	2.2e-16 ***	0.002960 **
TO	0.1395668	0.01750548
	2.2e-16 ***	2.2e-16 ***
Intercept	-	12.6215794
	-	6.409e-08 ***
Observations	2512	2512
R^2	0.23162	0.15208
Hausman Test	401.99(2.2e-16 ***)	

Table 4 displays the results of the Breusch-Godfrey/Wooldridge test for serial correlation in panel models. The results indicate that the p-values are statistically insignificant; consequently, the null correlation hypothesis is rejected. We conclude that our estimated model is free of correlation issues.

Table4: Breusch-Godfrey/Wooldridge test for serial correlation in panel models

	Chisq Statistic	p-value
Fixed Effec	182.71	0.1234
Fixed Effect FGLS	245.32	0.1672

Dumitrescu-Hurlin (DH) Panel Causality Tests

Table 5 contains the results of the Dumitrescu-Hurlin (DH) panel causality analyses. The findings indicate no causal link between FDI and EG in the Southern African Development Community. A confirmed bidirectional causal link exists between the exchange rate and the crude price.

Table 5: Dumitrescu-Hurlin (DH) Panel Causality Tests

Variables	Chi^2	H
FDI ⟶ GDP	has no causality	
TO ⟶ GDP	Bidirectional causality	
HC ⟶ GDP	Unidirectional causality	

Conclusion

This research aims to investigate the effects of TO and FDI on EG in the Southern African Development Community (SADC) region. The analysis makes use of quarterly data from 1970 to 2022. The statistical analysis results utilizing the fixed effects model indicate that both TO and human capital positively and significantly impact EG. These findings are consistent with the existing literature, especially regarding developing nations. However, FDI has been observed to have negative effects on EG.

The Dumitrescu-Hurlin (DH) panel causality tests indicate that there is insufficient empirical evidence to support the existence of a causal relationship between FDI and EG in the studied population. Evidence of bidirectional causality between TO and EG in the SADC region indicates that both variables exert influence on one another. The premise of this assertion is that the benefits of trade openness in the economy enhance the economy's growth potential. Theoretically, an increase in the transparency of the economy is associated with a corresponding increase in economic growth. This is because accelerated development would necessitate a market expansion to accommodate the growth. Human capital development has been studied in economic addition as measured by investments in education and healthcare. Human capital development leads to economic growth, as shown by the results. However, the reverse relationship, where human capital development leads to economic growth, could not be substantiated based on available evidence. To maximize the benefits of foreign direct investment (FDI) within the Southern African Development Community (SADC), substantial infrastructure investments and a robust institutional framework that discourages corruption and imposes severe penalties on wrongdoers are required. In addition, it is essential to establish stringent regulations and policies to monitor the repatriation of the highest returns on foreign direct investment while addressing concerns about their absorption capacity.

Policy Implications

- The research indicates that expanded trade opportunities stimulate economic growth throughout the SADC region. Trade barriers, such as tariffs and trade restrictions, should be reduced as a top priority for government policymakers. Regional trade agreements, improved infrastructure, and streamlined customs procedures all achieve this objective.
- The study emphasizes the importance of human capital investments in education and healthcare for economic growth. Governments should provide funding to make healthcare and educational opportunities more accessible to citizens. It may be necessary to make substantial investments in expanding educational facilities, introducing vocational training programs, and enhancing medical facilities to reach this objective.
- According to the research, the SADC region should prioritize attracting foreign direct investment (FDI), contributing to economic expansion. Policymakers can make their countries more attractive to foreign direct investment by enacting investor-friendly policies, enhancing infrastructure, and strengthening institutions. Additionally, safeguards should be in place to prevent corruption and facilitate the return of invested capital.

Limitations of the Study

- Due to its reliance on quarterly data from 1970 to 2022, the study may be subject to data limitations and potential biases. To fathom the interrelationship between TO, FDI, and EG in the SADC region, employing a broader temporal scope and current data may be advantageous.
- The applicability of this study's findings is limited to the Southern African Development Community (SADC) region and cannot be extrapolated to other regions or countries. Regional differences in defining characteristics and contextual factors may influence the correlation between TO, FDI, and EG. Therefore, it is not recommended to generalize these findings to other contexts without conducting additional research.
- Even when employing panel causality analyses, endogeneity and omitted variable bias can make it difficult to draw definitive conclusions regarding the correlation between the variables under study. Utilizing sophisticated econometric techniques and accounting for potential endogeneity issues in future research could increase the dependability of the findings.

The study's findings should be considered by policymakers when formulating strategies to boost the Southern African Development Community's trade liberalization, human capital development, and productive foreign direct investment. Given the study's limitations, it would be prudent for the researchers to conduct additional research to resolve the gaps and strengthen the empirical support for their findings.

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