



The Anchor of Economic Growth is the Meeting Point of International Trade And Productivity: The Eye of Ghana's Economy

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Josephine Adwoa Yeboah, Ernest Kay Bakpa (2025). The Anchor of Economic Growth is the Meeting Point of International Trade And Productivity: The Eye of Ghana's Economy. *International Journal of Multidisciplinary Studies and Innovative Research*, 13(1), 38-56. DOI: 10.53075/Ijmsirq/0435846355

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Abstract: International trade has a significant impact on Ghana's productivity and economic growth through various channels. Ghana's exports, namely gold, oil, and cocoa, have essentially propelled its economic growth and foreign exchange gains through the export-led growth strategy. The study employed annual time-series data from the World Bank database on Ghana from 1970 to 2020, utilising OLS, structural equation analysis techniques, and Granger causality test to analyse the data. Structural equation models utilised investment, consumption, and government expenditure as indicators of economic growth, exports and imports as indicators of international trade, and labour and capital as productivity measures. The findings showed that there was an inverse correlation between international trade and economic growth over both the long term and the short-term period in the Ghanaian economy. as a result, international trade also had a negative impact on economic growth. However, productivity had a beneficial influence on economic growth. The analysis demonstrated that the negative effect of international trade on economic growth was primarily attributable to the high volume of imports into the economy compared to the low volume of exports. The study also confirmed the Granger causality result, illustrating that all the variables had the ability to exert an impact on one another. We recognize that a strategic investment in the production sector of the Ghanaian economy will lead to long-term economic growth and enhance international trade.

Keywords: Economic growth, international trade, productivity, granger causality, investment.

1. INTRODUCTION

International trade has greatly influenced Ghana's economic growth and development. The nation has a long history of conducting business with foreign countries, and its advantageous position in West Africa makes it a significant centre for regional trade. International trade has a significant impact on Ghana's productivity and economic growth through various channels (Kindo et al., 2024). Essentially, Ghana's exports, namely gold, oil, and cocoa, have propelled its economic growth and foreign exchange gains

through the strategy of export-led growth. According to Bruton (1989) and, Yahina et al. (2023), import substitution, in the form of importing capital goods and technology, has enhanced productivity in diverse areas like manufacturing and agriculture. The intensification of rivalry and innovation has resulted in an increased exposure to global competition, thereby motivating local enterprises to engage in innovation and enhance the quality of their products for exports and domestic use. The influx of foreign investment in the Ghanaian economy has stimulated the formation of new enterprises and sectors, resulting in overall economic growth and an enhanced standard of living as a result of the nation's exposure to global competition. Over time, the expansion of trade and production has led to a higher rate of government revenue. Undoubtedly, international trade provides substantial government revenue through taxes, tariffs, and levies, including industrial taxes on both domestic and foreign entitle (Nyeadi et al., 2024; Warren Jr, 2000) This revenue allows the government to invest in public goods and services. The Ghanaian economy may assert with confidence that it has achieved a certain degree of diversification through trade and productivity, which has enabled Ghana to reduce its reliance on a single commodity such as agriculture.

Several studies have demonstrated that productivity offers numerous advantages for trade in the Ghanaian economy (Akorsu and Okyere (2023); Essel (2023); Obeng et al. (2023); Obeng-Amponsah and Owusu (2023); Kindo et al. (2024).. It can stimulate economic growth, boost job creation, alleviate poverty, create new market opportunities for local businesses, enhance innovation and competitiveness, strengthen the country's trade position, as well as promote export-oriented activities. It can also drive economic transformation through urbanization and technological progress, and raise the country's GDP. It is anticipated that the facilitation of international trade and the enhancement of productivity will help Ghana achieve its goal of attaining upper-middle-income status by 2032 (Abbas et al., 2022; Cilliers & Cilliers, 2021)

It's widely acknowledged that the integration of international trade and productivity will significantly impacts Ghana's economic growth or enhanced economic expansion: The combination of trade and productivity is a key driver of economic growth, as Ghanaian companies enhance their competitiveness and innovation. In addition to fostering job growth, export-oriented industries generate employment opportunities, thereby mitigating unemployment and poverty. Moreover, the amalgamation of trade and productivity has greatly enhanced living conditions. In other words, enhanced productivity and trade result in elevated earnings, improved healthcare, education, and general living standards (Winters et al., 2004). Atkin and Donaldson (2022) states that the amalgamation of international trade and productivity has a positive effect on economic growth, leading to an increase in foreign exchange revenues. Exports contribute to the accumulation of foreign exchange, promote currency stability, and enable the importation of vital commodities and technologies. Economic growth, job creation, and increased living standards all directly lead to a decrease in poverty and an improvement in overall well-being. Mazaraki and Zubko (2022) argues that trade and productivity are key drivers of enhanced economic stability. The combination of trade and productivity growth plays a crucial role in maintaining macroeconomic stability by decreasing inflation and interest rates (Bilalli et al., 2024). By harnessing international commerce and productivity growth, Ghana can achieve sustained economic development, alleviate poverty, and improve living conditions for its population (Ocampo, 2008).

Nevertheless, international trade also poses several obstacles, such as: Trade deficits which is when a country's imports exceed its exports, resulting in a negative trade balance. Ghana frequently faces trade deficits because its imports consistently exceed its exports. This indicates that Ghana does not produce enough to meet its own demands, resulting in a significant reliance on imports. Consequently, this reliance on imports leads to a depletion of foreign currency reserves and contributes to an escalation in the exchange rate. This mostly results in the depreciation of the indigenous currency, leading to economic instability. Studies by Fally and Sayre (2018), Bernard et al. (2003) and Kummu et al. (2020) indicates that the reliance on primary commodities significantly affects trade and productivity. Ghana's dependence on exporting raw materials leaves it susceptible to variations in world prices. This leads to a decline in the anticipated level

of growth, both in the long term and in the short term. Furthermore, Ghana's exports add little value. Ghana predominantly exports raw or semi-processed goods, which restricts the extent of value addition and potential earnings.

2. LITERATURE REVIEW

Trade and economic growth are closely related, with some studies showing that export-led growth can drive economic growth. According to Sultanuzzaman et al. (2019), Razzaq et al. (2021) and Zamani and Tayebi (2022), International trade can promote economic growth through technology spillover and external stimulation which is mostly driven by importation of capital goods. More so, international trade can improve optimal distribution of resources and productivity, stimulate economic growth and provide access to raw materials and equipment base on the comparative advantage trade theory. Also, international trade can promote economic growth through economies of scale and optimal allocation of resources (Helpman, 1981; Redmond & Nasir, 2020). Some researchers (Akadiri et al., 2020; Bardi & Hfaiedh, 2021; Jalil & Rauf, 2021; Osadume & Uzoma, 2020; Tah et al., 2021) have found a two-way causal relationship between international trade and economic growth, while others (Awokuse, 2008; Dudzevičiūtė et al., 2017; Islam, 1998) have found that export promotes economic growth but not vice versa. Other studies (Subhan et al., 2021; (Hobbs et al., 2021; Stievany & Jalunggono, 2022; SUBHAN et al., 2021) have found no causal relationship between international trade and economic growth.

Usman and Bashir (2022) employed Granger causality test to study Chinese economic growth and international trade. They concluded that the output was an exogenous variable that its benefit is outside the model of growth and there was a one-way causal relationship between economic growth and international trade. Magaji et al. (2022) also conducted a study on the link between international trade and economic growth by adding other variables, such as the trend of time, FDI, and the lagging investment to the main variables and concluded that export promoted economic growth and found the result to be affected by regional differences. Dreger and Herzer (2013) verified the assumption of export led economic growth using time-series data and regression analysis. The result of that study showed that the labor employment and output of manufacturing sector could promote export and economic growth. It was evident in that study that judging from the model of classical economics, using the statistics of population as labor force, export could play a leading role to economic growth. In these empirical studies (Ali et al., 2021; Islam, 1998; Malca et al., 2020; Subasat, 2002) economists used ordinary least squares (OLS) to test these cross-regional or cross-section data, and the results generally supported the promotion of export to economic growth. But its reliability is questionable because the results from OLS only showed the relevance between foreign trade and economic growth but could not explain the existence of a causal relationship between them.

Wu and Chen (2021) used Granger causality test and co-integration test to test the hypothesis of "Chinese export-oriented economic growth" using export and real GDP data from the World bank database on china from 1977 to 1998. The results showed that there was a two-way causal relationship between international trade and economic growth but no long-term and stable relations. Egyir et al. (2020) conducted a study on the relationship between international trade and economic growth by taking only the output and export into account. By not considering the level of import with the export output and how it affected general growth, it made the result not exclusively acceptable so the impact of import on economic growth should not be ignored. Ghana is a developing country and its endowments elements vary considerably with developed countries. The developed countries mainly have advantage in capital and technology. Putting Ghana with China, Ghana mainly in natural resources and China mainly in natural resources and labor, it gives China higher advantage over Ghana in the level of development even though China is also a developing country. This determines that the major export products of Ghana are agricultural products and low value-added products, and its import products are high-tech products which according to Carrasco and Tovar-García (2021b) on export production and import, impact on economic growth will be more on developed countries compared to the developing countries.

According to Jackson and Jabbie (2021), import is an important means to break economic development bottlenecks and promote economic growth. Thus, the imported products will encourage domestic enterprises to improve product quality and production efficiency and promote the upgrading of traditional industrial structures. As a result, the research on the relationship between import and economic growth is necessary. Abendin and Duan (2021) explored the relationship between economic growth and international trade taking into consideration export production and import, and recognized that export production at different times contributed to economic growth differently from import, but on the whole, there was a positive correlation between import and economic growth. Chrid et al. (2021) made an empirical analysis on economic growth model and pointed out that exports boosted economic growth. Gabriele (2006) found that net exports had less relevance with economic growth. Subasat (2002) viewed that exports had a great role in promoting economic growth. Boakye and Gyamfi (2017) started from the relevance of foreign trade and GDP growth rate and revealed that imports had a strong role in the promotion of the national economy by analyzing the data of Ghana from 1980 to 1998. He also explained why Ghana's exports had weak correlation with economic growth from the angle of the export structure. Tuffour (2010) studied the relationship through Granger causality model and broad difference approach, using Ghana's statistics from 1952 to 2003. The result showed that Ghana's GDP and export had a clear one-way causal relationship. That is to say, the export was an important factor to promote Ghana's economic growth.

Raihan et al. (2022) examined the relationship between agricultural productivity and economic growth by analysing secondary data from the years 1972 to 2012. The research also applied the autoregressive distributed lags approach (ARDL) to assess the relationship between economic growth and other variables, including real gross domestic product per capita, gross capital formation, employed labour force, inflation rate, trade, openness, and agriculture value added. The findings indicated that there was a negative correlation between the inflation rate and economic growth, whereas all other factors demonstrate a positive association with economic growth. The findings indicated that a significant portion of agricultural production had greater impact on economic growth. Consequently, the study recommended that the government should bolster the labour force by promoting higher education in both the agricultural and industrial sectors.

Kim and Wood (2020) examined the historical trajectory of productivity growth in Asian countries over the previous few decades, paying particular attention to the service sector. Drawing on historical data, the study assessed the consequences of accelerated labour productivity growth in the service industry in Asia. To accomplish this, an empirical general equilibrium model was employed, which accounted for the movement of goods and capital between sectors and economies as well as the dynamics of consumption and investment. The findings indicated that the rapid increase in productivity within the service sector in Asia played a significant role in fostering consistent and well-rounded economic growth in Asian nations. However, the process of adapting to these changes varies among different economies. Specifically, when transitioning towards increased productivity in the service sector, there is a notable expansion in the durable manufacturing industry. This expansion is necessary to support the accumulation of capital stock that accompanies heightened economic growth.

According to Ahmed et al. (2022), nations that focus on producing items associated with higher levels of productivity are expected to see more rapid economic growth compared to nations that specialise in other types of goods. Consequently, the majority of nations do not incorporate quality variations within a certain product category into their assessment of items' productivity levels. The findings indicate that when items are differentiated based on their quality levels, there is no significant correlation between specialising in products with greater productivity levels and experiencing accelerated growth. In contrast, the study also demonstrates that focusing on product specialisation provides a greater opportunity for enhancing quality, ultimately resulting in increased economic growth over time.

Li and Liao (2022) investigated the correlation between labour productivity, specifically a form of partial factor productivity, and economic development across seven OECD nations. The analysis was conducted using panel data for the period spanning from 2008 to 2014. In the context of globalisation, nations engaged in vigorous competition with one another. Countries place substantial attention on technological breakthroughs in order to attain a competitive advantage. Technological advances and developments enhance productivity, enabling countries to achieve production at reduced prices. The augmentation of factor productivities would facilitate the attainment of elevated levels of production within the economy. The factor productivity exerts a significant influence on several other factors, and it is seen that developed countries tend to exhibit superior adherence to the standards associated with these factors in comparison to developing countries. Consequently, the factor productivities in developed countries are higher relative to those observed in developing countries. Based on the obtained results, the studies have shown a unidirectional causal relationship wherein economic expansion influences labour productivity.

M'baye (2022) examined the productivity and economic growth patterns within the aggregated agricultural sector of Kenya from 1964 to 1996. According to the study, the period from 1964 to 1973 witnessed an average output growth rate that surpassed 4%. However, from 1988 to 1996, there was a notable stagnation in output growth, with an average rate of 1.2%. Throughout the whole duration, capital played a pivotal role in driving the increase in output. The average rates of increase for intermediate inputs saw a subsequent decline and exhibited negative values during the period of 1988 to 1996. The contribution of labour to economic growth was found to be relatively insignificant. The average total factor productivity growth exhibited a decline over time, with a value below 0.4%. The proportion of output growth attributed to productivity growth experienced a notable increase, rising from 10.2% during the period of 1964–1973 to 26.8% from 1988–1996. The findings indicate that the enhancement in productivity within the agricultural sector of the Kenyan economy is associated with an increase in overall economic growth.

Yang et al. (2023) investigated the field of international trade which has utilised microdata sets since the mid-1990s to examine the production and trade activities of countries at the business level. Through these investigations, it has been shown that enterprises engaged in exportation exhibit notable distinctions when compared to firms only catering to the domestic market. Numerous studies conducted in various nations and industries had consistently demonstrated that organisations engaged in exporting exhibit characteristics such as larger size, higher productivity, more reliance on skilled labour and capital, and the provision of higher wages compared to enterprises that do not engage in exporting activities. These disparities are present prior to the initiation of exports and carry significant implications for assessing the benefits derived from trade as well as their allocation among various components of production. The recent empirical study presented a challenge to conventional models of international trade, leading to a shift in focus within the field from countries and sectors to firms and products (Razzaq et al., 2021). The latest transaction-level U.S. trade data provided new insights into the involvement of firms in global markets. Moreover, recent advancements in theories of international trade that consider the diverse behaviour of firms have made significant strides in elucidating trade patterns and the growth of productivity (Raghutla, 2020).

Segarra-Blasco et al. (2022) examined the relation between export production. The objective was to establish a connection between trade theory and export behaviour at the plant level. This was achieved by expanding the Ricardian model to incorporate several countries, geographical obstacles, and the presence of imperfect competition. The study model well represented several fundamental aspects of U.S. plants, including: (i) the dispersion of productivity levels; (ii) the presence of greater productivity among exporting plants; (iii) the relatively small proportion of plants engaged in exporting activities; (iv) the limited share of revenue derived from exports among exporting plants; and (v) the size advantage enjoyed by exporters. This study aims to apply a model to analyse bilateral trade between the United States and 46 significant trading partners. The objective was to investigate the effects of globalisation and the appreciation of the dollar on several aspects of productivity, such as plant entry and departure as well as labour turnover within

the manufacturing sector of the United States. The findings of the study indicated that there was a gradual and cumulative effect of overall productivity growth arising from international commerce across all five levels

Redmond and Nasir (2020) examined the connection between global trade and productivity in his study. The findings of the study revealed that international trade has a substantial economic impact and a statistically significant positive influence on productivity. The study argued that it was desirable on theoretical grounds to utilise a trade measure of imports and exports relative to purchasing power parity GDP (real openness) instead of the nominal measure typically employed. The research also identifies a notable and favourable overall impact on an aggregate scale. The study conducted by the researchers provided an estimation that considers several indicators of institutional quality and geographical factors and also addressed the issue of endogeneity in relation to trade and institutional quality. The examination of the mechanisms through which trade and scale impact productivity revealed that these factors operated via total factor productivity.

Hobbs et al. (2021) conducted a study that aimed to assess the impact of international technology spillovers on U.S. manufacturing firms during the period from 1987 to 1996. The study focused on the influence of imports and foreign direct investment (FDI) on these spillovers. In contrast to previous research, the findings indicate that foreign direct investment (FDI) has a significant positive impact on the productivity levels of domestic enterprises. The magnitude of foreign direct investment (FDI) spillovers were of significant economic significance, contributing to around 14% of the overall productivity growth observed in United States enterprises during the period spanning from 1987 to 1996. Foreign direct investment (FDI) spillovers have significant strength within high-tech industries, while their presence is notably lacking within low-tech ones. The positive externalities of foreign direct investment (FDI) are more pronounced for small enterprises characterised by lower productivity levels as opposed to larger firms with higher productivity levels. The empirical support for import spillovers is considerably less robust.

In a study conducted by Mansouri (2022), an empirical relationship was estimated using Krugman's "technological gap" model to examine the impact of international trade and production patterns on the overall productivity growth of a developing economy. One significant finding of the study was that heightened import competition had a positive impact on total productivity growth in manufacturing sectors with medium levels of growth but not in sectors with low or high levels of growth. Once more, the findings indicated that the rate of aggregate productivity growth is significantly influenced by a production-share-weighted average of the sectoral productivity growth rates of technical leader.

Duodu et al. (2021) provided a complete description and study of the foreign trading operations of enterprises based on fresh and detailed Swedish data. The findings of this study showed a strong evidence that selection is taking place from market to market. In addition, the study demonstrated that selection is applicable to the total quantity of products that are exchanged. This result demonstrated that there is a significant degree of variation among exporters and importers with regard to the number of different markets with which they engage in trade as well as the variety of items with which they do so. Additionally, productivity premiums rise when there is growth in both the number of markets and the number of products that are traded. The productivity of businesses that just export or only import is lower than the productivity of businesses that do both export and import, also known as two-way traders. This finding can be explained by the fact that two-way traders are actively involved in the international division of labour and utilise inputs based on cutting-edge knowledge and technology in their production process, both of which boost their productivity and success on export.

A study conducted by Kaushal (2022) and Sharma and Mishra (2011) to determine the impact of global trade on India's manufacturing productivity. The study specifically focused on the many mechanisms via which economies of scale, reallocation, competition, and spillover channels contribute to this impact.

The study examined the overall consequences of these impacts by creating trade-related variables, including relative import prices, import penetration, and export intensity. These variables were applied to a panel of 17 two-digit organised manufacturing sector industries spanning the years 1980 to 2013. During this particular time frame, the manufacturing sector experienced significant liberalisation and openness, which coincided with a notable rise in manufacturing growth and productivity, particularly in the more recent decades. The findings of the econometric estimation conducted using panel data and employing random effect modelling indicate that the benefits of economies of scale, reallocation, and spillover on productivity enhancement are primarily observed through imports. Furthermore, these effects tend to become more significant with a delay of approximately 1 to 2 years. During a brief timeframe, there were certain indications of the prevalence of negative economies of scale resulting from import rivalry. The study revealed a positive correlation between exports and productivity across all chosen time periods. However, statistical significance was shown solely in the present period. The importation of goods, which had a sustained effect over a long period of time, generally facilitated the increase in productivity that resulted from trade. This finding suggests that the influence of trade on industrial productivity in India is characterised by a dynamic rather than static nature.

To evaluate the effect of international trade on productivity, Carrasco and Tovar-García (2021a) looked at a sample of 14 OECD countries and 15 manufacturing industries. Frankel and Romer's suggestion to use the geographical component of international trade as an instrumental variable addresses the issue of endogeneity. The results showed that trade, as expressed in the export ratio, has a favourable effect on productivity. This relationship holds true even when accounting for country-specific factors such as the quality of institutions. However, it is worth noting that the results are somewhat less reliable when considering imports. Estimations conducted at the macro level of manufacturing reveal significantly bigger figures, highlighting the significance of inter-industry spillover

Over the last four decades, many developing countries have initiated reforms to lower barriers to trade. Yet, despite these reforms, developing countries still remain far less open than developed ones, both because of tariffs that remain high but also weak contract and regulatory enforcement, inadequate transport infrastructure, search frictions, and a plethora of other distortions that are more severe in the developing world (Akorsu & Okyere, 2023).

In accordance with the Marxist point on international trade and productivity leading to growth, the relationship between international trade and economic growth was the relationship between exchange (which the trade) and production in the final analysis or impact on economic growth. According to Marx, said: “the depth, breadth and the way of trade are decided by the development and structure of production. From the classical production theory, it can be seen that all the elements of trade are included in the production directly, or are decided by it.” Essentially, production decides the trade, but the trade which is a stage of the exchange, is not merely decided by it and could react to produce under certain conditions. Sometimes, the counteractive of promoting or inhibiting is tremendous. That is to say that on one hand, the increase of production needs a growing market; on the other hand, the growing market will promote the increase of production continuously. So, production and trade, affect each other every second in impacting economic growth in both the long-run and the short-run. This provides a very important revelation to many economists. According to Teixeira and Queirós (2016) and Raghutla (2020) most economist believed that foreign trade promoted economic growth in two ways. The first one holds that, foreign trade improved the optimal distribution of resources and productivity consequentially and then stimulated the economic growth; on the other hand, one country could gain raw materials and equipment which it could not produce. Those provided the material basis for economic development. This open the gate way to most of the trade and growth theories in the early days of economic growth theories. The most famous theories were exports of surplus of Adam Smith, comparative advantage of David Ricardo, the interests of the trade development of John Mueller and “trade is the engine of economic growth” of D.H. Robert Morrison. All these theories

interpreted the relationship to some extent but ignored that the international environment is complex and rule less.

3. METHODOLOGY, DATA AND VARIABLES

The objective of this study was to examine the impact of international trade and productivity on economic growth from the Ghanaian point of view. This is an impact study therefore the method adopted is a multiple regression analysis with Ordinary Least Square (OLS) econometric technique and that of structural equation model with a time series secondary data from 1960 to 2022 obtained from world bank database and the Ghana statistical services. Difficulties may arise while performing regression with clearly nonstationary series thus leading to the so-called spurious results. In view of that this study also performed the Augmented Dicky Fuller (ADF) test for unit root in order to attain stationarity. The study also conducted a Granger causality test to trace the direction of causality between the real GDP, International trade and productivity

The growth of production abilities in emerging economies and a bigger facility for doing business internationally have created additional choices for outsourcing work, which is also introducing new industrial players to the field. One of the most noticeable significances of GVCs has been the move of large shares of manufactured products from the industrialized economies to the emerging economies, predominantly in Asia. With this, trade variable was measured as the total value of goods produced for export and the domestic market and the total amount of goods imported into the country. And in the context of our study, we added other factors such as inflation rate and exchange rate since they influence trade. In sum up to the measurement variables for international trade, the study employed total export, total import and net export from the Ghanaian economy as a measurement for international trade.

The Measures of productivity in the context of growth instituted a lot of core indicators in the process to analyze economic growth. However, there are numerous methods used in measuring productivity same as its calculation and interpretation which requires vigilant deliberation specifically, when undertaking international evaluations. Productivity is generally measured as the ratio of aggregate output to aggregate input used in production. Productivity growth is normally estimated by subtracting total growth in inputs from total growth in output which is the residual. There are so many ways to measure productivity but in the context of our study, we stick with the Cobb-Douglas production: value-added output per unit of labor and capital input that is used in the production. With labor productivity, our model measures the growth in the value-added output per unit of labor used in producing the output. According to (Jorgenson, 1991; Korkmaz & Korkmaz, 2017; Li et al., 2019; Ramos, 2019) labor productivity can be measured with both market and non-market sectors of the economy because labor value can be in the real volume terms as an hour per labor work. Because of that, our study builds the measure of productivity on the multifactor productivity measure.

Pretest on the data

Unit root test

We performed a unit root test to rectify any abnormalities in the data. Table 1 showed the results of the stationarity examination conducted in this study using the augmented Dickey-Fuller test. We chose the lag duration in order to guarantee that the residuals exhibited the characteristics of white noise. The results indicate that all variables exhibit stationarity at the level of integration $I(0)$. Therefore, this evidence indicates that using differencing at levels is enough for modelling the time series in this investigation. Ahmad et al. (2022), testing for the stationarity of variables is done with the idea that the Augmented Distributed Lag (ARDL) method only allows co-integration, which means that the time series must be either $I(0)$ or $I(1)$ variables. As a result, the $I(2)$ variable will cause the bounds testing assumption to fail. The result indicated that the limits testing approach was suitable for this investigation, as the variables were stationary at $I(0)$ values.

Table 1. Unit root test result using ADF procedure

Variable	level	1st	2nd	Lag	Order of integration	critical value	
RGDP	4.135	-6.191	-5.368	2	I(0)	1%	-2.956
TD	3.015	-2.731	-4.153	2	I(0)	5%	-3.894
Q	6.856	1.915	-6.301	2	I(0)	10%	-3.648

Based on the findings presented in Table 1, the study utilised the Johansen co-integration test to determine whether there are long-term correlations among the variables (Table 2).

Table 2. Johansen co-integration test in the data

Eigenvalue	Likelihood Ratio	5 Percent Critical Value	1 Percent Critical Value	Hypothesized No. of CE(s)
0.854	62.801	29.68	35.65	None **
0.493	18.476	15.41	20.04	At most 1 *
0.115	2.812	3.76	6.65	At most 2

*Test assumption: Linear deterministic trend in the data Series: D(RGDP) D(TD) D(Q) Lags interval: 1 to 1 (**) denotes rejection of the hypothesis at 5% (1%) significance level L.R. test indicates 2 cointegrating equation(s) at 5% significance level**

Two co-integrating equations that are statistically significant at the 5 percent level suggested the existence of a long-term link between the variables. The co-integrating variables or vectors consist of real gross domestic product (RGDP), international trade (TD), and productivity (Q). After confirming the presence of a long-term connection between the variables, we perform the regression analysis using the Ordinary Least Squares (OLS) and structural equation models.

Reliability and Construct Validity of Variables

It is crucial to assess the reliability and validity of the measures before proceeding to test the hypothesized relationships, as this can affect the overall results of the study (Hair Jr et al., 2019). Reliability is the extent to which a set of measured variables show internal consistency in measurement, while validity is the extent to which a set of measured variables truly represent their theoretical latent constructs they are supposed to measure.

Table 3 Measurement model assessment

Variables	Indicators	Loadings	Cronbach alpha	Convergent validity AVE	CR
International Trade	Export	0.845	0.932	0.769	0.659
	Import	0.892			
Productivity	Labor	0.877	0.911		
	Capital	0.911			

			0.913	0.821	0.881
Real GDP	Investment	0.957			
	Government expenditure	0.943			
	Consumption	0.821			
			0.909	0.818	0.917

From the result presented on table 3, the reliability was examined by Cronbach's alpha and composite reliability. Cronbach's alpha represents the lowest reliability value of a variable, whereas composite reliability indicates the size of the actual reliability value of a variable (Hajjar, 2018). As seen in Table 3, Cronbach's alpha values for the various constructs ranged from **0.909 to 0.937**, above the recommended alpha of 0.70 (Nunnally, 1994), indicating the internal consistency of the constructs. The composite reliability ranged from **0.659 to 0.917**, above the threshold of 0.60 (Hair Jr et al., 2019). Factor loading parameters, composite reliability (CR), and the average variance extracted (AVE) have to be put into consideration to establish convergent validity. The factor loadings were higher than the recommended value of ≥ 0.50 (Fornell & Larcker, 1981); the values of the average variance extracted (AVE) were all above the recommended value of 0.50 and the composite reliability were above the threshold of 0.60 (Hair Jr et al., 2019), indicating adequate convergent validity.

Estimation Model

In this study we used export and import as our independent variable which are regressed against economic growth measured with RGDP. The functional form on which our econometric model is given thus:

$$RGDP = f(TD, Q) \quad (1)$$

$$RGD = f\{TD = (EX - IMP) + Q = (AL^\beta, K^\alpha)\} \quad (2)$$

where; RGDP = real gross domestic product (proxy for economic growth), TD = international trade, EX = export, IMP = import and Q = Productivity, K = capital and L = labor

From equation 2, the long-run and the short-run can be restated as

$$RGDP = f\{TD = (EX_{t-1} - IMP_{t-1}) + Q(Y/K^\beta (hl)^{1-\alpha})\} \quad (3)$$

In general, the estimation equation for the model can be stated as

$$RGDP = TD + Q + \mu \quad (4)$$

$$RGDP = \alpha + \beta_1 TD_{t-1} + \beta_2 Q_{t-1} + \mu_{ti} \quad (5)$$

With the causality model, it is stated as follows;

$$GDP_{it} = \sum_{i=1}^n \alpha_i GDP_{it-k} + \sum_{j=1}^n \beta_j TD_{it-k} + \sum_{k=1}^n \gamma_i Q_{it-k} + \varepsilon_{it} \quad 6$$

$$TD_{it} = \sum_{i=1}^n \lambda_i TD_{it-k} + \sum_{j=1}^n \delta_j GDP_{it-k} + \sum_{k=1}^n \gamma_i Q_{it-k} + \varepsilon_{it} \quad 7$$

8

$$Q_{it} = \sum_{i=1}^n \rho_i Q_{it-k} + \sum_{j=1}^n \omega_j TD_{it-k} + \sum_{k=1}^n \varphi_k GDP_{it-k} + \varepsilon_{it}$$

Were i, j and k = lag period $\varphi, \omega, \rho, \delta, \lambda, \alpha, \beta, \lambda,$ = parameters, t = time period and ε is the stochastic or the error term.

4. RESULTS

4.1 Discriminant validity

Discriminant validity (divergent validity) refers to the extent to which a construct or concept is not unduly related to other similar, yet distinct constructs (Hair Jr et al., 2019). In the current study, Fornell and Larcker's criterion was employed in evaluating the discriminant validity. This technique was done by calculating the square roots of the AVE values and then examining whether they were consistently greater than all the corresponding correlations of the latent constructs (Fornell & Larcker, 1981). Thus, the value of the square root of the AVEs for each construct should be greater than the correlation values of the constructs. As shown in Table 4, the square roots of the AVE values were higher than correlations with other constructs, indicating acceptable discriminant validity.

Table 4 Correlation matrix and the square roots of AVE

Variables	Real GDP	International Trade	Productivity
Real GDP	-0.877		
International Trade	-0.101**	-0.906	
Productivity	0.5689***	0.523**	-0.861

Correlation is significant at *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$. *** represents a significant level of 0.001; ** represents a significant level of 0.01; * represents a significant level of 0.05. Diagonal elements in bold are the square roots of the Average Variance Extracted (AVE).

From the table 4, there was a level of correlation between all the variables under study. With a good significant level of 0.001 for productivity to Real GDP which was also positive which showed that the level of productivity to real GDP was good and led to growth in the Ghanaian economy. From table 5, it was also seen that there was a significant level of 0.01, international trade correlated with the Real GDP but at a negative level which can be implied that there was either higher level of import as compared to export or a low level of incentive for export production.

4.2 OLS Regression analysis

Table 5 OLS regression analysis of the independent variables on economic growth

VARIABLES	Coefficient	t. Statistics
INTERNATIONAL TRADE	-0.131**	0.54
PRODUCTIVITY	0.972***	4.51
R-squared	0.749	
Adj R-squared	0.742	
Prob > F	0.000	
Durbin-Watson Stat.	1.868	

Table 5 displayed the Ordinary Least Squares (OLS) findings regarding the direct influence of international trade and productivity on economic growth. The findings indicated that international trade exerted a detrimental and statistically significant influence on economic growth. Table 5 indicated that productivity has a favorable influence on economic growth and was also statistically significant. The OLS result showed that the R-squared value of 0.749 accounted for approximately 75% of the overall variation in the model. This indicates that the independent variable explains the dependent variable by around 75%. The Durbin-Watson score of 1.868 signifies the absence of first-order autocorrelation, which is crucial for validating the model.

4.3 Structural equation models and the goodness of fit.

Structural equation modelling (SEM) is a statistical framework that enables the modelling of intricate interactions between directly seen and indirectly observed (latent) variables. Structural equation modelling (SEM) is a comprehensive approach that incorporates the simultaneous solution of linear equation systems. It also includes other statistical techniques, including regression, factor analysis, route analysis, and latent growth curve modelling. Current research has expanded the use of the general structural equation modelling (SEM) framework to analyze data on generic pedigrees, despite its common use for independent observation analysis.

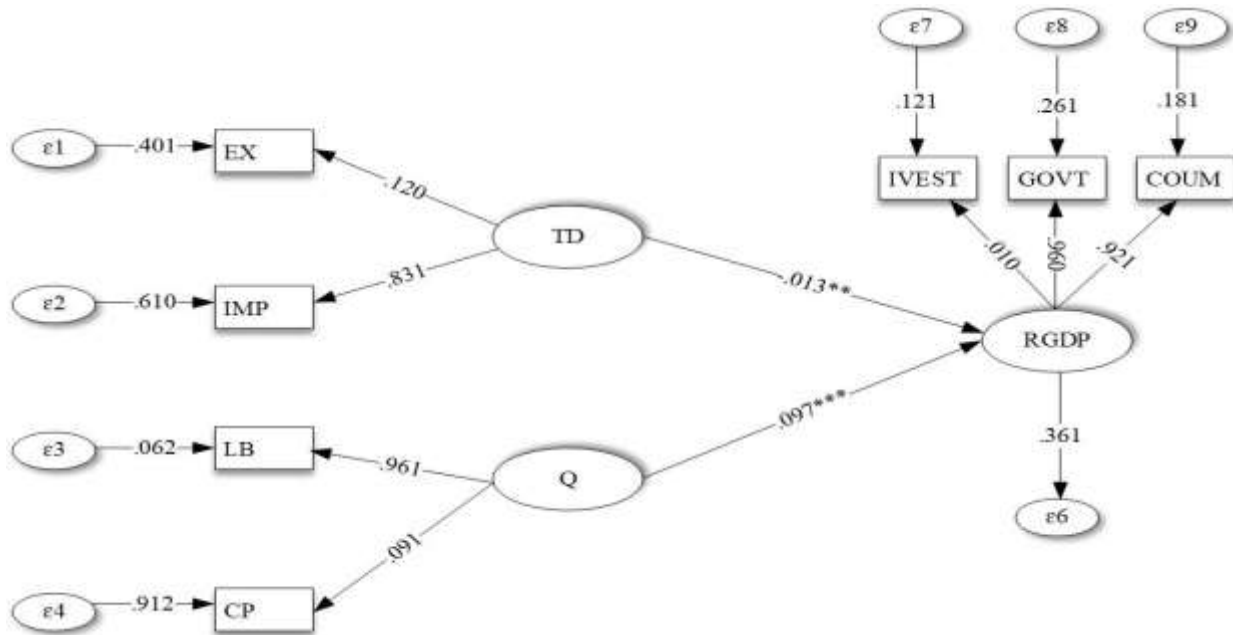


Figure 1. Structural equation model of the impact of international trade and productivity on economic growth.

Figure 1 presents the results of the structural equation model, which examines the impact of international commerce and productivity on economic growth. The result incorporates the constructs of all the variables under study. The structural equation model is conducted to establish the reasons for the various impacts.

Table 6 Goodness of fit

Fit Indices	Recommended Values	Direct Effect
χ^2	-	921.441
degree of freedom [df]	-	120
χ^2/df	≤ 5	4.864
CFI	≥ 0.90	0.973
TLI	≥ 0.90	0.951
NFI	≥ 0.90	0.983
IFI	≥ 0.90	0.935
RMSEA	≤ 0.06	0.052
SRMR	≤ 0.08	0.063

To evaluate the goodness-of-fit of the proposed model, certain fit indices should be considered. We adopted the following fit indices: χ^2 , degree of freedom [df], χ^2/df , comparative fit index (CFI), Tucker-Lewis index (TLI), normed fit index (NFI), incremental fit index (IFI), root mean square error of approximation (RMSEA) and standardized root mean square residual (SRMR) to indicate acceptable fit. Table 6 depicts the recommended values of these indices and acceptance fit levels obtained from the data.

4.4 Granger causality

When examining causality, it is crucial to conduct certain tests, such as the t-test and the F-test. These tests play a significant role in determining the decision rule for the direction of causality. Ordinary least squares (OLS) residuals, observed to exhibit correlation and heteroscedasticity even in cases where the genuine errors are uncorrelated and have equal variance, form the basis of the diagnostic tests.

Table 7 Granger causality

Variables movement	Lag	F-values	P values	Decision
TD↔RGDP	1	2.575	0.121	Accept
RGDP↔TD	1	3.625	0.698	Accept
Q↔RGDP	1	5.477	0.806	Accept
RGDP↔Q	1	8.145	0.272	Accept
Q↔TD	1	0.616	0.342	Accept

Table 7 shows that there is a Granger causality relationship between Real Gross Domestic Product (RGDP) and international trade (TD). Specifically, RGDP Granger causes TD, and TD Granger causes RGDP. Hence, the Granger causality outcome demonstrates a reciprocal connection, suggesting a transition from Real Gross Domestic Product (RGDP) to international commerce. This outcome demonstrates that an increase in the economy would augment the magnitude of international trade, assuming all other factors remain constant. Our observation indicates that there is a reciprocal causal relationship between productivity and both RGDP and international trade. Specifically, productivity Granger causes RGDP and international trade, while RGDP and international trade Granger cause productivity. This result also suggests a reciprocal link between the variables. Table 7 illustrates that all variables exhibit a bidirectional link.

5. DISCUSSION

The findings indicate that the impact of international commerce on economic growth is negative (0.013), which is equivalent to a decline of 13% and is substantial. It suggests that a change in the percentage of foreign commerce will result in a drop of approximately 13% in the real GDP. According to the findings shown in Figure 1, it appears that the variables related to international commerce could be the primary cause of the negative effect. In accordance with the concepts of international trade, exports are responsible for approximately 12.7% of the overall impact. Increased exports will lead to growth (Darrat (1987); Feder (1983); Henriques and Sadorsky (1996); Brandi et al. (2020); Lomachynska et al. (2020); Zafar et al. (2022). On the other hand, Okafor et al. (2022), Rahman and Dilanchiev (2021), Blavasciunaite et al. (2020), Mitchell (2020), McCombie and Roberts (2002) and Johnson (1958) assert that an economy that produces more and exports more will repair the balance of the payment deficit. There is a possibility that the negative impact is due to an increased number of imports into the Ghanaian economy. Furthermore, Figure 1 shows that imports contribute approximately 0.831, or 83%, to the explanation of international trade.

According to Bakpa and Yeboah (2024), Bakpa et al. (2021) and Mensi et al. (2021) suggests that the act of importing signals an increase in the outflow of foreign money from the economy, implying payment outside the economy. Furthermore, large imports indicate that the country is not producing enough to meet the growing population's demand, resulting in a requirement for imports in order to provide food for the population. High imports are another indication that the native currency is under strain, which could potentially lead to currency devaluation. As a result of the increased volume of imports, the Ghanaian currency is currently experiencing a significant amount of intense pressure.

The findings also indicate that productivity has a positive influence on economic growth, with a value of 0.097, equivalent to a 9% increase and statistically significant. This indicates that a proportional shift in productivity results in around 9% growth in the real GDP. The production variable indicates that labour, which accounts for around 0.961 of productivity, comprises approximately 96% of the total workforce in the economy. This implies a large labor force in the economy, which could lead to higher production levels. Figure 1 illustrates the Ghanaian economy's capital formation level, which is approximately 0.091, equivalent to 9%. Radło and Tomeczek (2022), Abdeldayem et al. (2021) and Pasichnyi and Nepytyaliuk (2021) argue that a robust workforce and substantial capital investments are key factors that contribute to enhanced productivity in an economy, ultimately contributing to a rise in the real GDP.

O'Sullivan (2020) and Maestas et al. (2023) demonstrated that an economy characterised by a substantial labour force and minimal capital investments will generate a smaller output to sustain the expanding population, resulting in a bigger balance of payment deficit. This investigation's findings are consistent with the conclusions reached by those researchers. The economy demonstrates a significant degree of import dependency, which exacerbates the adverse effects of international trade on the real gross domestic product (GDP). When examining the composition of the real GDP, the investment component accounts for approximately 0.01, equivalent to 1% of the overall GDP. We can perceive this situation as a compromise between limited efficiency and a significant reliance on imported goods. The consumption component of the real GDP, which stands at around 0.962, or 96%, also indicates the presence of high imports as opposed to low exports, and according to Role (2017), imports make up the majority of total consumption in the Ghanaian economy.

6. CONCLUSION

This study investigated the influence of international trade and productivity on the economic growth of Ghana. The study also examined the cause-and-effect link between international trade, productivity, and economic growth, as well as how this relationship changes over time. The study used annual time-series data from the World Bank database on Ghana from 1970 to 2020 using the OLS and structural equation analysis techniques. The structural equation models utilized investment, consumption,

and government expenditure as indicators of economic growth, exports and imports as indicators of international trade, and labor and capital as productivity measures.

According to the findings, there was an inverse correlation between international trade and economic growth over both the long term and the short term in the Ghanaian economy. Judging from the level of imports as the construct of international trade, it indicates a positive relation to international trade, and by extension, it impacts economic growth.

However, productivity exerted a beneficial influence on economic growth. The analysis demonstrated that the negative effect of international trade on economic growth was primarily attributable to the high volume of imports into the economy compared to the low volume of exports. The insufficient level of domestic investment in the RGDP component also contributed to Ghana's decreased productivity. According to Chrid et al. (2021), export production positively influences economic growth, meaning exports will boost economic growth in both the long run and the short run. This highlights the importance of re-evaluating the practice of export diversification in order to enhance growth. The abundance of the labour force in the economy enhances the positive correlation between productivity and economic growth, suggesting that if Ghana had a larger number of export-oriented businesses, the effect on economic growth would have been more significant. The findings from the study indicated that a strategic investment in the production sector will result in long-term growth in the economy and boost international trade.

The study also confirmed the Granger causality result, illustrating that all variables have the ability to exert an impact on one another. Therefore, we can infer a reciprocal relationship between economic growth and international trade. Furthermore, both economic growth and international trade directly correlate with productivity. The long-term relationship between the variables was looked into in this study. The Johansen cointegration test confirmed that there is a long-term relationship between real gross domestic product (RGDP), international trade, and productivity as co-integrating vectors.

In order to optimize the advantages of international trade and enhance productivity for economic growth in the Ghanaian economy, the study proposed that the government and private sector collaborate to: expand the range of products or services that are being exported. Facilitate the growth of novel export sectors, such as manufacturing and services. To boost productivity in crucial industries, it is advisable to invest in technology, training, and infrastructure. Promote value addition: In order to boost profits, incentivize the enhancement and processing of raw materials. Cultivate a conducive climate for business. To encourage investment and entrepreneurship, optimize rules, minimize bureaucracy, and enhance infrastructure. Ghana may leverage these tactics to exploit the potential of international trade and productivity in order to propel sustainable economic growth and development.

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