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Examining The Influence of Trade Openness on the Economic Growth of Ghana

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Abstract

Despite the prominence of trade liberalization or openness as an economic topic over last decades, the debate among economists and experts on the relationship between trade openness and economic growth is still open. This study purposed to examine, as the main objective, the impact of trade openness on economic growth in Ghana from 1990 to 2019. The study sought to investigate the relationship between trade openness and economic growth in Ghana. The study incorporated trade openness, investment, inflation, industrial value and labour force as the additional variables. In view of this, the Granger causality test was applied to ascertain the flow of information between time series which helped to make authentic forecasts of the data and model. To test for stationarity of the data, the augments Dickey-Fuller (ADF) (Dickey and Fuller, 1981) was applied. The findings of the evaluation suggest that trade openness has a negative impact on the Ghanaian economy and the degree of influence on Economic Growth is at a 1% level of significance and not statistically strong. This result is consistent with other studies including (Pickson et al, 2018; Kwegyir-Aggrey, 2019). Also, the study was aimed towards advocating some substantial policies for Ghana's policymakers to help develop trade and economic growth.

Keywords: trade openness, economic growth, liberalization, Ghana, relationship, technology, Cobbs-Douglas

1. Introduction

The role of trade openness in enhancing economic growth of countries has been debated for decades and is still an issue up for debate between several advocates for trade openness and protectionists against the principles (Dabel, 2016). Trade Openness can be simply defined as the sum of imports and exports normalized by GDP (Abdullah et al 2014). It translates as the degree or magnitude of trading activities that an economy is willing and able to indulge in internationally over a period of time. The relationship between trade openness and economic growth is not new to international trade discussions. However, this relationship has been

analyzed much on literature basis and the results are still inconclusive. Some studies established a positive relationship between trade openness and economic growth while other studies failed to find the relationship between these variables. The main reason for the difference in the results of these studies lie with different methodologies used, different study periods explored and country specifics.

Ghana has experienced periods of steady growth as well as instability over the years. Several policy directions and changes have been shown in the trends of the economic growth in the country (Mireku et al, 2017). After independence in 1957, Ghana sought to industrialize and promote economic growth by adopting import-substitution policies. This was done by restricting imports of manufactured goods which already had a domestic demand in the country. The nation implemented several trade policies such as increasing tariffs, non-tariffs and exchange rate control which were so restrictive to the extent that it suppressed trade openness (Ghartey, 1987). The economy experienced a negative growth rate for a period of time between 1978 and 1983 where the annual average real GDP growth rate was –1.34%. The other years however, saw positive growth rates despite being at declining rates (Dabel, 2016). Ghana eventually had to borrow to a great extent from the international market in order to deal with its trade-deficit problems, in spite of the fact that the country continued to follow substitution approach to growth until the 1980s, (Quartey, 2005). However, in an effort to deal with this downward economic spiral caused by the restrictive economic policies, Ghana espoused the Economic Recovery Programme (ERP) and Structural Adjustment Programme (SAP) as part of the reform and adjustment program of the Breton Wood institutions to increase the free flow of goods and services amongst its trading partners. Ghana's trade authorities dislodged towards more open, market-oriented and outward-oriented policies (Dabel, 2016; Mireku et al, 2017).

The country's economy thus responded positively to the ERP and SAP. Ghana's economy eventually recovered from its negative growth rate of about 5% in 1983 to a healthy 8% positive rate in 1984. This significant growth increase continued with relatively less discrepancy, though since 1990 there appears to be a little lag in the growth rate (Fosu, 2000). Despite the prior belief upon the adoption of trade liberalization policies, that the country would derive the aforementioned benefits which would work together to ensure macroeconomic stability and sustained economic growth, the economic impact of trade openness, however, remains persistent in most policy arguments in Ghana (Sakyi et al, 2015).

2. Literature Review

2.1 Relationship Between Trade Openness and Economic Growth

Trade openness has been defined in many different ways by several economists in their studies; According to Quartey et al (2013), "Trade Openness refers to the degree to which nationals and foreigners can transact trade without artificial (that is, governmentally imposed) costs (including delays and uncertainty)". Baldwin (2003) explained that trade openness can be interpreted in two forms; from a broad perspective, to include exchange rate policies, subsidies and domestic taxes, competition and other economically related regulatory policies. And from a narrow perspective, to include only imports and export taxes or subsidies as well

as non-tariff deformations of trade.

The link between trade openness and economic growth is best exposed by the comparative advantage and the endogenous growth theories. According to the theory of comparative advantage, a country focuses to specialize in producing a commodity or render a service in which it has comparatively better factor or resources endowments than the other country that its going into trade with (Shayanewako, 2018). As a result of this strategy of production, the country can export more of that product or service which will consequently skyrocket their economic growth. Markus and Daniel (1978) elaborated on this theory by contending that sectors or commodities to be specialized in should have economies of scale in order to reap economic benefits through trade openness or international trade. A country that allows for more trade openness and invests in research and development has the tendency of its comparative advantage evolving over time, while enhancing the production of commodities that can reap bigger profit margins as a result of the generation of higher level of differentiation (Dao, 2014).

Empirical evidence from several studies including Dollar and Kraay (2004), Lee et al (2004), Freund and Bolaky (2008), and Chang et al (2009), prove that in the long-run countries that are more open to international trade experience higher and faster growth in their economies. Other researchers like Rodriguez and Rodrik (2001) however argue that most of these studies possess some shortcomings that question their results. The shortcomings include the measurement of trade openness and the retained estimation methods. Hausmann et al (2007) made an empirical examination on the relationship between trade and growth, which they defined an index which captured the productivity level of each of the grouped commodities exported by each country. In their study, they applied various panel data across 38 years (i.e., 1962 – 2000), of which their regression results proved that countries that export commodities with higher productivity levels consequently experience higher economic growth performances.

Theoretical literature from several authors on the trade and economic growth relationship reveals that openness to trade may have long run effects on economic growth. For example, Barro and Sala-i-Martin (1995) posited that in the long run, trade openness has the tendency to bolster the growth of an economy by disseminating technical know-how to its human resource, the importation of complex and quality technological accoutrements, and from the spillovers as a result of foreign direct investment (FDI) or public expenditure (e.g., financial openness, from the coaction with the innovations' sources). Rajan and Zingales (2003) in their article, "The great reversals: the politics of financial development in the twentieth century" suggested that trade liberalization compels institutional bodies and governments to make policy amendments and establish reforms programs to deal with the intense competition in global market. Redding (1999) however makes a contrary assertion which argued that trade openness through comparative disadvantage in specialized sectors of an economy hinders overall economic growth. In a scenario like this where an economy is facing a comparative disadvantage, a way to improve the economy is by setting up protection policies that can facilitate technological advancements and further induce economic growth (Lucas, 1988). Also, Romer (1990) assessed the relationship between trade openness and economic growth,

and according him openness to trade may expose an open country to several and numerous innovations which can boost domestic and hence economic growth. Greenaway et al (2002) analyzed the short-run and long-run effects of trade liberalization on economic growth by applying the panel data approach. In their analyses, they explained that there is "j-curve" relationship between trade liberalization and economic growth; and that international trade causes economic growth to increase up to certain levels of trade liberalization after which it tends to decline.

2.2 Trade Openness and Economic Growth in Ghana; Historical Overview

In Ghana's historical overview of trade openness and economic growth, there has been periods where the country experienced unwavering growth as well as periods of economic instability. (Quartey, 2005; Bawumia, 2010). Before Ghana gained independence in 1957 from British colonial rule, the nation's major exports were raw materials or primary goods, and operated under a regime of liberal payments. Post-independence however, the country sought to venture into an ambitious industrialization project by adopting import-substitution policies that included increasing import tariffs, non-tariff measures, and exchange rate controls as a way to promote economic growth. In order to implement this, the country restricted the importation of finished commodities that already had a demand in the domestic market. However, this plan was active until around 1986 (the liberalization period) when the project was met with some difficulties emerging from the 1960s and 1970s, hence severely demeriting the country's balance of payments. During this tough economic period, imports, exports and service as a fraction of GDP continuously diminished. These significant economic growth factors exhibited downward moving trends as exports as a percentage of GDP declined from 20.7% in 1970 to 3.6% in 1982, and imports as a share of GDP also decreased from 18.5% in 1970 to 3.3% in 1982 (World Bank , World Development Report, 1995). Findings from the Institute of Statistical, Social and Economic Research - ISSER (2000) also revealed that Ghana's economy experienced negative growth rates of 12.9%, 3.5%, 7.8%, and 4.6% in 1975, 1976, 1979, and 1983 respectively. Ghana's government was hence compelled to borrow heavily from the international market and embark on an economic recovery programme prescribed by World Bank and IMF in order to salvage its economic catastrophe. The recovery programme came with reforms which were geared toward eliminating distortions in the economy and included liberalization of trade and exchange rate. Also, further measures were adopted to promote the export sector by emphasizing on improving non-traditional exports (Laryea and Akouni, 2012). Upon several recovery measures, Ghana began to enjoy a positive growth rate at a diminishing rate beyond 1980s.

Sustainable economic growth is an ultimate national ambition for developing countries, Ghana being inclusive. A lot of developing countries from time immemorial have developed various policies in the hope of achieving a satisfactory economic growth. Notwithstanding, policymakers need to be abreast with knowledge and information pertaining to the factors of economic growth and how growth policies they enact may affect growth in order to sustain a higher rate of growth. This has led to the emergence of the trade liberalization concept which has been a prominent economic topic of debate by several experts over the years. Ghana first

adopted the trade liberalization concept part of its Economic Recovery Program (ERP) and Structural Adjustment Program (SAP) of the Bretton Wood Institutions in 1986 for the purpose of increasing and easing up the flow of commodities and services with and between its trading partners and opening up its economy. This shaped Ghana's trade structure to be more open, market-oriented and outward-oriented (Mireku et al, 2017).

Even though Ghana's liberalization policy led to subsequent economic growth to an extent, the impact was not significant enough as a result of low productivity from the manufacturing sector leading to slow growth of the sector. Statistics derived from the Institute of Statistical, Social and Economic Research (ISSER), 2002), established that Ghana's growth of 5.20% in 1986 shot up to 5.63% in the year 1988, however in 1990 the growth reduced to a whopping 3.33%. Moreover, upon the significant shift of the country's economic prototype from a restrictive government-controlled policy structure to a liberalized concept, the growth rate increased to 5.28% in 1991, then decreased to 3.30% in 1994. The trade liberalization period saw Ghana's import and export shares of GDP rising from 12.43% and 13.49% in 1986 to 28.51% in 1993 and 22.63% in 1994 respectively, due to a significant increase in per capita income. Despite the fact that the adaptation of the trade liberalization concept was a commendable decision by Ghana's policymakers, there has been no consensus in literature to identify trade openness as the major instigator for the country's economic growth. The effect of trade liberalization on economic growth varies from country to country due to distinct economic structures across countries. Most countries enjoy economic gains from trade liberalization whereas some countries also experienced adverse effects from adopting liberalization policies. Ghana and several other African countries have not benefited enough from trade liberalization. This is so because there have numerous trade policy reforms over the years; and these reforms possess the tendency to cause both merits and demerits to the country thereby leading to economic instability. Which is why it is very critical for policymakers to have an in-depth understanding of the influence that trade liberalization has on economic growth so as to enable them to adequately deal with the issues that stem from indulging in international trade as a country (Pickson et al, 2018).

Ghana's major economic bane over the years has been inflation. Inflation has demerited the country's economy greatly until 2011and 2012 when it averaged a single digit annual inflation rate of 8.73%. The annual inflation rate of Ghana has lingered between 0.4% and 59.5% resulting in a 19% average year-on-year rate across the span of thirty-four-year period between 1986 and 2020. Inflation rate soared so high and at a rapid pace as result of the effects of Ghana's currency (Cedi) value depreciating sharply against the major currencies, particularly the United States (US) dollar which is the major international market currency. Upon adopting a floating exchange rate in 1986, the cedi's value declined by an alarming 48.9%. Moreover, in 1997 the domestic currency depreciation also saw an upsurge which resulted in a value of 22.66%; this figure was a low as 11.54% in 1991 and 21.76% in 1994. The Ghana cedi recorded a 96.8% depreciation rate in 2000 (highest rate ever recorded). The rate of depreciation later experienced a drastic declination in 2006 to record a low 1.1%, however it rose again in 2008 and 2011 to 24.1% and 27.3% respectively. In 2012, the Ghana cedi's depreciation reduced to 14.6% (Bank of Ghana, 2015). Bawumia (2014) in a lecture at

Central University College on "Restoring the value of the cedi" posited that Ghana's economic problems of increased costs of doing business and living is as a result the sharp depreciation of its local currency as it operates as an open economy.

2.3 Trade and Growth Patterns of the Ghanaian Economy

2.3.1 The Ghanaian Economy

Ghana's economy is made up of private and public enterprises. The services sector contributes about 60% of the GDP, the agriculture sector contributes about 20%, and the remaining 20% is derived from the industrial sector. After gaining independence in 1956, the Ghanaian government established a lot of state-owned enterprises in the industrial and agricultural sectors as a measure to widen its control over the economy. However, the country was faced with inadequate capital and skilled labour, thus, measures were implemented to lure investments from business expatriates to either operate independently in the country or work in partnership with the government. Even though these measures were laudable to some extent, they did not reap the expected satisfactory results due to poor due to mismanagement and corruption in the administration. By the time the government at the time (Pres. Kwame Nkrumah) had been overthrown in 1966, the country had amassed a whopping $1 billion worth of external and internal debts stemming from heavy overseas borrowing upon which the government had relied to support its economic programs. Moreover, this could also be attributed to the immense embezzlement of almost all of the country's overseas reserves on the part of the corrupt administration (Boateng et al, 2020).

Ghana's economic growth over the last decade has been greatly driven by minerals and crude oil production rather than by the manufacturing sector (which has the tendency to increase employment rate due to need for more labour). The economic growth has however been comparatively strong with an annual economic growth average of about 6.8 percent from 2010 to 2019. As a matter of, Ghana's quest to promote structural transformation and build a sophisticated and complex economy keeps facing numerous significant challenges which hinder its fruition (Baah-Boateng and Twum, 2020). Inefficiency at ports and transit points within the Economic Community of West African States (ECOWAS) region is on major constraint faced by production in Ghana as domestics producers seek to increase output and diversify into knowledge-intensive products. Research has shown that instead of embarking on trade reforms a more effective way to curb this problem is by improving port efficiency which will reduce cost at the same time increasing trade. And obviously an increase in trade will tend to have a positive impact on the economic growth rate of the country.

2.4 Theoritical Framework for Ghana's Economic Growth

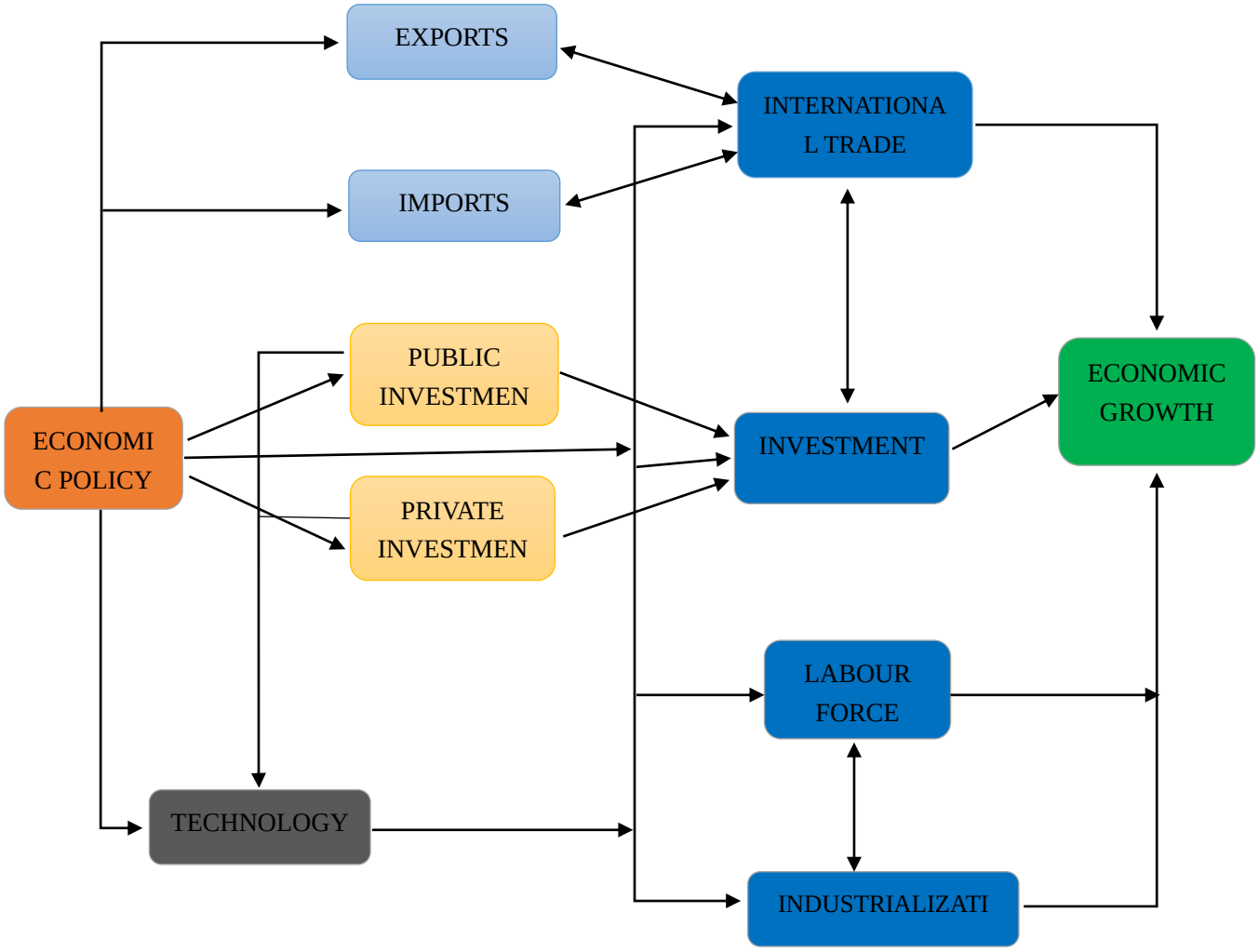

Figure 1. A designed theoretical framework as a complete model to demonstrate the holism of Ghana's economic growth

Source: Designed by researcher, 2021

The above figure illustrates a holistic theory that depicts a stable economic growth stemming from the various sectors, factors and policies that function conjointly. In order to realise a balanced economic growth behaviour there are some major elements and processes in the economy that must interrelate with each other effectively and efficiently. The above framework explains how these elements coexist in influencing economic growth and development. The theory begins with Economic Policy as the first step as it works its way through the other factors to reach economic growth.

3. Methodology

3.1 Theoretical Model Specification

The study adopted the neoclassical growth model which explains that when capital and

labour are increased by additional inputs in the production function growth can arise. The Solow growth model explicates that economic growth is the result of combining capital invested (K) and amount of labour (L).

$$Y\text{t} = f\ (K\text{t}, L\text{t}) \tag{1}$$

Equation (1) exclusively covers the magnitude of increment in output that the changes in labour and capital can instigate when they are combined. However, there is the possibility of other factors, besides labour and capital to influence output as well. In order to curb this, Solow (1956) demarcated increase in output into three parts: growth of labour force, physical capital accumulation and growth of Total Factor Productivity (TFP). The growth of TFP denotes the increase in output that is not accounted for by an increase in physical inputs (i.e., capital and labour) in the model. Therefore, the TFP can be construed as the effect of exogenous technological progress that can also be reflected in increasing productive efficiency (Dabel, 2016). To account for this, Solow employed the Cobb-Douglas production function expressed as:

$$Y_t = A_t {K_t}^{\alpha} {L_t}^{\delta} \tag{2}$$

where *Y* is economic output or real GDP, *K* is capital stock, *L* is labour force, and *A* total factor productivity. It is important to note that A is not fixed, but varies with different production functions based on the factors being studied.

3.2 EMPIRICAL MODEL SPECIFICATION

The production function used in this study is extended by assuming that technological progress can be influenced by trade openness. This leads to *A* being specified as follows:

$$A_t = f(OPEN_t,\ INF_t,\ IND_t) \tag{3}$$

where *OPEN* represents trade openness while *INF* and *IND* stand for inflation and industrialization process respectively. This implies that;

$$A_t = \ OPEN_t^{\beta_1}, INF_t^{\beta_2}, IND_t^{\beta_3} \tag{4}$$

Substituting Equation (3) into Equation (1), gives

$$Y_t = OPEN_t^{\beta_1}, INF_t^{\beta_2}, IND_t^{\beta_3}, {K_t}^{\alpha} {L_t}^{\delta} \tag{5}$$

The study applied natural logarithm to equation (4) and estimated a log-linear model of the following form:

$$\ln Y_t \ = \ \beta_0 + \beta_1 \ln OPEN_t \ + \ \beta_2 \ln INF_t \ + \ \beta_3 \ln IND_t + \alpha \ln K_t + \delta \ln LF_t + \mu_t \tag{6}$$

Let $\alpha \ = \beta_4$ and $\delta = \beta_5$

Therefore, Equation (5) can be expressed as;

$$\ln Y_t = \beta_0 + \beta_1 \ln OPEN_t + \beta_2 \ln INF_t + \beta_3 \ln IND_t + \beta_4 \ln K_t + \beta_5 \ln LF_t + \mu_t \quad (7)$$

Where the coefficients; $\beta_1, \beta_2, \beta_3, \beta_4 \; and \; \beta_5$ are the parameters of the respective variables, 'ln' is natural logarithm operator, β_0 is the intercept, t denotes time and μ represents the error term

The variables for the model to capture the assessment of the effect of trade openness on Ghana's economic growth are stated below:

Independent variables; trade openness (OPEN), inflation (INF), industrialization process (IND), investment (K), labour force (LF)

Dependent variable; Economic growth (Y)

Description of variables:

$\ln Y_t$ – dependent variable implying Economic Growth (proxy for this variable is real or annual GDP)

$\beta_1 \ln OPEN_t$ – independent variable implying Trade Openness (proxy for this variable is import plus export divided by GDP)

$\beta_2 \ln INF_t$ – independent variable implying Inflation

$\beta_3 \ln IND_t$ – independent variable implying Industrialization process (proxy for this variable is industrial value added as a share of GDP)

$\beta_4 \ln K_t$ – independent variable implying Investment (proxy for this variable is gross fixed capital formation as a share of GDP)

$\beta_5 \ln LF_t$ – independent variable implying Labour force

β_0 = intercept

$\beta_1 - \beta_5$ = coefficients of the independent variables

3.3 Summary of Data

This involves the descriptive statistics of the variables used in the study. The descriptions have been presented below in table 1. The table uses 30 observations on the listed variables to determine their respective standard deviation and mean values. Observations made show that the variable that have the highest level of variability is inflation, whereas trade openness has the lowest variability amongst the variables.

Table 1. Descriptive Statistics of Variables for Ghana (1990-2019)

Variable	Number of observations	Standard deviation	Mean
Real GDP	30	2.19e+10	2.43e+10
Trade Openness	30	0.1854325	0.7554176
Inflation	30	12.39058	18.94916
Industrial Value	30	5.053631	24.84458
Investment	30	5.346673	21.09225
Labour Force	30	2.577925	72.95333

4. Results of Regression Analysis

Table 2. First Regression Results_ Spurious Regression)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TRADE_OPENNESS	-2.14E+10	4.53E+09	-4.723346	0.0001
INFLATION	-28724429	80208671	-0.358121	0.7234
INDUSTRIAL_VALUE	1.88E+09	2.57E+08	7.327133	0.0000
INVESTMENT	-8.71E+08	2.16E+08	-4.031570	0.0005
LABOUR_FORCE	-6.26E+09	4.46E+08	-14.02970	0.0000
C	4.69E+11	3.40E+10	13.80266	0.0000

R-squared	0.970221	Mean dependent var	2.43E+10
Adjusted R-squared	0.964017	S.D. dependent var	2.19E+10
S.E. of regression	4.16E+09	Akaike info criterion	47.31069
Sum squared resid	4.15E+20	Schwarz criterion	47.59093
Log likelihood	-703.6603	Hannan-Quinn criter.	47.40034
F-statistic	156.3887	Durbin-Watson stat	1.683134
Prob(F-statistic)	0.000000		

In order to examine and determine the correlation between the dependent variable (Economic Growth) and the selected independent variables in this study, the table above was employed. The table uses Ordinary Least Square method of evaluation to produce results. The regression however emanated results that were specious in nature and not particularly as accurate as anticipated. Technically, such a result is termed spurious due to the fact that some the time

series variables at this level of the evaluation are non-stationary and as such are unpredictable and cannot be modeled or forecasted. In order to get consistent and reliable results, the non-stationary data needs to be transformed into stationary data. In order to achieve this, the study goes on to carry out a stationarity test for the data using a test tool called Augmented Dickey Fuller root unit test which will examine each variable's stationarity.

4.1 Multicollinearity Test

4.1.2 Variance Inflation Factor (VIF)

The Variance Inflation Factor (VIF) is a tool that is used to measure the severity of multicollinearity in a regression analysis. VIF is a statistical concept that shows the increase in the variance of a regression coefficient as a result of the presence of collinearity. A rule of thumb for interpreting the variance inflation factor; a VIF figure equal to one (=1) is considered not correlated, between one and five (1 ≥ 5) is moderately correlated, and greater than five (≤ 5) is said to be highly correlated. In general, a VIF above ten (≤ 10) indicates high correlation and is cause for concern (Glen, 2015). Various authors have suggested that a more conservative level of 2.5 or above is prudent for studies.

Table 3. Variance Inflation Factor (VIF)

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	1.16E+21	2006.267	N/A
TRADE_OPENNESS	2.05E+19	21.48692	1.182664
INDUSTRIAL_VALUE	6.60E+16	73.55851	2.828926
INFLATION	6.43E+15	5.668831	1.657810
INVESTMENT	4.67E+16	38.31702	2.240878
LABOUR_FORCE	1.99E+17	1840.776	2.219239

Variance Inflation Factors Results computed by author, 2021.

The above table represents the results derived from using the Variance Inflation Factor (VIF) to measure the collinearity of the variables in the regression model. According to the results, all explanatory variables in the equation have VIF figures below 5 (≥ 5). This means that all the variables are moderately correlated to each other and hence should be kept in the model for further analysis in the study. In conclusion the regression model does not have a concerning level of multicollinearity and thus there is no need for further amendments.

4.2 Autocorrelation Test

In diagnosing autocorrelation, Durbin-Watson test is one of the most commonly used to test. The results of the Durbin-Watson test ranges from 0 to 4. When an outcome of the test is approximately 2 it denotes a very low level of autocorrelation. An outcome closer to 0 means a stronger positive autocorrelation, and an outcome around 4 suggests a stronger negative autocorrelation. In generic terms, if the result of Durbin Watson test is below 1.7 (≤ 1.7), then the model is considered to have autocorrelation, whereas an outcome above 1.7 and below 2.3 (1.7 ≥ 2.3) suggests that the model has no autocorrelation characteristic present. Nonetheless, after autocorrelation has been detected it can be remedied by adding or introducing a one period lag of the dependent variable as an independent variable.

This command is computed as (LREAL_GDP=REAL_GDP {-1}), where (L) represents the one period lag of REAL_GDP. This then generates a new independent variable which is then included in the model in order to do a new estimation. This computation and its conforming results are show in the figure below:

4.2.1 Serial Correlation Test

Table 4. Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.493911	Prob. F(1,21)	0.4899
Obs*R-squared	0.666394	Prob. Chi-Square(1)	0.4143

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Sample: 1990 2019
Included observations: 29
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob
TRADE_OPENNESS	1.16E+09	5.64E+09	0.205943	0.8388
INDUSTRIAL_VALUE	-9990942.	3.97E+08	-0.025190	0.9801
INFLATION	-14264162	83973429	-0.169865	0.8667
INVESTMENT	-31812697	2.49E+08	-0.127597	0.8997
LABOUR_FORCE	3.95E+08	1.15E+09	0.343567	0.7346
REAL_GDP(-1)	0.049279	0.172482	0.285703	0.7779
C	-2.97E+10	8.56E+10	-0.346543	0.7324
RESID(-1)	-0.189771	0.270027	-0.702788	0.4899

R-squared	0.022979	Mean dependent var	0.000105
Adjusted R-squared	-0.302695	S.D. dependent var	3.60E+09
S.E. of regression	4.11E+09	Akaike info criterion	47.33847
Sum squared resid	3.54E+20	Schwarz criterion	47.71565
Log likelihood	-678.4078	Hannan-Quinn criter.	47.45660
F-statistic	0.070559	Durbin-Watson stat	2.106187
Prob(F-statistic)	0.999267		

Source: Computed by researcher, using EViews 2021

From the above figure it is evident that the Durbin Watson statistics result is 2.106187, which means that the model now has no autocorrelation after running the Breusch-Godfrey test. This now allows for the null hypothesis to be accepted for the model so far as presence of autocorrelation is concerned; since the expected Durban Watson statistics value required to accept null hypothesis for autocorrelation is between (1.7 and 2.3). Furthermore, another way to detect for a possible serial correlation presence is the Probability Chi-Square. When the figure of the Prob. Chi-Square is less than 0.05 it implies that there is presence of autocorrelation and vice versa. Thus, from the above results produced from the Breusch-Godfrey Serial Correlation LM test, it is appropriate to reject the alternative hypothesis of the presence of serial correlation in the model and rather accept the null hypothesis of no serial correlation. This is because it can be seen in the above Breusch-Godfrey test figure that the value for probability Chi-Square (1) = 0.4143 which higher than the minimum 0.05 value stipulated.

4.3 Augmented Dickey-Fuller Unit Root Test

The study applied the Augmented Dickey-Fuller unit root test in determining the stationarity of the variables. In the Augmented Dickey-Fuller test analysis, the columns applied were Levels, 1st and 2nd differencing; and the critical value chosen was 5% level. (-3.5) was chosen as the critical value of the test for all the three columns of the analysis table. The initial steps of the unit test of this study began with first applying the Schwarz Information Criterion with a maximum number of three (3) lags. Expected t-statistical value of test should be more than (-3.5) in order for each analyzed variable to be considered stationary. This means that the critical value for the test has been pegged at (-3.5). A variable in this model is thus considered non stationary when either the t-statistical value is less than the test critical value (5%) or both values are below (-3.5).

Augmented Dickey Fuller Test for Economic Growth (Y)

Null Hypothesis: Economic Growth (Y) has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 4 (Automatic- based on SIC, maxlag=4)

Table 5. Augmented Dickey Fuller Test for Economic Growth (Y)

Variable	Levels		1st Differencing		2nd Differencing	
Economic Growth (Y)	Constant	Trend and Intercept	Constant	Trend and Intercept	Constant	Trend and Intercept
T-Statistic Values	0.590842	-1.805697	-5.935328	-6.466164	-5.146475	-4.135150
Critical Values 5% level	-2.967767	-3.574244	-2.971853	-3.580623	-2.991878	-3.622033
Probability	0.9869	0.6758	0.0000	0.0001	0.0004	0.0180
Set Critical Values	Critical value= -3.5		Critical value= -3.5		Critical value= -3.5	

Source: Computed by researcher, using EViews 2021

Economic Growth (Y) becomes stationary at Levels (Trend and Intercept) with a t-statistical value of -1.805697 which higher than the stipulated test critical value at 5% level which is -3.332896, with 0.6758 as a significant probability value.

Augmented Dickey Fuller Test for Trade Openness (OPEN)

Null Hypothesis: Trade Openness (OPEN) has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 2 (Automatic- based on SIC, maxlag=4)

Augmented Dickey Fuller Test for Trade Openness (OPEN)

Table 6. Augmented Dickey Fuller Test for Trade Openness (OPEN)

Variable	Levels		1st Differencing		2nd Differencing	
Trade Openness (OPEN)	Constant	Trend and Intercept	Constant	Trend and Intercept	Constant	Trend and Intercept
T-Statistic Values	-2.373139	-2.143378	-5.412412	-5.482142	-5.801112	-5.671053
Critical Values 5% level	-2.967767	-3.574244	-2.971853	-3.587527	-2.986225	-3.603202
Probability	0.1577	0.5015	0.0001	0.0007	0.0001	0.0005
Set Critical Values	Critical value= -3.5		Critical value= -3.5		Critical value= -3.5	

Source: Computed by researcher, using EViews 2021

Trade Openness (OPEN) becomes stationary at Levels (Constant) with a t-statistical value of -2.373139 which higher than the stipulated test critical value at 5% level which is -2.967767, with 0.1577 as a significant probability value.

Augmented Dickey Fuller Test for Inflation (INF)

Null Hypothesis: Inflation (INF) has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 4 (Automatic- based on SIC, maxlag=4)

Augmented Dickey Fuller Test for Inflation (INF)

Table 7. Augmented Dickey Fuller Test for Inflation (INF)

Variable	Levels		1st Differencing		2nd Differencing	
Inflation (INF)	Constant	Trend and Intercept	Constant	Trend and Intercept	Constant	Trend and Intercept
T-Statistic Values	-2.954835	-5.322526	-6.296777	-6.154331	-5.742696	-5.728311
Critical Values 5% level	-2.967767	-3.587527	-2.986225	-3.603202	-2.998064	-3.622033
Probability	0.0514	0.0010	0.0000	0.0002	0.0001	0.0006
Set Critical Values	Critical value= -3.5		Critical value= -3.5		Critical value= -3.5	

Source: Computed by researcher, using EViews 2021

Inflation (INF) becomes stationary at Levels (Constant) with a t-statistical value of -2.954835 which higher than the stipulated test critical value at 5% level which is -2.967767, with 0.0514 as a significant probability value.

Augmented Dickey Fuller Test for Industrial Value (IND)

Null Hypothesis: Industrial Value (IND) has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 1 (Automatic- based on SIC, maxlag=4)

Augmented Dickey Fuller Test for Industrial Value (IND)

Table 8. Augmented Dickey Fuller Test for Industrial Value (IND)

Variable	Levels		1st Differencing		2nd Differencing	
Industrial Value (IND)	Constant	Trend and Intercept	Constant	Trend and Intercept	Constant	Trend and Intercept
T-Statistic Values	-2.182840	-2.495117	-4.120054	-4.045710	-7.202489	-7.057015
Critical Values 5% level	-2.971853	-3.580623	-2.971853	-3.580623	-2.976263	-3.587527
Probability	0.2165	0.3278	0.0035	0.0187	0.0000	0.0000
Set Critical Values	Critical value= -3.5		Critical value= -3.5		Critical value= -3.5	

Source: Computed by researcher, using EViews 2021

Industrial Value (IND) becomes stationary at Levels (Constant) with a t-statistical value of -2.182840 which higher than the stipulated test critical value at 5% level which is -2.971853, with 0.2165 as a significant probability value.

Augmented Dickey Fuller Test for Investment (K)

Null Hypothesis: Investment (K) has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 4 (Automatic- based on SIC, maxlag=4)

Augmented Dickey Fuller Test for Investment (K)

Table 9. Augmented Dickey Fuller Test for Investment (K)

Variable	Levels		1st Differencing		2nd Differencing	
Investment (K)	Constant	Trend and Intercept	Constant	Trend and Intercept	Constant	Trend and Intercept
T-Statistic Values	-2.978739	-2.862430	-4.919721	-4.870953	-6.228166	-6.071065
Critical Values 5% level	-2.971853	-3.580623	-2.971853	-3.580623	-2.981038	-3.595026
Probability	0.0493	0.1888	0.0005	0.0028	0.0000	0.0002
Set Critical Values	Critical value= -3.5		Critical value= -3.5		Critical value= -3.5	

Source: Computed by researcher, using EViews 2021

Investment (K) becomes stationary at Levels (Trend and Intercept) with a t-statistical value of -2.862430 which higher than the stipulated test critical value at 5% level which is -3.580623, with 0.1888 as a significant probability value.

Augmented Dickey Fuller Test for Labour Force (LF)

Null Hypothesis: Labour Force (LF) has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 1 (Automatic- based on SIC, maxlag=4)

Augmented Dickey Fuller Test for Labour Force (LF)

Table 10. Augmented Dickey Fuller Test for Labour Force (LF)

Variable	Levels		1st Differencing		2nd Differencing	
Labour Force (LF)	Constant	Trend and Intercept	Constant	Trend and Intercept	Constant	Trend and Intercept
T-Statistic Values	-1.109724	-2.724111	-1.742256	-1.411964	-5.126709	-5.282029
Critical Values 5% level	-2.971853	-3.580623	-2.971853	-3.580623	-2.976263	-3.587527
Probability	0.6976	0.2352	0.4000	0.8349	0.0003	0.0011
Set Critical Values	Critical value= -3.5		Critical value= -3.5		Critical value= -3.5	

Source: Computed by researcher, using EViews 2021

Labour Force (LF) becomes stationary at Levels (Trend and Intercept) with a t-statistical value of -2.724111 which higher than the stipulated test critical value at 5% level which is -3.580623, with 0.2352 as a significant probability value.

4.4 Johansen Cointegration Test

Johansen cointegration test is a technique that is used to determine if three or more time series are cointegrated. It specifically uses the Maximum Likelihood Estimates (MLE) approach in assessing the validity of a cointegrating relationship between several non-stationary time series data in a model. It is a tool that is also used to find the number of relationships and furthermore estimate those relationships (Glen, 2020). Due to the fact that Johansen's test can be used to find cointegration of several time series, it thus avoids the issues created when errors are carried forward to the next step of the model.

The table below represents the results VAR lag order selection criteria:

4.4.1 Var Lag Order Selection Criteria

Endogenous Variables: REAL_GDP TRADE_OPENNESS LABOUR_FORCE INVESTMENT INFLATION INDUSTRIAL_VALUE

Exogenous Variables: C

Sample: 1990 2019

Included observations: 27

Table 11. Results for VAR Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-932.0422	NA	6.05e+22	69.48461	69.77257	69.57024
1	-787.5067	214.1267	2.10e+19	61.44494	63.46069	62.04433
2	-741.5544	47.65430	1.57e+19	60.70773	64.45126	61.82088
3	-619.0895	72.57178*	1.20e+17*	54.30292*	59.77424*	55.92983*

Source: Computed by researcher, using EViews 2021

* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

4.4.2 The Johansen Cointegration Test Results

The results of the Johansen Cointegration test have been displayed in the table below. The trace results show two (2) Cointegration equations with the trace statistical values exceeding the 5% critical values and probability values lower than 1%. Thus, the null hypothesis that there is no cointegration between the variables is rejected. Also, since there are two (2) cointegration equations with statistical values that exceed the 5% critical values and has probability values less than 1%, the Maximum-Eigen results back up the rejection of the null hypothesis.

Trace and Max-Eigen Results.

Included observations: 25 after adjustments

Trend assumption: Linear deterministic trend

Series: REAL_GDP TRADE_OPENNESS LABOUR_FORCE INVESTMENT INFLATION INDUSTRIAL_VALUE

Lags interval (in first differences): 1 to 1

Table 12. Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.876707	132.0912	95.75366	0.0000
At most 1 *	0.665302	73.48186	69.81889	0.0248
At most 2	0.499456	42.83514	47.85613	0.1366
At most 3	0.439372	23.45748	29.79707	0.2243
At most 4	0.227958	7.253974	15.49471	0.5483
At most 5	0.000354	0.009908	3.841466	0.9204

Source: Computed by researcher, using EViews 2021

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values.

Table 13. Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.876707	58.60934	40.07757	0.0002
At most 1	0.665302	30.64672	33.87687	0.1158
At most 2	0.499456	19.37765	27.58434	0.3859
At most 3	0.439372	16.20351	21.13162	0.2132
At most 4	0.227958	7.244065	14.26460	0.4607
At most 5	0.000354	0.009908	3.841466	0.9204

Source: Computed by researcher, using EViews 2021

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level.

**MacKinnon-Haug-Michelis (1999) p-values

4.5 Interpretation of the Normalized Cointegration Equation

Results of the First Normalized Cointegration Equation.

1. Equation (s) Cointegrating Log Likelihood -811.5252

Table 14. Normalized cointegrating coefficients (standard error in parentheses).

Y	OPEN	IND	INF	INV	LF
1.000000	4.07E+10	-3.33E+09	3.43E+08	1.62E+09	3.92E+09
	(4.3E+09)	(2.0E+08)	(5.0E+07)	(1.7E+08)	(3.3E+08)

Source: Computed by researcher, using EViews 2021

The findings of the normalized cointegration equation indicate that Economic Growth (Real GDP) is the normalized variable whereas Trade Openness, Industrial Value, Inflation, Investment and Labour Force are the independent variables. According to the interpretation of the findings in the above cointegration equation, independent variables with positive values are considered to have a negative effect on the normalized variable (independent variable) while independent variables that have negative values are considered to affect the normalized variable positively. Therefore, per the corresponding values of the variables in this equation, it can be explained that ceteris paribus, trade openness, inflation, investment and labour force will have a negative effect on economic growth in the long run; and industrial value on the other hand will have a positive correlation with economic growth. Hence the null hypothesis of no-cointegration in the model is rejected against the alternative of a cointegration correlation.

4.6 Granger Causality Test

Granger causality test is a statistical hypothesis concept which is used to ascertain the flow of information between time series. It is used to determine whether one time series is a factor and offer useful information that can be used to forecast another time series. Usually, this test is run to find out the extent to which independent variables in a model can influence the dependent variable to statistically change. In other words., it investigates the percentage of

change in a dependent variable as a result of a percentage of change in an independent variable.

VAR Granger Causality/Block Exogeneity Wald Tests

Sample: 1990 2019

Included observations: 28

Table 15. Granger Causality Test Results

Dependent variable: REAL_GDP			
Excluded	Chi-sq	df	Prob.
TRADE_OPENNESS	1.912779	2	0.3843
INDUSTRIAL_VALUE	1.949316	2	0.3773
INFLATION	0.224376	2	0.8939
INVESTMENT	2.859401	2	0.2394
LABOUR_FORCE	9.334555	2	0.0094
All	20.11764	10	0.0282

The above table shows that Labour force has a strong causative influence on Economic Growth. It can however be seen that, Trade Openness, Industrial Value, Inflation and Investment do not statistically influence Economic Growth. In other words, so far as Ghana is concerned these factors or variables' degree of influence on Economic Growth is not statistically strong enough.

4.7 Performing the Error Correction Term

The significance of this step is that in case of any form of imbalance in the model, this determines the speed of adjustment within the model which can restore equilibrium after occurrence of such imbalance. The coefficient of error correction term with Economic Growth (-1) as the predicted variable is negative; and this is statistically significant for the model since it indicates a convergence from short dynamics towards long run equilibrium. The adjustments coefficients were pegged to 0.02% and 0.01% towards long run equilibrium in case of any disequilibrium situation that may arise from imbalance in the model. Below are the findings from the ECT calculations;

Table 16. Error Correction Term using Least Squares

System: UNTITLED
Estimation Method: Least Squares
Sample: 1990 2019
Included observations: 29
Total system (balanced) observations 174

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	0.632481	0.244447	2.587400	0.0108
C(2)	1.01E-05	2.85E-06	3.558506	0.0005
C(3)	-0.300251	0.142634	-2.105050	0.0372
C(4)	2.079532	1.070782	1.942069	0.0543

C(5)	1.408672	0.367006	3.838282	0.0002
C(6)	1.080345	0.050541	21.37568	0.0000
Determinant residual covariance		5.66E+29		

Source: Computed by researcher, using EViews 2021

C(1) => C(6) represents variables; Economic Growth, Trade Openness, Industrial Value, Inflation, Investment and Labour Force respectively.

The findings from the above error correction term estimation shows that, Industrial Value in the long run has a negative coefficient and its probability value indicates that it has a statistical significance, which proves a long run positive causality with Economic Growth. Its negative coefficient denotes its ability to restore equilibrium in case of disequilibrium caused by imbalance. Trade Openness, Investment and Labour Force have positive coefficients hence shows that they have negative causal effect on Economic Growth and their probability figures further proves that they possess very strong and significant causal effect on Economic Growth. Moreover, Inflation has a positive coefficient which shows a negative correlation with Economic Growth, exhibiting a diversion away from equilibrium (disequilibrium); but since its probability is slightly higher than the 0.05 statistical standard, it is considered to be statistically weak. In evaluating and explaining the collective effect of the independent variables with statistically significant p-values on the dependent variable, it can be deduced that; a percentage of increase in Industrial Value will cause Economic Growth to increase by 0.3%. Then again, a percentage increase in Trade Openness will lead to 1% decrement in Economic Growth; Investment increasing by a percent will also lead to a 1.4% decrease in Economic Growth whereas Economic growth will decrease by 1.1% in response to a percentage increase in Labour Force.

5. Conclusion

The focus of the study was to examine, as the main objective, the impact of trade openness on economic growth in Ghana from 1990 to 2019. Based on the empirical evidence that emanated from the study, it was shown that trade openness has a negative impact on the Ghanaian economy and does not promote economic growth. The results suggests that the degree of influence on Economic Growth is at a 1% level of significance and not statistically strong. This result is consistent with other studies including (Pickson et al, 2018; Kwegyir-Aggrey, 2019) who explained that, this was due to the fact that Ghana exports more primary commodities like gold, cocoa, bauxite, and crude which are less valued in the global market hence reaps less incomes. Moreover, the country tends to import even more secondary products like automobile, plant and machinery, and technological gadgets which have high value on the global market. This leads to balance of payment deficits or trade imbalance and a rather poor performance of the domestic markets since there is a higher patronage of imported foreign commodities, hence hindering economic growth. Buttressing this conclusion, (Huchet et al, 2019) posited that when export quality is taken into account, trade may have a negative impact on growth when countries have specialized in low quality products. The evaluation also revealed that inflation, investment and labour force negatively affect growth rate of Ghana's economy. This discovery was aligned with literatures including

(Dabel, 2016; Pickson et al, 2018; Kwegyir-Aggrey, 2019;). The study further indicated that only industrial value has a positive impact on economic growth. Although industrial value in Ghana has a positive impact on economic growth, it is not necessarily the desirable outcome since its significance value is considering low (i.e., an increase in industrial value will only boost the economy to a 0.3% increase).

5.1 Recommendations

With respect to the negative relationship of impact between investment and economic growth in Ghana, the government should invest more in physical infrastructure and human capital. This would go a long way to promote and induce private investment in the country, and further bolster the strength and growth rate of the economy to a desirable extent.

Based on the evidence of a negative impact of inflation on economic growth, governmental institutions, statutory bodies and policymakers in Ghana have to device ways to come up with programs and remedial measures to cut down strictly tackle corruption and stabilize price commodities so as to salvage and propel the growth of the economy. The Bank of Ghana as a government institution should focus on policy options that will keep the inflation rate stable in an attempt to sustain a single digit inflationary rate to ensure macroeconomic stability and certainty in the economy.

Furthermore, in order to reverse the negative impact of trade openness on the economic growth in Ghana, the study recommends that stakeholders and policymakers should increase the production and consequent exportation of secondary commodities and rather reduce importation of secondary products. To add to, the country should diversify its exports by adding value to the existing ones, and further pursuing other new foreign market destinations. This would reduce trade deficits and stimulate economic growth, and has the tendency to guarantee positive impact of trade openness on economic growth.

Lastly, since industrial value proved to exhibit a positive influence on Ghana's economic growth, the economic decision makers of the country should concentrate on allocating more resources into the industrial sector in the country. This will increase the industrial value added to the country's GDP and may even elevate the significant level of influence on economic growth to a satisfactory status. The recommendations given would yield the preferred results if there is a commitment on the part of the government, institutional bodies, policymakers and all stakeholders in the Ghanaian economy to adopt prudent strategies in implementing and sustaining them. This has the overall effect of making the Ghanaian economy experience immense growth and stability.

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