Economic Diversification and Bilateral Trade Agreements in the United Arab Emirates: A Gravity Model Analysis

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The United Arab Emirates (UAE) has experienced a remarkable economic shift—from a reliance on pearl diving, fishing, and agriculture to becoming a global trade hub. This study explores the development of the UAE's bilateral trade agreements within its oil-based economy, especially after the 1970s oil boom. It highlights key strategies such as the Comprehensive Economic Partnership Agreements (CEPAs) and Dubai's diversification efforts, including the Jebel Ali Free Zone (JAFZ) and tourism expansion. Dubai's non-oil trade growth has positioned it as a significant global re-export center. Using a gravity-type trade model and pooled data from 1970 to 1997, the study evaluates the UAE's trade with nine major partners: India, China, the U.S., Canada, South Africa, Egypt, Kenya, the U.K., and Germany. Variables include GDP, distance, exchange rates, FDI, and trade openness. Results show that GDP, FDI, and openness boost trade, while distance and risk reduce it. The model accounts for about 90% of trade variation, offering insights for sustaining growth through strategic diversification.

Keywords: bilateral trade agreements, UAE, economic growth, foreign direct investment (FDI), gravity model of trade, trade openness, non-oil trade, Dubai economy, exchange rates, economic diversification

INTRODUCTION

The United Arab Emirates (UAE) has emerged as a significant player in global trade and economic development over recent decades. Central to this success is the country's strategic utilization of bilateral trade agreements (BTAs) to diversify its economy, reducing its reliance on oil and fostering growth in non-oil sectors. This paper examines recent studies and developments in trade theory concerning the UAE's efforts to leverage bilateral trade agreements as a tool for economic diversification. Before the first oil exports in 1962, the United Arab Emirates (UAE) economy was dominated by pearl production, fishing, agriculture, herding, and trading. Today, trade has become the cornerstone of the economy, and with the rise of oil prices in the 1970s, petroleum dominates the economy as it accounts for most UAE export earnings. The country has vast proven oil reserves, estimated at 98.2 billion barrels or about 8% of the

world's total, with gas reserves estimated at 214.4 trillion cubic feet or 3.5% of the world's total (Oil & Gas Journal, 2006). The Energy Information Administration (2006) reports that GDP growth was 7.2% in 2005. Most of this growth is attributed to high crude oil prices. At current production rates, UAE crude oil supplies could last over 150 years and much longer with rising prices.

The UAE is a federation of seven emirates – Abu Dhabi, Dubai, Sharjah, Ajman, Fujairah, Ras al-Khaimah, and Umn al-Qaiwain. The country initiated several bilateral trades, investment, and cooperation deals. This is known as Comprehensive Economic Partnership Agreements (CEPAs), allowing the country to diversify income sources and economic sectors further. Dubai, one of the seven emirates that make up the UAE, is the most populous and second largest of the emirates. It is distinct from other members in that most of its revenues are from the Jebel Ali Free Zone (JAFZ) and tourism, with revenue from oil accounting for only 6% of its Gross Domestic Product GDP. The JAFZ offers an economic zone with lucrative business and tax incentives to corporations and also caters to the Port, which ranks 13th in the world in terms of container traffic. As such, much of UAE's non-oil revenue comes from trade in Dubai, currently the world's third most important re-export center after Hong Kong and Singapore. The non-oil trade rose 12.6% from 2022, reaching a record high of 3.5 trillion dirhams ($952.93 billion) in 2023.

Dubai is strategically located between Africa, the Middle East, the Far East, and Europe, connecting over 1.5 billion consumers in countries surrounding the Red Sea and the Gulf. It has a superb infrastructure, and as a consequence, it has become a critical link in the global transport and distribution system. The free trade zone in this emirate provides warehousing and distribution facilities to international and local corporations. More than 200 factories operate at the Jebel Ali complex in Dubai, including a deep-water port and a free trade zone for manufacturing and distribution. Goods for re-export or transshipment enjoy a 100% duty exemption within the free trade zone. A central power plant with associated water desalination units, an aluminum smelter, and a steel fabrication unit are prominent facilities within the complex. The emirate has construction and development in various industries and has attracted world attention through innovative real estate projects, sports events, and conferences. These have led to an increased population, which coincides with the emergence of Dubai as a world business hub and the potential human rights concerns due to its largely immigrant workforce.

The Africa Business Guide (2006) reports that the size of the Dubai economy has been increasing at a steady pace since the early 1980s. Dubai has emerged as a significant re-export center for the entire Middle East and a major supplier of goods to such emerging markets as India, the Commonwealth of Independent States (CIS), Central Asia, and Africa. Dubai can potentially promote almost any type of goods and services in a regional context and has been playing an important role in catering to the increasing demand for foodstuff, high-technology equipment, and luxury products in the prosperous Gulf countries. Dubai also reaches enormous markets in the East African countries, the CIS, Iran, and the Indian subcontinent. By establishing a base in Dubai, international entrepreneurs, manufacturers, and exporters of less sophisticated equipment and mass consumer products can find readily available buyers for their goods.

This paper will look at the significant determinants of bilateral trade between the UAE and its major trading partners in an applied gravity-type trade model with pooled data for nine countries from 1970 to 1997. Specifically, this paper will analyze and compare the UAE trade pattern with India, China, the United States, Canada, South Africa, Egypt, Kenya, the United Kingdom, and Germany. These countries are in different geographical locations, at different distances from the UAE, and have different economic sizes. Therefore, this paper seeks to quantitatively explain the trade volume between the UAE and the selected countries. All these countries are members of the World Trade Organization (WTO). The WTO (2006) reports that most members are party to one or more regional trade agreements (RTAs). At the end of 2005, 170 of the 250 existing RTAs will be in force, and about 70 will soon be operational. The CIA World Fact Book (2006) reports in April 2004 that the UAE signed a Trade and Investment Framework Agreement (TIFA) with Washington and, in November 2004, agreed to undertake negotiations toward a Free Trade Agreement (FTA) with the US.

LITERATURE REVIEW

Bilateral Trade Agreements are instrumental in supporting the UAE's diversification strategy. By opening up new markets and encouraging foreign investment, BTAs enable the country to tap into global value chains and develop new industries. For instance, the UAE-Japan BTA has facilitated the growth of the UAE's manufacturing and high-tech sectors, with Japanese firms investing in automotive manufacturing, electronics, and renewable energy (Tsuchida & Fujimura, 2022). Similarly, the UAE's agreement with the United States has led to significant investments in the aerospace and defense industries, diversifying the UAE's industrial base (Ismail et al., 2022). Moreover, BTAs help the UAE access advanced technologies and know-how from its trading partners, accelerating the development of high-value industries such as artificial intelligence (AI), renewable energy, and financial services. For example, the UAE's partnership with South Korea has enabled the transfer of nuclear energy technology, which is expected to play a critical role in the country's transition to a more sustainable energy mix (Kim & Lee, 2021).

International trade is the exchange of goods and services across international boundaries, representing a significant share of GDP in most countries, and its importance has been on the rise recently. As a result, industrialization, advanced transportation, multinational corporations, and outsourcing have been on the rise and have significantly impacted international and bilateral trade between countries. Alavi and Thompson (1988) report that the Foreign Trade Zones Act became a law in the United States in 1934, but firms only realized their potential importance in the late 1970s. Increased free trade zones have resulted in increased competition and increased international trade.

Linnemann (1966) explains why the sizes of international trade flows differ between different pairs of countries. Using data from 80 different countries between 1958 and 1960 and a log-linear relationship with variables that affect supply from the exporting countries and demand from the importing countries, he uses regression analysis to produce three different results. His results show that countries within the same colonial and ex-colonial blocks have a more balanced increase in trade volumes. However, Rettab and Morada (2004) explained that the non-oil trade of Dubai grew by 21% between 2002 and 2004, with import growth of 21%, re-export growth of 28%, and export by 3%. Dubai primarily trades machinery, electrical and electronic equipment, precious stones and metals, vehicles, aircraft, transport equipment, textiles, prepared foodstuff, and vegetable products. Major trading partners include China, India, Japan, Germany, the USA, the UK, Iran, Kuwait, Libya, Kenya, Tanzania, South Africa, and Malaysia. Dubai has a significant trade deficit with China and a primary surplus with Iran.

De Groot, Linders, Rietveld, and Subramanian (2004) examine the institutional determinant of bilateral trade patterns in a gravity-type model using variables like geographical proximity, language, trade policy, and shared history. Focusing on governance, rules, and norms, they determine whether institutional homogeneity and quality impact the trade volume between countries. They find that a similar institutional framework and better quality of institutions would increase bilateral trade volume.

Frankel and Rose (2002) estimate the effect of common currencies on trade and income. Using data from over 200 countries and two-stage estimation, they show that having a common currency triples trade with another currency union. The second stage of the estimation shows that every 1% increase in overall trade raises income by 0.33%. The study concludes that belonging to a currency union promotes trade.

Anderson and Marcouiller (2002) empirically investigate insecurity and the pattern of trade. Testing the hypothesis that corruption and imperfect contract enforcement dramatically reduce trade, they estimate trade reduction with a structural import demand model, including transaction cost. They find poor institutional quality is ineffective and constrains trade far more than tariffs. They also show that ceteris paribus, the traded good expenditure share declines significantly as income per capita rises and that cross-country variation in the effectiveness of institutions explains the observed global pattern of trade. High-income, capital-abundant countries trade disproportionately with one another relative to low-income countries.

Bilateral Trade Agreements in the UAE

Bilateral trade agreements (BTAs) are treaties between two countries that foster trade and investment by reducing tariffs, eliminating barriers, and promoting cooperation in various economic sectors (Panagariya, 2020). BTAs have gained increasing importance in the UAE's trade policy as it seeks to expand its economic partnerships beyond oil-related industries. In recent years, the UAE has signed multiple BTAs with countries such as India, Japan, and the United States, focusing on trade liberalization and foreign direct investment (FDI) (Ahmad et al., 2022).

One of the UAE's most notable bilateral agreements is with India, a rapidly growing economy and one of the UAE's largest trading partners. The UAE-India Comprehensive Economic Partnership Agreement (CEPA), signed in 2022, aimed to boost trade between the two nations by reducing tariffs on goods and services, encouraging FDI, and creating new market opportunities (Ahmad et al., 2022). This agreement is expected to significantly contribute to the UAE's economic diversification efforts by promoting growth in manufacturing, services, and technology (Chaudhary & Patel, 2023).

Economic Diversification in the UAE

Economic diversification refers to expanding the variety of economic activities within a country, reducing dependence on a single sector or commodity (El Ebrashi, 2021). In the UAE's case, the diversification agenda is driven by the Vision 2021 and Vision 2030 strategic frameworks, which emphasize reducing reliance on oil revenues and fostering growth in non-oil sectors such as finance, tourism, logistics, and technology (Al Qasimi & Al Tamimi, 2021). The country's leadership recognizes that diversification is essential for long-term economic stability and sustainable growth. Recent studies highlight the UAE's success in achieving some degree of economic diversification through its BTAs. For example, the UAE has become a significant hub for logistics and trade, with Dubai's ports and airports serving as crucial entry points for goods moving between Asia, Europe, and Africa (Ismail et al., 2022). This has enabled the UAE to strengthen its position as a global trade hub while diversifying its economy by developing logistics, transportation, and services industries.

Challenges and Opportunities

Despite the success of BTAs in promoting diversification, the UAE still faces several challenges in its economic transition. One challenge is the potential for increased competition in specific industries, particularly in manufacturing and services, as foreign firms enter the market (Chaudhary & Patel, 2023). Additionally, the UAE must continue investing in education and workforce development to ensure its citizens are prepared to participate in new industries. On the other hand, there are significant opportunities for the UAE to further enhance its economic diversification through BTAs. As global trade patterns shift in response to changing geopolitical and economic dynamics, the UAE is well-positioned to benefit from emerging markets in Africa and Asia. The UAE's participation in the Belt and Road Initiative (BRI) offers new avenues for investment and trade in infrastructure, logistics, and energy, further supporting diversification (Al Qasimi & Al Tamimi, 2021).

THEORY AND EMPIRICAL MODEL

In its basic form, the gravity model of trade is an empirical analysis of trade patterns among countries; it predicts trade based on the distance between countries and the interaction of the economic sizes. However, other factors affect bilateral trade flows, such as tariffs, exchange rates, risks, bureaucracies, and languages that either aid or impede trade. Keith (2003) defines the "gravity equation as a formulation for statistical analyses of bilateral flows between different geographical entities." Feenstra, Markusen, and Rose (2001) explain that international trade flows can be described using an equation in which bilateral trade flows are a log-linear function of the incomes and distance between trading partners.

This equation could be written as follows:

$$F_{ij} = (G)(Y_i)^{\beta 1}(Y_j)^{\beta 2}(D_{ij})^{\beta 3}(R_{ij})^{\beta 4}\varepsilon_{ij} \quad (1)$$

Equation (1) is a linear approximation of the gravity-type model where F_{ij} = the total value trade flow between county i and country j measured as the total Dollar value of imports and exports between the two countries, Y_i = the economic size of country i as GDP per capita, Y_j = the economic size of country j as GDP per capita, G = constant, D_{ij} = the distance between the two countries, and R_{ij} = vector of other factors that promote or impede trade between the trading countries. Subscript (i) denotes the home country, and (j) denotes the foreign partner. Distance is a proxy for the cost of moving goods from country i to j and vice versa. It is assumed that the greater the distance, the more it will cost to move goods between the countries. There are other reasons why distance is essential in the gravity equation. Head (2003) explains that it could also indicate time elapsed during shipment, accounting for the risk of damage during transportation or loss of sales if goods are unnecessarily delayed. Distance could also represent synchronization costs, such as warehousing, incurred if the good is part of a production process and encounters bottlenecks. Distance could also be a proxy for communication cost, transaction cost, or cultural distance.

Sanso, Cuairan, and Sanz (1993) explain that the origin of the gravity equation as an instrument for bilateral trade flows is an intuitive approximation. The success of its application has enhanced the interest in finding its microeconomic foundations. They conclude that a significant characteristic of the equation is its general validity, which applies to any pair of countries. Other variables, including dummies indicating membership to an economic area or protection levels, border effects, monetary agreements, or free trade agreements, may be added to the regression analysis. Bergstrand (1985) explains that the gravity equation has long been recognized for its empirical success in explaining different flows like migration, tourism, and commodity shipping. He specifies a log-linear equation where a flow from origin i to destination j can be explained by economic forces at the origin, economic forces at the destination, and economic forces aiding or resisting the flow. The trade flow is assumed to be affected by price levels in the trading countries and the trade quantity.

$$F_{ij} = f\,(P, P^*, Q) \tag{2}$$

where P is the home price in the UAE, P* is the price in the foreign country, and Q is the quantity of trade between the two countries measured in dollar values of the trade. Without product differentiation or transport costs, the prices will be equated by the purchasing power parity (PPP).

While Import price

$$P_m = eP^*(1+D) \tag{3}$$

similarly Export price

$$P_x^* = P\,(1+ D)/e \tag{4}$$

Let F_{ij} be the U.S. dollar value of non-oil trade between UAE and the selected trading partners. This trade is the sum of export revenue and import expense for the home country, Dubai. Trade is assumed to be a function of price levels in both countries and the quantities (Q) of goods traded. It is assumed that the products are undifferentiated between countries and that there is perfect product substitutability. Anderson (1979) assumes that preferences are identical in the trading countries and expenditure shares are identical, making prices constant at equilibrium values. Units are chosen so that prices are consistent. Bergstrand (1985) concludes that substantive deviations from PPP will persist without tariffs and transport costs, and the exchange rate and distance will dominate the price. Distance is a proxy for the transport cost paid to move goods between the two countries, the time lag between the trading countries, communication cost, and cultural distance (Head, 2003). Equation (2) then becomes:

$$F_{ij} = f\,(e_{ij}, D_{ij}\,R_{ij}) \tag{5}$$

D_{ij} = transport cost, e_{ij} = exchange rate between the trading countries, and R_{ij} = Foreign Direct Investment (FDI), risk, and openness (each country's trade index.

Liberatori (2001) explains FDI as a variable that measures an essential aspect of globalization, i.e., the economic integration of activities performed in different world regions. FDI is only one of the factors influencing the international integration of markets and the growth of national economies. International economic integration results from direct and indirect mobility of resources across national borders. This mobility may take various forms, including migration of workers, international trade in goods and services, capital flows, and international production.

The total volume of trade between the UAE and the trading countries will be the sum of the values of exported and imported goods.

$$F_{ij} = (X_{ij} + M_{ij}) \quad (6)$$

Where Export, $X_{ij} = x(Y^*, P/e)$ and Import, $M_{ij} = m(Y, eP^*)$ and the total volume of trade is the sum of total export and import. Exports are a function of foreign country income (Y*), home price (P), and the exchange rate (e). Imports are a function of the home country's income (Y) and the foreign country's price (P*) and exchange rate (e). The general trade flow equation becomes

$$F_{ij} = g(Y^*, Y, e, D, R) \quad (7)$$

Total trade from the home country's point of view is expected to be an increasing function of foreign and home income, the exchange rate, and the cost of trade between the two countries. The cost of trade is expected to increase with the distance between the countries. The empirical bilateral trade model is specified as follows:

$$\ln F_{it} = \beta_0 + \beta_1 \ln Y_{it} + \beta_2 \ln Y_{jt} + \beta_3 \ln D_{ijt} + \beta_4 \ln eX_{ijt} + \beta_5 \ln R_{ijt} + \beta_6 \ln FDI_i + \gamma_{1\text{-}8}\, D_{1\text{-}8} + \varepsilon_{iit} \quad (8)$$

The data for this study includes data on the countries' GDP, values of trade between the countries, the distance between the countries, exchange rate, and the trade barriers or incentives such as openness of the countries, and the risk levels in each of the trading countries. The R_{ij} includes variables such as openness (Z), which is measured as the total trade as a percentage of the GDP, expected to have a positive effect on trade; country risk (R) is expected to affect trade negatively, and foreign direct investment (FDI), expected to have a positive effect on trade. For this study, the corruption risk *R* index is used, and it is rated 0 – 6, where 6 is less risk, and it is expected to have a negative effect on trade (The World Bank, 2006)

The FDI variable explains the level of investment other countries have in UAE, measured in dollars and expected to have a positive effect. FDI could be investments in new facilities or expanding existing facilities in a foreign country, creating new production capacity, jobs, transfer technology, or know-how. This is a form of linkage to the global marketplace and helps increase trade flows. Distance (D) is a proxy for transport costs, time lags between trading countries, communication costs, and cultural differences. $D_{1\text{-}8}$ is the dummy that allows for different intercepts for each of the nine countries that trade with the UAE. Trade theory has experienced several notable advancements in recent years, particularly in its application to bilateral trade agreements (BTAs) and economic diversification. For the UAE, which is working to reduce its dependency on oil and foster growth in non-oil sectors, recent developments in trade theory offer essential insights into the role of BTAs in shaping economic outcomes.

Advancements in Trade Theory

One critical development in trade theory is the application of new structural gravity models to analyze bilateral trade agreements (Bergstrand & Egger, 2021). These models have become increasingly sophisticated in capturing the dynamic effects of BTAs by accounting for changes in trade costs, market access, and production factors. The UAE has used such theoretical frameworks to analyze the long-term impacts of its trade agreements on economic diversification. According to Beshkar et al. (2022), these

models provide a better understanding of how BTAs can drive trade volume and shifts in the composition of traded goods, facilitating diversification into sectors like manufacturing and services.

Another advancement is the incorporation of firm heterogeneity into trade models. Traditional trade theories, such as the Ricardian and Heckscher-Ohlin models, assumed homogeneous firms within industries, but recent studies highlight the diversity of firm productivity within sectors (Melitz, 2003). In the UAE context, firm-level trade data has been used to explore how BTAs affect domestic firms differently based on their productivity and export capabilities (Ahmad et al., 2023). These models show that larger, more productive firms in the UAE are better positioned to take advantage of new market access provided by BTAs, thus accelerating diversification in high-tech and service sectors.

Empirical Methodologies

Recent empirical methodologies have also advanced significantly, enabling a more nuanced analysis of the effects of BTAs on economic diversification. One such advancement is the use of micro-level data in empirical studies. Firm- and industry-level datasets allow researchers to explore how BTAs influence specific sectors and firms, providing a more granular view of trade's impact (Pierce & Schott, 2021). For the UAE, empirical studies using micro-level data have demonstrated that BTAs increase overall trade volumes and spur diversification by shifting exports from oil-based commodities to sectors such as manufacturing and logistics (Tsuchida & Fujimura, 2022).

Another significant methodological advancement is synthetic control methods (SCM) for evaluating the causal impact of BTAs. SCM enables researchers to construct a synthetic version of the UAE's economy based on other countries that did not sign BTAs, allowing for a robust comparison of outcomes (Abadie et al., 2010). Recent studies using SCM have demonstrated that the UAE's bilateral agreements, such as the Comprehensive Economic Partnership Agreement with India, have led to substantial growth in non-oil sectors, especially in industries like information technology and financial services (Chaudhary & Patel, 2023). Lastly, advancements in network analysis have facilitated a deeper understanding of how the UAE integrates into global trade networks. Network analysis tools allow researchers to visualize the UAE's evolving trade relationships and assess the centrality of its economy in global trade (Hidalgo & Hausmann, 2009). Recent research suggests that the UAE's BTAs have bolstered its position as a critical global trade hub, leading to diversification by connecting it to new markets across Africa and Asia (Ismail et al., 2022).

Data Analysis and Estimation

The data came from several sources: The World Penn Table, Robert Feenstras' data website, the Department of Trade and Industry of South Africa, FRED II, Data Management and Research Department of UAE, World Bank Trade Flow, NBER data, World in Figures, and the WTO website. Nine countries have 28 years of time series data from 1970 to 1997. The data is pooled, and a panel analysis is performed. Pooling helps to care for the biased, unobserved omitted variables that differ between the countries over time or omitted variables that vary over time but are constant between countries. The data structure confers two dimensions on all the variables, including the error term, a cross-sectional unit of observation indicating the countries (i, j), and a time reference (t), which indicates the year. Due to the nine counties considered in this study, the model also includes eight country dummies to account for the country effects. To establish the stationarity and normality of the pooled variables, autoregressive tests (AR1) of the natural log of the variables are conducted on the series. The stationarity tests also include dummies for the country effects. The variables are all stationary with white noise (Figure 2-7). The residual error term of each of the variables has zero mean, zero covariance, and constant variance, fulfilling white noise conditions.

FIGURE 1
REGRESSION RESIDUAL PLOT

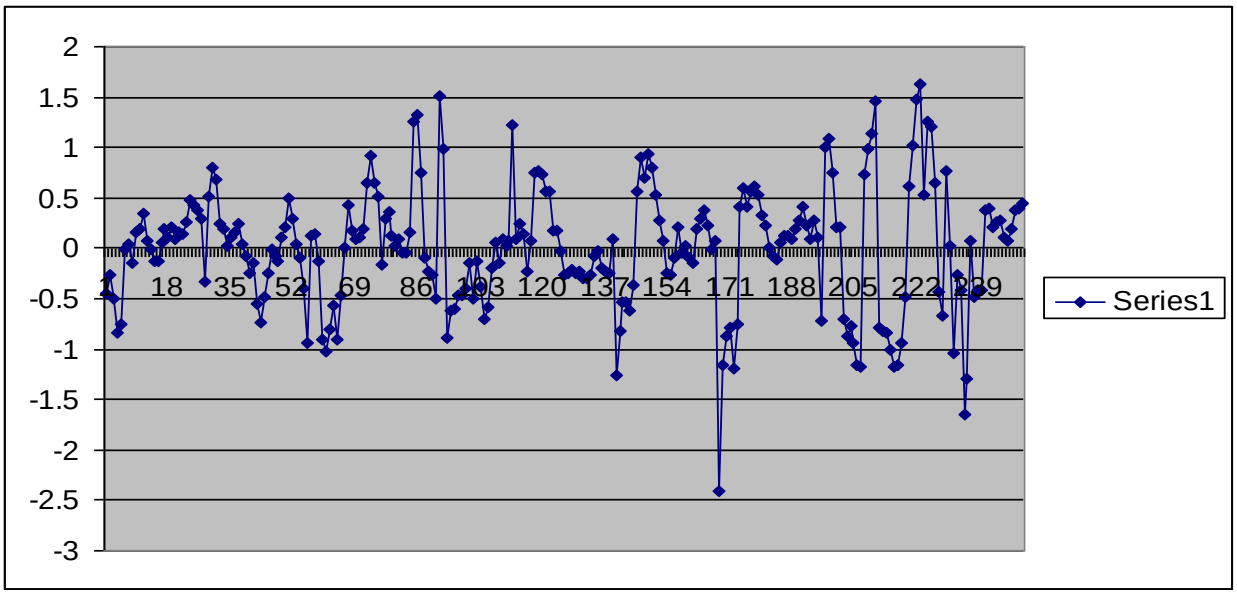


Figure 1 displays the residuals of a fitted model over a range of data points from 1 to 239. The distribution of residuals around the zero line indicates the accuracy of the model's predictions. Ideally, residuals should be randomly distributed around zero, with no apparent pattern, signifying that the model's errors are consistent across all data points. The residuals in this plot seem to fluctuate randomly around the zero line, suggesting that the model has appropriately captured the underlying trend of the data. However, there are a few points where the residuals deviate more significantly, which could indicate outliers or areas where the model's performance is less accurate. These deviations warrant further investigation to determine if they are due to model misspecification, data anomalies, or other factors. Overall, this plot provides a useful diagnostic tool for assessing the model's fit and identifying potential areas for improvement.

FIGURE 2
TIME PLOTS OF THE VARIABLES

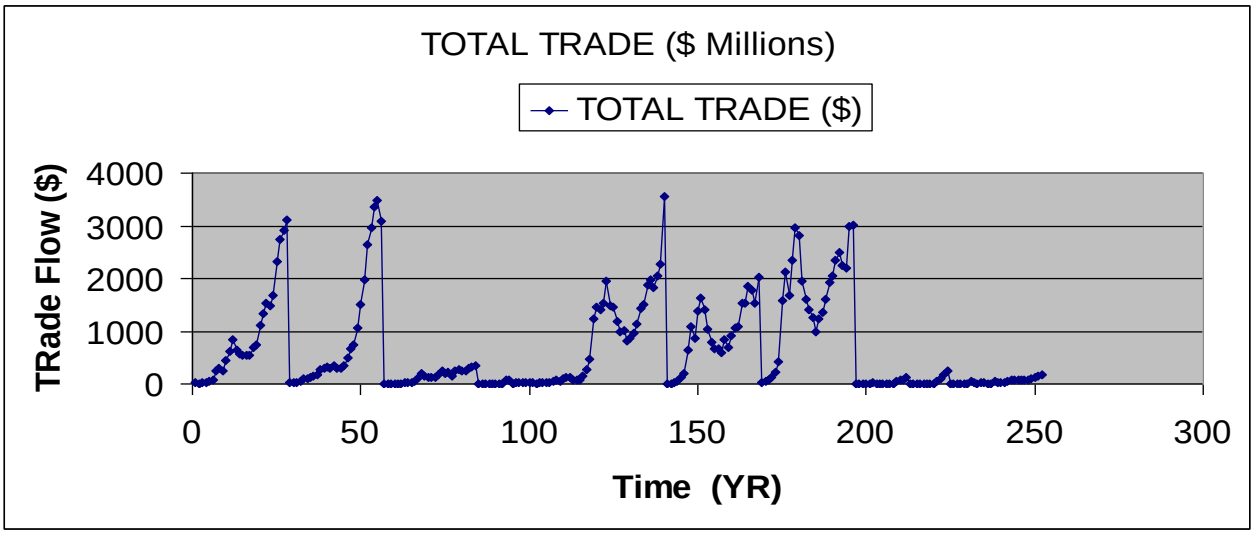
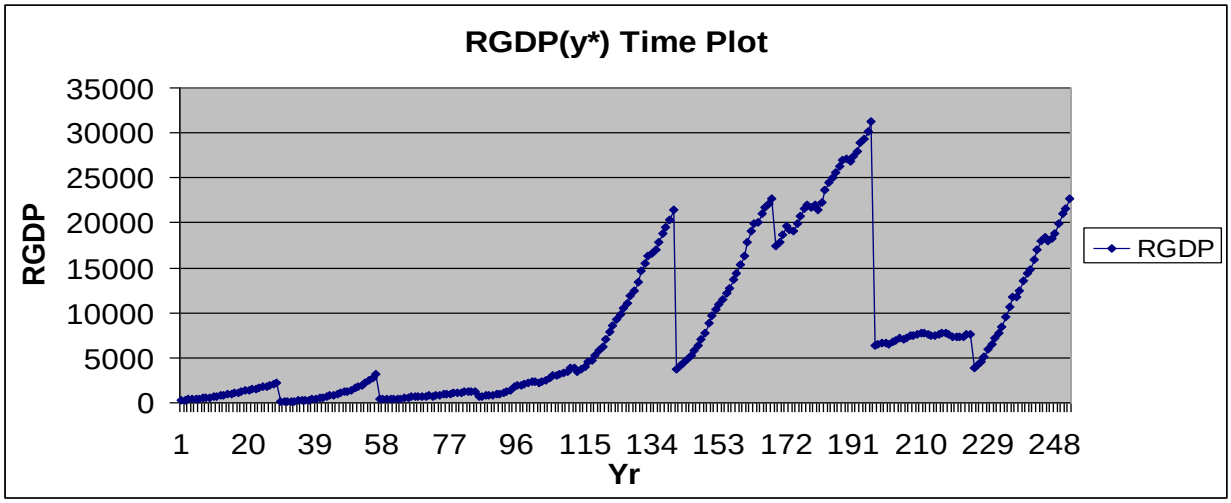


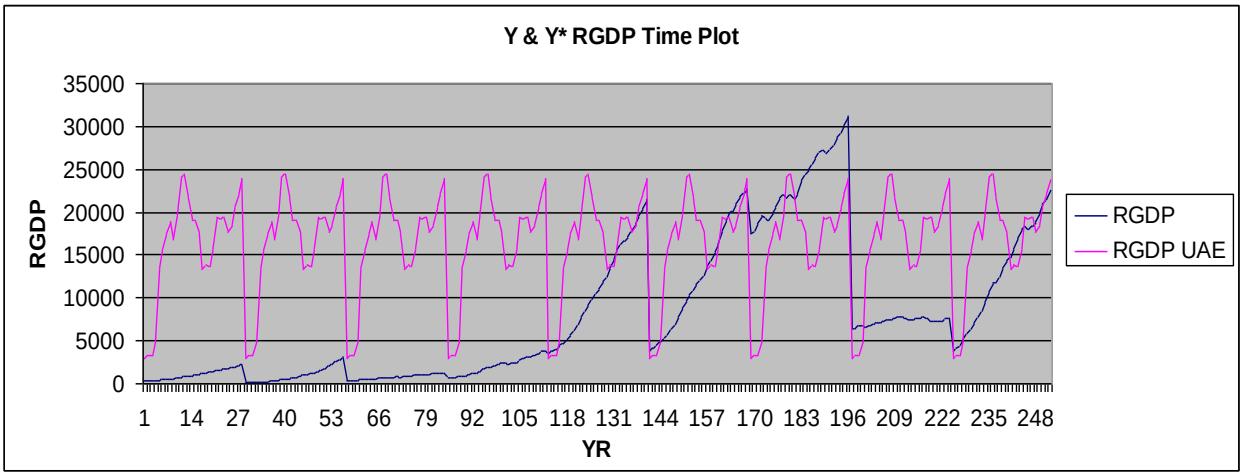
Figure 2 illustrates the time plots of total trade values over a period, and the plot depicts a consistent upward trend in total trade values, signifying growth over the observed period. The data points are plotted at intervals up to 300 years, demonstrating an apparent long-term increase in trade flows, suggesting an expanding economic environment or increasing globalization influences over time. This visualization is crucial for understanding the temporal dynamics of trade, as it reveals the overall trend and any potential fluctuations within the observed period. The steady rise in the plot indicates robust growth, while the magnitude of trade flows underscores the significant economic activity. However, without further context regarding economic policies, global events, or regional developments, the plot alone cannot explain the underlying causes of this growth. The figure effectively highlights the importance of temporal analysis in economic research and provides a foundation for further investigation into the factors driving trade expansion.

FIGURE 3
REAL GROSS DOMESTIC PRODUCT (RGDP) VALUES OVER TIME



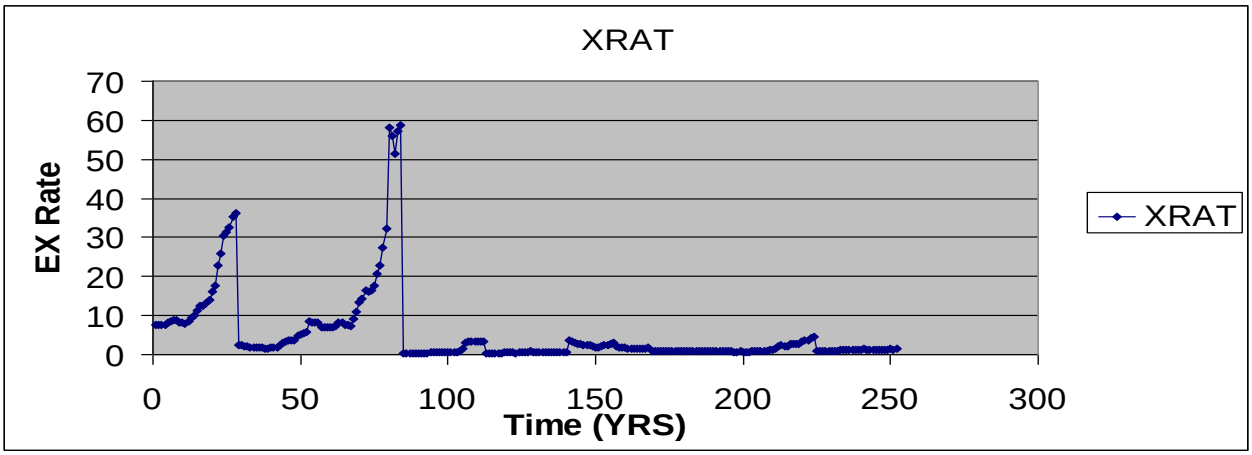
The Real Gross Domestic Product (RGDP) values over time indicate a significant upward trajectory in RGDP values, suggesting sustained economic growth over the observed period. Starting from a base value close to zero, the RGDP increases steadily, reaching 35,000 thousand dollars by the end of the timeline, as shown in Figure 3. This upward trend reflects an expanding economy and potentially increased productivity and economic output over time. The consistent rise in RGDP indicates robust economic health and growth. Such a trend is crucial for policymakers and economists as it highlights the effectiveness of economic policies, investments, and other factors contributing to growth. However, while the overall trend is positive, the plot does not provide insights into the underlying causes or potential fluctuations during the period. Further analysis would be required to examine factors such as policy changes, external economic shocks, or other variables that might have influenced the RGDP growth. The figure serves as a fundamental representation of economic progress, offering a macroeconomic perspective on the performance and trajectory of the economy.

FIGURE 4
UNITED ARAB EMIRATES (UAE) RGDP TIME PLOT



A comprehensive time-series analysis of key economic indicators for the United Arab Emirates (UAE) is provided in Figure 4, which shows the RGDP time plot, illustrating both actual RGDP (Y) and potential RGDP (Y*). The X-axis represents the years, while the Y-axis shows the RGDP in thousands of dollars. The data reveals a steady increase in actual and potential RGDP over time, reflecting consistent economic growth. The gap between Y and Y* appears minimal, indicating that the UAE economy is operating close to its potential output, which signifies efficient utilization of resources and minimal economic slack. Figure 5 illustrates the UAE's exchange rate (EX Rate) time plot. This figure highlights the UAE's exchange rate fluctuations over the observed period. The plot exhibits periods of stability interspersed with significant changes, which could indicate various macroeconomic factors such as changes in oil prices, monetary policy adjustments, or shifts in global economic conditions. The variability in the exchange rate underscores the importance of a stable macroeconomic environment for maintaining economic stability.

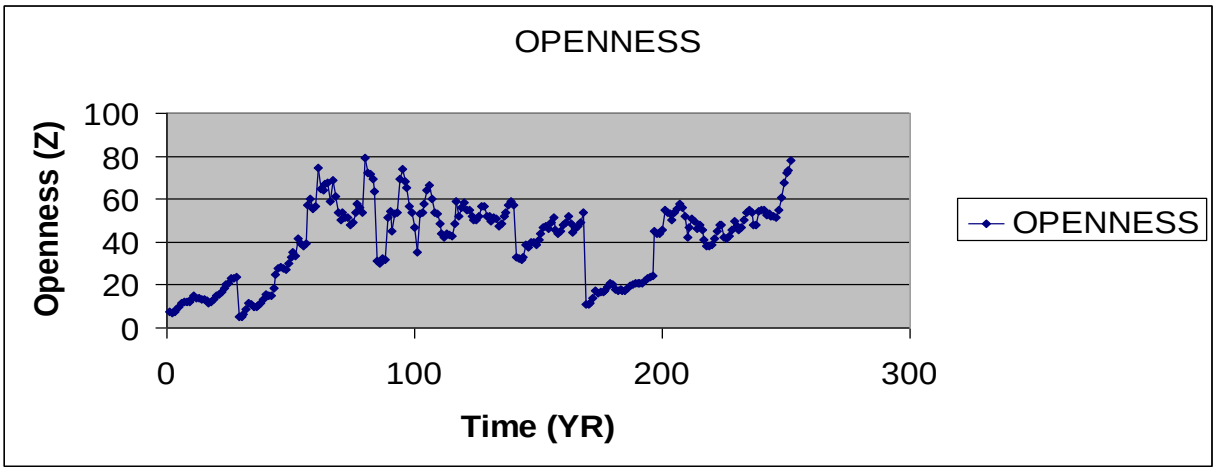
FIGURE 5
UAE'S EXCHANGE RATE (EX RATE) TIME PLOT



A time plot of the UAE's economic openness, represented as a percentage, is shown in Figure 6. This figure demonstrates an increasing trend in economic openness over time, suggesting that the UAE has progressively integrated into the global economy. The upward trajectory indicates enhanced trade policies,

foreign investment inflows, and a strategic shift towards diversification beyond oil dependency. Increased openness is often associated with economic growth and development, facilitating access to international markets, technology transfer, and investment opportunities. These figures offer a detailed overview of the UAE's economic performance and integration into the global economy.

FIGURE 6
UAE'S ECONOMIC OPENNESS, REPRESENTED AS A PERCENTAGE



The steady growth in RGDP highlights the resilience and strength of the UAE's economy, while the exchange rate fluctuations point to the dynamic nature of its monetary environment. The rising trend in economic openness underscores the strategic efforts by the UAE to diversify its economic base and enhance its global economic linkages. This multi-faceted analysis is crucial for understanding the economic trajectory of the UAE and identifying areas for policy intervention to sustain and enhance economic growth.

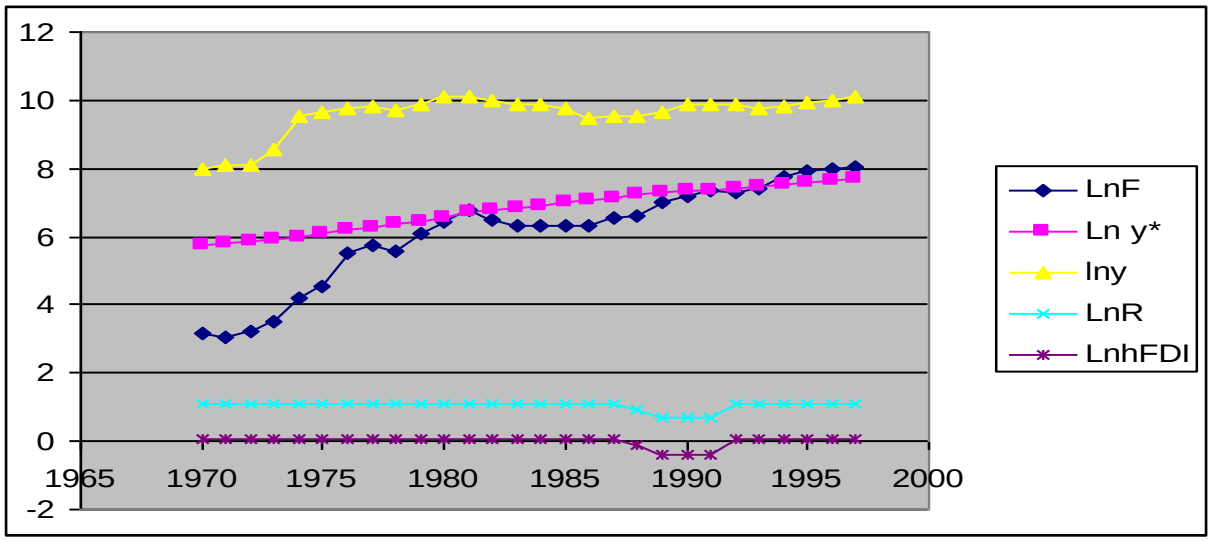
RESULTS AND DISCUSSION

A comprehensive time plot that examines various economic indicators for multiple countries, including India, China, Kenya, Egypt, the United Kingdom, Germany, the USA, South Africa, and Canada, from 1965 to 2000. The indicators plotted are natural logarithms of different variables: LnF (possibly reflecting some form of economic factor), Ln y* (potential output), lny (actual output), LnR (possibly reflecting resources or revenue), and LnhFDI (likely foreign direct investment). Each subplot follows the same analysis pattern across different countries, providing a comparative view of economic performance and trends over time.

India

Figure 7 for India illustrates the logarithmic values of various economic indicators from 1965 to 2000. The plot includes logarithms of GDP (lny), potential GDP (ln y*), foreign direct investment (LnFDI), remittances (LnR), and a factor (LnF). The steady upward trend in lny and ln y* indicates consistent economic growth and an increase in potential output. The increasing trend in LnFDI suggests that India has become a more attractive destination for foreign investments, likely due to liberalization policies initiated in the early 1990s. LnR also shows an upward trajectory, reflecting the significant role of remittances in the Indian economy. This data suggests that India's economic policies have fostered growth, increased foreign investments, and harnessed remittances to boost economic development.

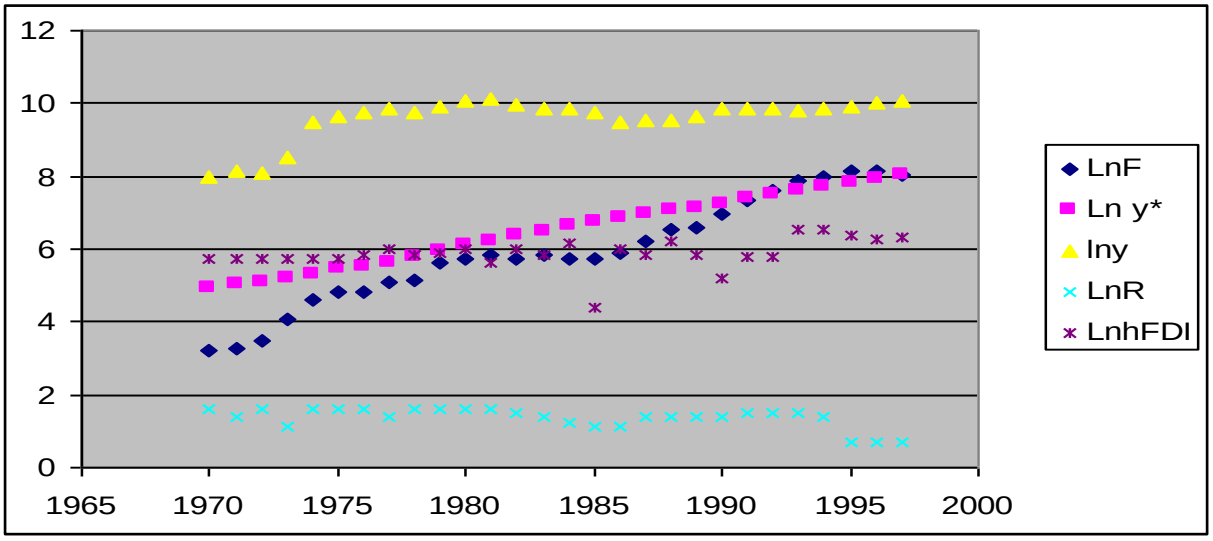
FIGURE 7
INDIA



China

China's plot reveals a more dramatic upward trajectory, particularly from the late 1980s, aligning with its economic reforms and opening-up policies. The steep rise in lny and Ln y* reflects rapid industrialization and economic growth. The substantial increase in LnR indicates that resource utilization has grown significantly, while the surge in LnhFDI indicates China's attractiveness as a destination for foreign investments. China's plot illustrates how policy shifts can lead to profound economic transformations over a relatively short period.

FIGURE 8
CHINA

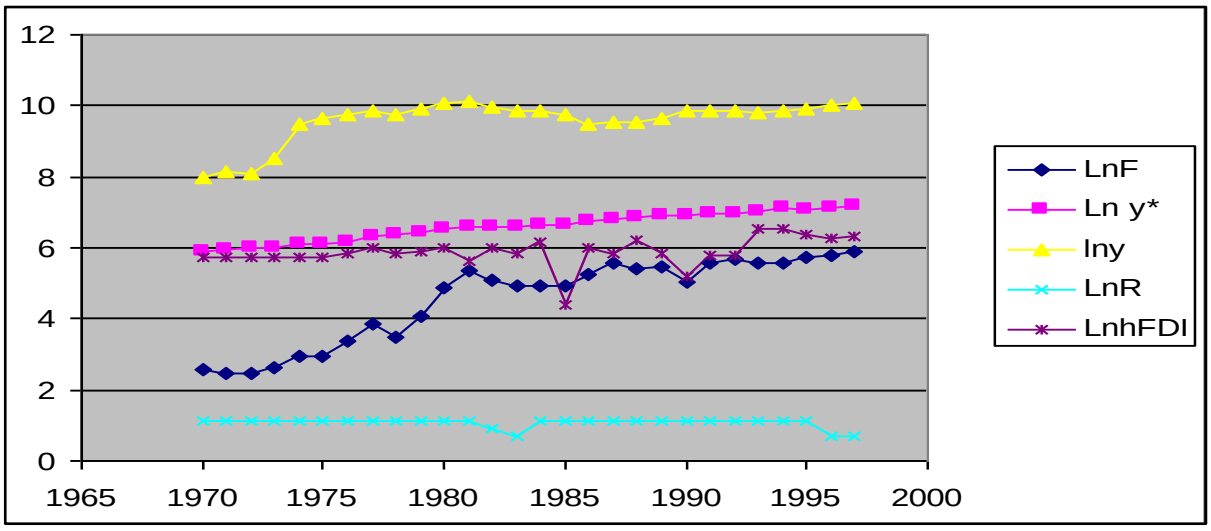


Kenya

The plot for Kenya shows a more gradual and less consistent growth pattern than India and China. The indicators exhibit fluctuations, suggesting periods of economic instability. The modest increase in LnhFDI

indicates some level of foreign investment but not at the scale seen in the other countries. Kenya's economic performance appears more volatile, reflecting challenges in achieving sustained growth and stability.

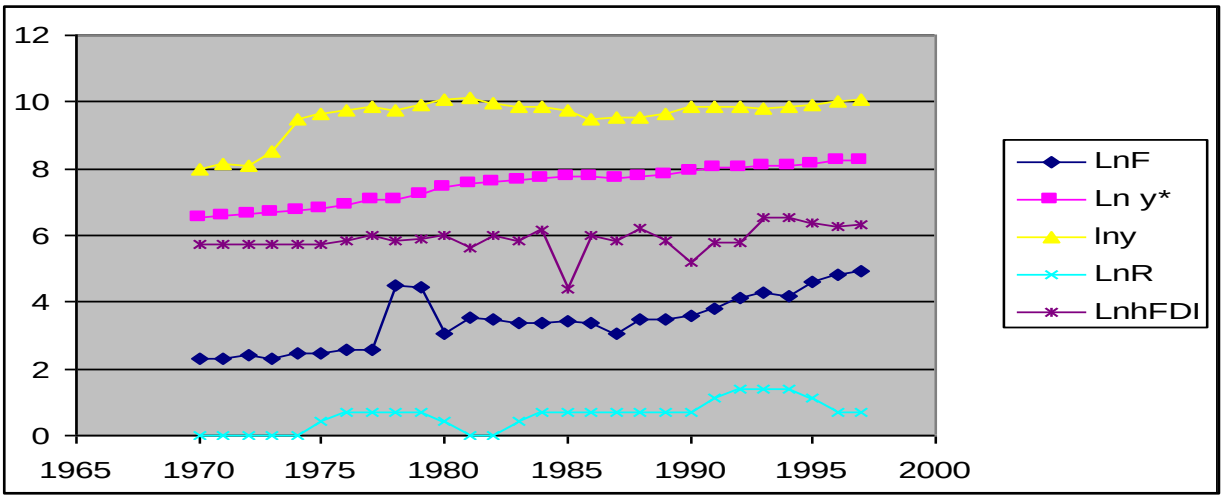
FIGURE 9
KENYA



Egypt

For Egypt, the plot shows a steady increase in GDP, albeit with some fluctuations that may be attributed to political and economic challenges. The rise in FDI and trade openness in the late 1990s reflects efforts to reform the economy and attract foreign investment, aligning with broader globalization trends.

FIGURE 10
EGYPT

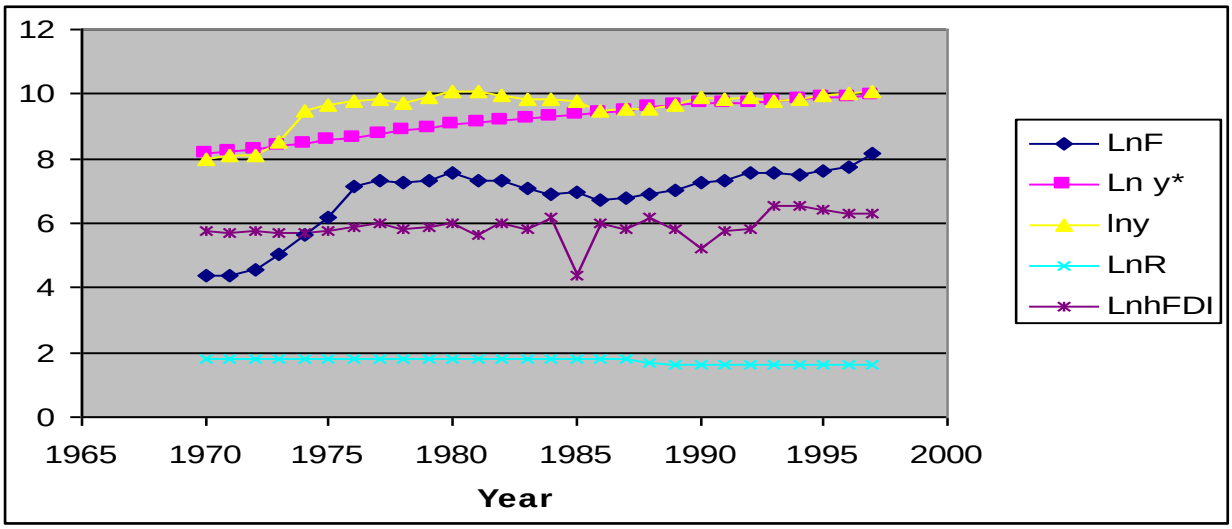


United Kingdom

The United Kingdom's plot indicates a steady and consistent growth in lny over the period, with ln y* closely tracking actual output, suggesting effective utilization of economic potential. The LnhFDI plot shows significant fluctuations, with peaks indicating periods of high foreign investment. The LnF plot indicates a stable but slowly growing labor force, while LnR shows a consistent upward trend, reflecting

strong and increasing investments in research and development. This pattern underscores the UK's developed economy with robust mechanisms for attracting foreign investment and fostering innovation, contributing to its sustained economic growth.

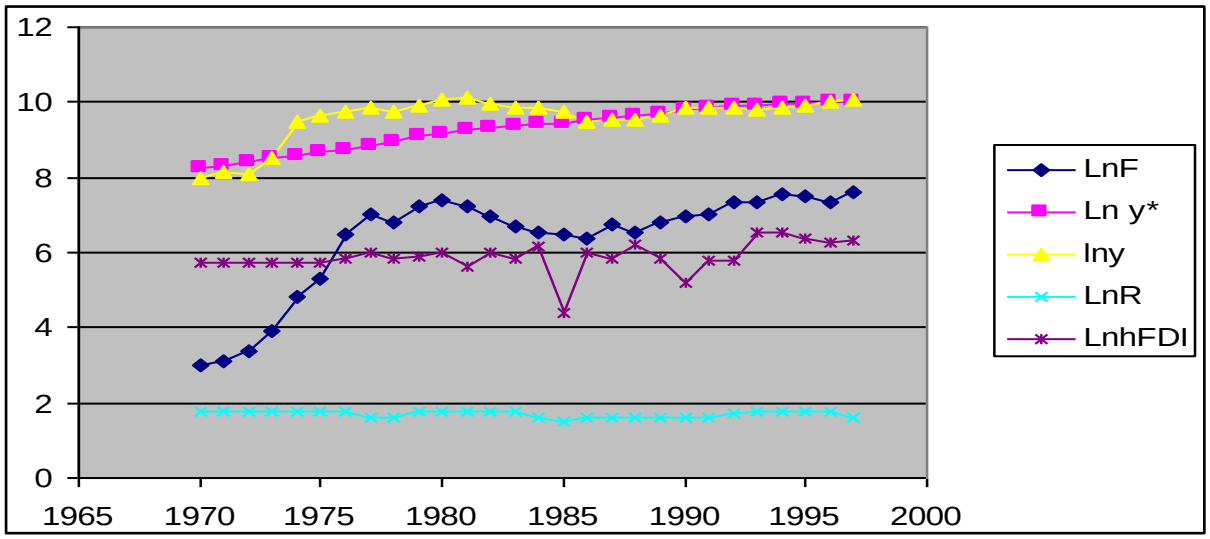
FIGURE 11
UNITED KINGDOM



Germany

For Germany, Figure 12 shows strong growth in GDP (lny) and potential GDP (ln y*) from 1965 to 2000. The significant rise in LnFDI reflects Germany's position as a leading destination for foreign investments, underpinned by its industrial prowess and stable economic policies. The LnR remains relatively stable, indicating a lesser role of remittances in the German economy. This analysis underscores Germany's robust economic growth, driven by substantial foreign investments and a stable macroeconomic environment.

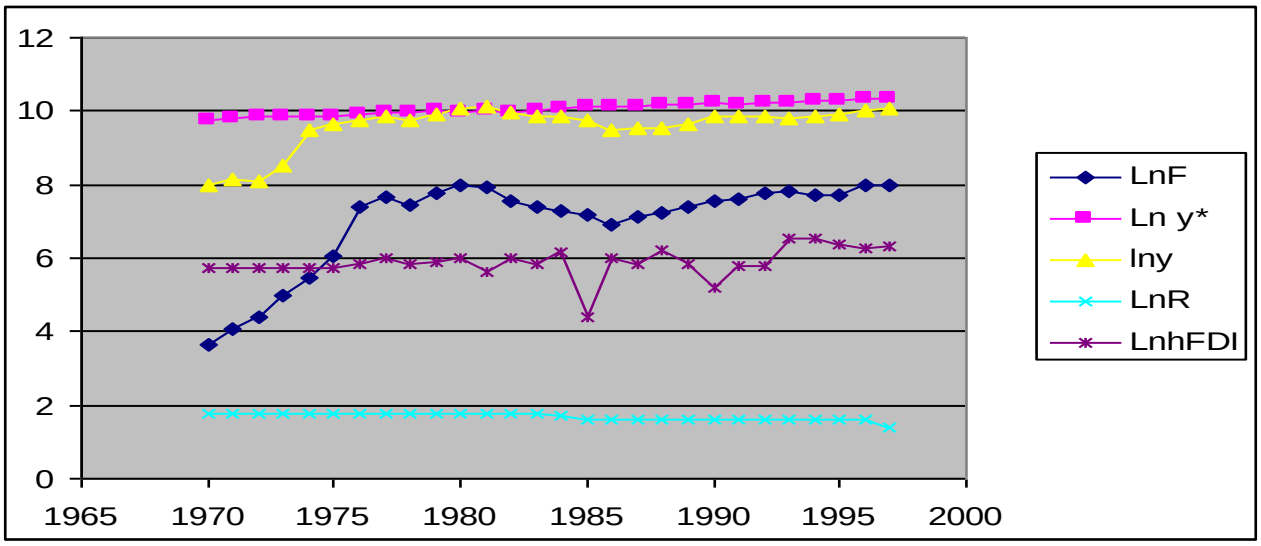
FIGURE 12
GERMANY



United States

The USA's economic indicators in Figure 13 reveal robust growth in GDP (lny) and potential GDP (ln y*) from 1965 to 2000. The LnFDI shows a consistent upward trend, highlighting the USA's attractiveness to foreign investors due to its large market size and economic stability. The LnR remains relatively lower, suggesting that remittances have a minor impact on the overall economy. The data indicates that substantial foreign investments and a resilient economic framework have supported the USA's economic growth.

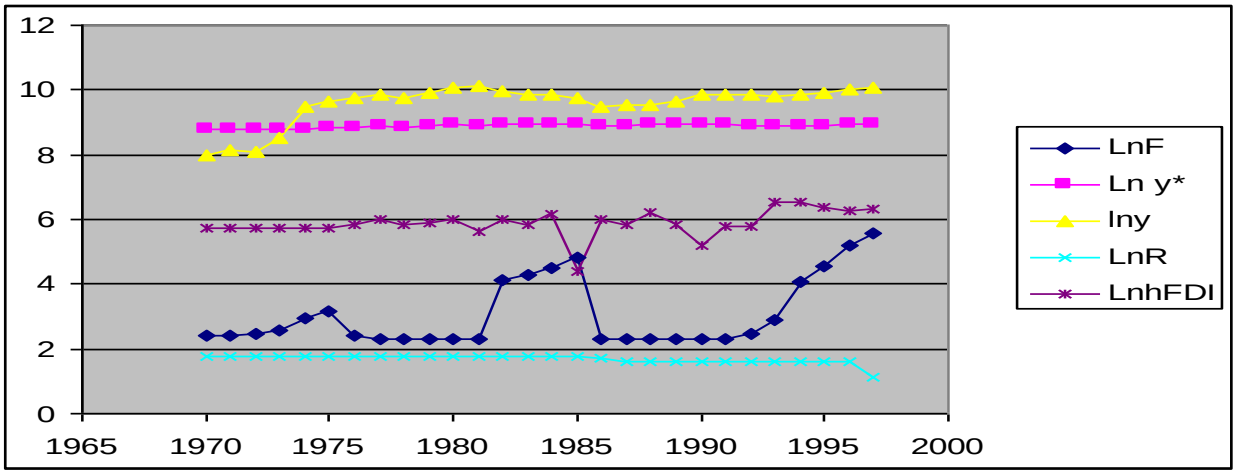
FIGURE 13
USA



South Africa

South Africa, Figure 14 depicts moderate growth in GDP (lny) and potential GDP (ln y*) from 1965 to 2000. The LnFDI shows fluctuations, reflecting varying foreign investment inflows, possibly due to political and economic changes. The LnR displays a relatively stable trend, indicating the consistent role of remittances in the economy. This analysis highlights the need for South Africa to stabilize its investment climate to attract more consistent foreign investments and bolster economic growth.

FIGURE 14
SOUTH AFRICA



Canada

Canada's economic indicators in Figure 15 show steady growth in GDP (lny) and potential GDP (ln y*) from 1965 to 2000. The LnFDI demonstrates a significant rise, indicating Canada's strong appeal to foreign investors, driven by its stable economic policies and open market. The LnR remains relatively low, reflecting the limited impact of remittances. The data suggests that substantial foreign investments and a stable economic environment support Canada's economic growth.

FIGURE 15
CANADA

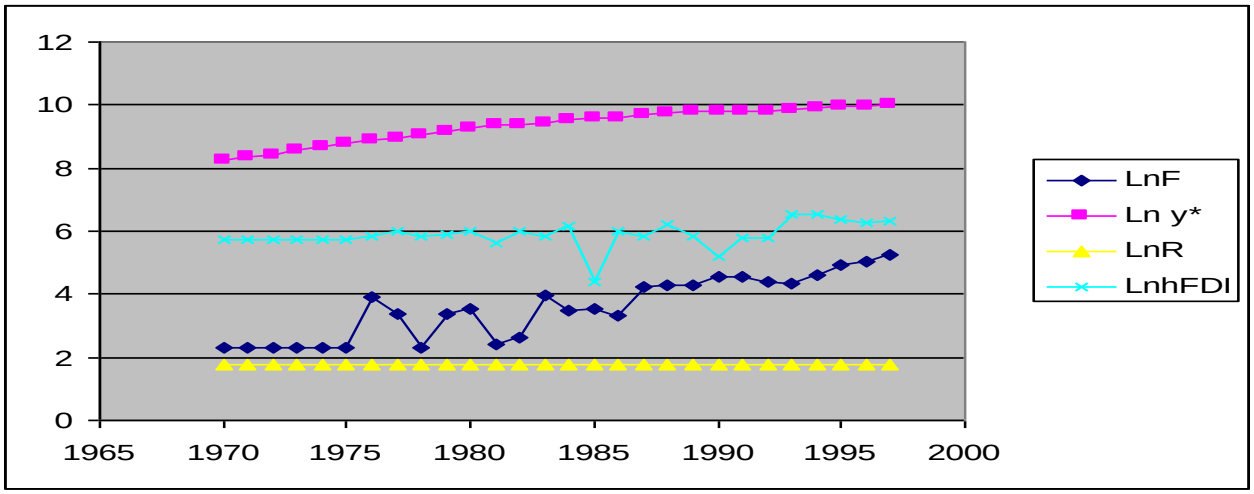


Table 1 shows that the coefficients of lny* and lny are 1.01 and 0.93 and are statistically significant at 1%. Although both values could be approximated to 1, the 1% increase in foreign income will result in a 1.01% increase in trade flow. In comparison, a 1% increase in the UAE's income will generate a 0.93% increase in trade flow between the countries and the UAE. The coefficient of exchange rate is 0.15. This implies that a 1% depreciation in the trading countries' currencies will generate a 0.15% increase in trade flow between them and the UAE. For example, if the US currency depreciates, goods from the US will be more attractive to importers in the UAE. If the UAE currency depreciates, UAE goods will be more attractive to importers in the US. This is similar to the finding of Ben-David (1993), which shows a strong link between trade reform and income convergence among countries. When currencies in two trading countries depreciate together, the exchange goes towards 1, the differences in prices are eliminated, and incomes in the two countries get closer.

TABLE 1
EMPIRICAL RESULT

Variable	Coefficients	t Stat
Intercept	-29.4179*	-8.227
lny* (Foreign Income)	1.009791*	9.287
lny (Home Income)	0.933872*	11.763
lnel (Exchange Rate)	0.153663**	1.939
lnZ (Trade Index)	0.166158	0.915
lnS (Distance)	1.40652*	3.745
lnR (Country Risk)	-0.26714	-1.413

lnhFDI	0.214011**	2.17
D1 (India)	7.235922*	9.881
D2 (China)	6.082588*	14.535
D3 (United States)	4.753774*	9.157
D3 (Canada)	3.434926*	6.832
D5 (South Africa)	4.375097*	14.626
D6 (Egypt)	3.84902*	11.229
D7 (Kenya)	2.839123*	10.163
D8 (United Kingdom)	0.93277*	3.158
R Square	0.902	
Adjusted R Square	0.895	
F (15, 236)	143.802*	
Standard Error	0.609	
Observations	251	

***Statistical significance at 10% level
**Statistical significance at 5% level
*Statistical significance at 1% level

The coefficient of distance, S, is 1.41, contrary to expectation. However, some studies have found that distance is no longer a significant issue in international trade as transportation and insurance costs have been falling over the years. Head (2003) writes that economic considerations determine air and sea routes and that shipping cartels set freight prices that bear little relationship to distance. Also, the cost of packaging, loading, and unloading are fixed and unrelated to the distance. The coefficient of FDI is 0.21, and a 1% increase in FDI will increase trade flow by 0.21%. FDI improves trade by setting up production plants like those in the UAE free trade zones. It helps expand production and trade capacities. The coefficients of the dummies show the level of trade flow between the UAE and each of the countries. The relative magnitudes of the dummies show that the UAE trades most with India out of the nine countries, followed by China, the United States, South Africa, Egypt, Canada, Kenya, and the United Kingdom. The coefficient of Germany is taken as the base. The time plot of the residual of this model in Figure 1 shows that the residual is white noise, and the results can be trusted. Overall, the model shows a very high value of the coefficient of determination, R^2, and the F- value. The model indicates that about 90% of the changes in trade flow between these countries and Dubai are explained by the model. Overall, these provide a comprehensive analysis of the economic indicators for various countries, highlighting their GDP growth, foreign direct investment inflows, and the role of remittances. Each country's economic trajectory reflects its unique policy environment, global economic integration, and domestic factors influencing economic performance. The data underscores the importance of stable economic policies, attractive investment climates, and the role of remittances in driving economic growth and development. Furthermore, the analysis shows a detailed comparative analysis of economic growth and factors influencing it across different countries. It highlights the varying impacts of economic policies, foreign investment, and resource utilization on growth. The plots underscore the dynamic nature of economic development and the importance of policy interventions in shaping economic outcomes. The indicators offer valuable insights into the economic histories and trajectories of the included countries, making it a crucial tool for researchers and policymakers. This study has shown that if trade barriers are eliminated amongst trading countries, other economic variables will determine the level of trade between countries. This is shown by the pattern of bilateral trade in UAE, which is affected by the chosen variables in the model in the absence of tariffs. Information on the traded commodity compositions could further enhance this study. If the import and export compositions of the trade flow are estimated separately, the study results will be enhanced.

CONCLUSION

This current study on bilateral trade agreements in the United Arab Emirates (UAE) offers a comprehensive analysis of the significant determinants influencing the UAE's trade patterns with its major trading partners from 1970 to 1997. By utilizing a gravity-type trade model and examining pooled data from nine countries, the research highlights the UAE's economic evolution from a pearl and fishing-based economy to a petroleum-dominated one and further to a diversified economy supported by strategic trade agreements and investments. The empirical results demonstrate that the UAE's trade volume is significantly influenced by the economic size (GDP) of the UAE and its trading partners, foreign direct investment (FDI), and trade openness. These factors positively impact trade flows, while geographical distance and country risk present challenges, negatively affecting trade volumes. The high explanatory power of the model, with an adjusted R-squared of 89.5%, underscores the robustness of the findings, suggesting that the included variables explain most of the variations in trade flows. The research highlights the strategic role of Dubai, particularly the Jebel Ali Free Zone (JAFZ), in driving non-oil trade and establishing the UAE as a critical global re-export hub. The diversification efforts in Dubai, focusing on sectors such as tourism, logistics, and manufacturing, have significantly contributed to the emirate's economic growth and resilience. The study also points to the importance of international agreements, such as the Comprehensive Economic Partnership Agreements (CEPAs), in fostering trade relations and economic integration. Bilateral trade agreements have played a pivotal role in the UAE's economic diversification efforts by fostering trade, investment, and technology transfer across various sectors. The success of these agreements is evident in the growth of non-oil industries such as logistics, manufacturing, and renewable energy. However, the UAE must address competition and workforce development challenges to sustain long-term growth. BTAs will continue to be a crucial tool in the UAE's strategy to build a resilient, diversified economy capable of thriving in an increasingly interconnected global marketplace. Additionally, the analysis underscores the need for stable economic policies and attractive investment climates to sustain economic growth. The role of remittances, although varying across countries, is identified as an essential component of economic development, providing a stable source of income and investment. The study's findings offer valuable insights for policymakers, emphasizing the importance of enhancing trade facilitation measures, reducing trade barriers, and fostering an environment conducive to foreign investments. The conclusion drawn from this research is that the UAE's strategic initiatives in diversifying its economy and strengthening trade relations have been pivotal in achieving sustained economic growth. The gravity model analysis reaffirms the significance of economic size, FDI, and openness in driving bilateral trade while highlighting the challenges of distance and risk factors. Future research could further explore the sectoral composition of trade flows to provide a more detailed understanding of the UAE's economic diversification.

Finally, the study provides a detailed and nuanced understanding of the factors influencing the UAE's bilateral trade, offering a foundation for further research and policy formulation to enhance the UAE's position in the global economy. The comprehensive analysis of economic indicators across different countries highlights the varying impacts of economic policies and global integration, providing a comparative perspective on international trade dynamics. Bilateral trade agreements have played a pivotal role in the UAE's economic diversification efforts by fostering trade, investment, and technology transfer across various sectors. The success of these agreements is evident in the growth of non-oil industries such as logistics, manufacturing, and renewable energy. However, the UAE must address competition and workforce development challenges to sustain long-term growth. BTAs will continue to be a crucial tool in the UAE's strategy to build a resilient, diversified economy capable of thriving in an increasingly interconnected global marketplace.

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