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## Article

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Cogent Economics & Finance

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*Suggested Citation:* Duodu, Emmanuel; Baidoo, Samuel Tawiah (2020) : How does quality of institutions affect the impact of trade openness on economic growth of Ghana?, Cogent Economics & Finance, ISSN 2332-2039, Taylor & Francis, Abingdon, Vol. 8, Iss. 1, pp. 1-19, <https://doi.org/10.1080/23322039.2020.1812258>

This Version is available at:

<https://hdl.handle.net/10419/269967>

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**To cite this article:** Emmanuel Duodu & Samuel Tawiah Baidoo | (2020) How does quality of institutions affect the impact of trade openness on economic growth of Ghana?, Cogent Economics & Finance, 8:1, 1812258, DOI: [10.1080/23322039.2020.1812258](https://doi.org/10.1080/23322039.2020.1812258)

**To link to this article:** <https://doi.org/10.1080/23322039.2020.1812258>



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Received: 29 June 2020  
Accepted: 16 August 2020

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## GENERAL & APPLIED ECONOMICS | RESEARCH ARTICLE

# How does quality of institutions affect the impact of trade openness on economic growth of Ghana?

Emmanuel Duodu<sup>1\*</sup> and Samuel Tawiah Baidoo<sup>1</sup>

**Abstract:** Developing countries, of which Ghana is no exception have actively engaged in trade openness after independence, yet, their economic growth remains low and this calls for urgent attention to address the situation. This study therefore examines the impact of trade openness on economic growth of Ghana for the period 1984–2018 taken into consideration the role quality of institutions play. The results from the autoregressive distributed lag model (ARDL) reveal that, both trade openness and quality of institutions exert a significant positive impact on economic growth in both the long and short run. However, the interaction of trade openness and quality of institutions is shown to have insignificant impact on economic growth in both periods. The results further indicate that exchange rate has a significant positive (significant negative) impact on economic growth in the long run (short run). Based on the findings, the study concludes that, institutional quality has no influence on the impact of trade openness on economic growth in the Ghanaian context. Policy implications aimed at ensuring sustained economic growth have been put forward for the discourse of stakeholders.

**Subjects:** Economics; Macroeconomics; Econometrics; International Economics; Development Economics

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### PUBLIC INTEREST STATEMENT

Many emerging economies such as Ghana have actively engaged in trade liberalization after independence, yet, their economic growth remains low. This however calls for the urgent need to consider other factors that could enhance economic growth. Quality of institutions is asserted to enhance growth but there is no empirical evidence to substantiate this claim in the Ghanaian context. This study has shown that trade openness and quality of institutions facilitate economic of Ghana. However, trade openness does not necessarily need complementarity from quality of institutions in order for Ghana to benefit fully from trade openness. The implications of the findings are that there is the need to encourage exports and limit imports. This will ensure trade surplus which will in turn promote growth. Also, quality of institutions should be strengthened, free from political pressures and devoid of any corrupt practices by government officials as corruption is seen as harmful.

**Keywords:** trade openness; quality of institutions; economic growth; ARDL; Ghana  
**Jel classification:** C22; F10; F43; O40; O43

## 1. Introduction

Ghana, after independence, strategized toward economic growth and development and for that matter put policies (especially trade policies) in place aimed at stimulating or enhancing economic growth. For instance, trade policies such as import substitution strategy, exchange rate, tariffs and quantitative controls were implemented. However, the impact of these policies on the economy was relatively lower, especially in mid 1960s. Killick (1978) and Ackah and Aryeetey (2012) document that, during mid 1960s, performance of many state enterprises was poor and that had a detrimental effect on the economy. The economic growth problem largely continued even after 1966 and it is not surprising that the economy of Ghana between 1970 and 1983 was described as a period of little macro management (Ackah and Aryeetey, 2012). This notwithstanding, Ghana, guided by World Bank and International Monetary Fund (IMF) and with the aim of restoring the gloomy performance of the economy embarked on Economic Recovery Programs (ERP) in 1983 and some of the key ERP programs were trade and exchange rate liberalization comprising tariff adjustments, import liberalization and exchange rate liberalization among others. These efforts were to ensure economic growth of Ghana is enhanced to improve the welfare of individuals.

It is argued theoretically (the classical theory of trade) that trade openness facilitates economic growth, because, trade openness leads to reallocation of resources, and countries that involve in trade tend to have a comparative advantage as they specialized in production and export to their trading counterparts which enhances economic growth. Despite the effort of many developing countries to open up in trade to the rest of the world, economic growth and development remain prone to the doubts of trade liberalization benefits (Haddad et al., 2013; Mireku et al., 2017) which Ghana is no exception. This has resulted in a debate among economist and researches as to whether trade openness (trade liberalization) indeed promote economic growth. In view of that, scholars have empirically researched the impact of trade openness on economic growth both in Ghana and in other parts of the world. Some of the authors report that trade openness impact positively on economic growth (see: Barlow, 2006; Iscan, 1996; Makun, 2017; Mireku et al., 2017; Nketiah et al., 2019; Nugent, 2002; Sakyi, 2011) while others posit that trade openness has a negative or insignificant impact on economic growth (see: Adams & Atsu, 2014; Adhikary, 2011; Adu, 2013; Akpan & Atan, 2016; Razin et al., 2003; Stensnes, 2006). These conflicting (inconclusive) outcomes continue to linger and hence calls for further research to fill the knowledge gap.

Notwithstanding the conflicting results, world trade statistical review in 2019 documents that GDP and world trade have grown up in tandem for the past ten years. The report further indicates that, since 2008, there has been a 26 percent increment in both world trade and GDP. The statistics further indicate that, between 2008 and 2018, developing countries performance (in terms of world trade) outweighs or corresponds with the performance of the developed economies. The question that comes to mind is that, does this really reflect in individual economy (especially developing countries)? For instance, Ghana has seen little improvement after the implementation of trade liberalization policies in 1983. The average annual GDP growth rate of Ghana were 5.74, 4.27, 5.36 and 6.83 percent for the periods 1984–1989, 1990–1999, 2000–2009 and 2010–2018 respectively (World Bank, 2019a). Data from World Bank (2019a) further reveals that annual GDP growth rate on average from the period 1984–2018 was estimated at 5.49 percent and has not exceeded 6 percent within same period. However, on average, Ghana's trade (measured as export plus import to GDP) with the rest of the world for the period 1984–1989, 1990–1999, 2000–2009 and 2010–2018 were 34.82, 62.72, 89.11 and 74.66 percent respectively (World Bank, 2019a). Further, data from World Bank shows that Ghana's trade on average from the period 1984–2018 amounted to 68.55 percent. Looking at the increasing trend of Ghana's trade with the rest of the

world and the growth rate of Ghana, one can construe that Ghana has not reap the full benefit of trading with the rest of the world as expected. This connotes that, trade alone may not be sufficient (though necessary) for Ghana to achieve its expected growth. Gries et al. (2009) explain that sub-Saharan African economies are not able to reap the full benefits from trade due to lack of effective regulations. Zhao and Wang (2009) also indicate that trade liberalization without appropriate (necessary) policy reforms is not adequate to induce economic growth. Further, it has been indicated that institutional factors play a significant role in shaping economic growth and development (see: Bénassy-Quéré et al., 2007; Lin & Fu, 2016; Rodrik et al., 2004).

From what is expounded above, there are several questions one could ask concerning Ghana's economic growth. Could it be that the quality of institutions in Ghana is inadequate to effectively enhance economic growth? Is trade lacking complementarity from institutional quality to enhance economic growth as expected? Is the current governance not facilitating economic growth? The current study addresses these questions so as to provide some insight for policy discourse aimed at enhancing economic growth. According to Rodrik (1999), economies with bad or poor institutions lack the capacity to respond properly to external shocks (including openness shocks) which in turn retards economic growth in the long run. This assertion is lacking an empirical evidence in the context of Ghana and the present study seeks to fulfill that. Studies done in other countries point to the fact that, quality of institutions play a significant role in terms of promoting economic growth and development (see: Akpan & Atan, 2016; Doan, 2019; Stensnes, 2006).

This study investigates the impact of trade openness, institutional quality on economic growth as well as examining whether institutional quality has influence on the impact of trade openness on economic growth of Ghana. In achieving the objectives of the study, the following null hypotheses are tested: (i) trade openness has no significant effect on economic growth of Ghana, (ii) quality of institution has no significant effect on economic growth of Ghana and (iii) quality of institution and trade openness have no complementarity effect on economic growth of Ghana. The study contributes to past literature pertaining to trade openness and economic growth in that, past studies, especially on Ghana (see: Adams & Atsu, 2014; Adu, 2013; Asiedu, 2013; Ehigiamusoe & Lean, 2018; Khobai et al., 2018; Mireku et al., 2017; Nketiah et al., 2019; Oteng-Abayie & Frimpong, 2006; Sakyi, 2011; Sakyi et al., 2015a) in attempt to assess the impact of trade openness on economic growth of Ghana ignore quality of institutions as a variable in the analysis and as a result fail to examine how quality of institutions influence the impact of trade openness on economic growth. Therefore, this study contributes to literature by incorporating this issue in the analysis.

The remaining structure of the paper is as follows. The next section discusses a brief theoretical underpinning and empirical review and this is followed by the methodology of the study. Following methodology is the analysis and discussion of the empirical results and the final section ends the paper with summary and concluding remarks.

## 2. Literature review

The relationship that exist between trade openness and economic growth has indeed obtained prominent place (theoretically and empirically) in the context of international economics. In view of that, the study reviews some theories and previous literature related to trade openness and economic growth. With respect to theories, the study reviews the mercantilist theory, the classical theory, Heckscher—Ohlin theory and the Krugman's intra—industry trade model.

According to the mercantilist theory, the only way-out for an economy to prosper in trading is to export more than import. They view trade as a zero-sum game—one country benefits from trade at the expense of another. Proponents argue that for an economy to be rich and powerful, governments should encourage export of more goods whiles limiting its import and domestic industry should be protected from import competition. According to them, increasing exports whiles minimizing imports enables a country to accumulate high trade surplus which in effect

leads to national prosperity, hence, economic growth. One can then conclude that, the mercantilist believes in self-seeking trade which is a one-way transaction.

The classical theory of trade on the other hand does not perceive trade as zero-sum game but classical economist like Adam Smith and David Ricardo postulate that trade is rather a positive sum-game (all trading economies benefit even though some benefit more than others) under the theory of absolute advantage (Adam Smith) and comparative advantage (David Ricardo). They argue that a country benefits from foreign trade if they specialize and export goods (commodities) that has lower absolute cost (higher comparative) advantage and import commodities with higher absolute cost (least comparative) disadvantage. The implication of Smith and Ricardo theories is that a country benefits from foreign trade through specialization and efficient resource allocation. Also, they add that trading with other countries brings about new technologies and skills which leads to higher productivity and hence economic growth. Thus, Smith and Ricardo believe that involving in international (foreign) trade induces economic growth since each economy has a share of the benefits from trade.

Heckscher—Ohlin (HO) theory of trade argues that international trade exists because of differences in factor endowment (some countries are endowed with capital while others are endowed with labor) in different economies and it is the reason there exists differences in comparative cost of production. Heckscher and Ohlin define factor endowment base on price criterion (a country is capital endowed if the ratio of the price of capital to the price of labor is lower compared with other economy) and physical criterion (a country is capital endowed if the total amount of capital to the total amount of labor is higher compared with other economy). According to Heckscher and Ohlin, economies endowed with capital should produce and export capital-intensive commodities and import labor-intensive goods whereas countries endowed with labor should produce and export labor-intensive goods and import capital-intensive goods. Heckscher (1919) and Ohlin (1933) posit that economic growth of an economy with adequate factor endowment will improve if they produce goods at a larger scale and trade with other countries.

Krugman's intra—industry trade model is however different from the traditional models of trade in the sense that Krugman identifies economies of scale and monopolistic competition (differentiable products) as the reason countries engage in international trade. In his model, he indicates that trade is possible among two nations with identical tastes, technology, factor endowments and income levels because of internal economies of scale in production and product differentiation. This suggests that even in the absence of differences in technology or resources between nations, economies of scale provides incentives for countries to specialize and trade among themselves. Krugman's model implies that consumers welfare will be improved since trade increases availability of consumers' choice of goods. Also, trade enabled by economies of scale can result in increase in demand, production and income and hence economic growth.

Aside the above theoretical review, empirical literature (see for example, Acemoglu et al., 2005; Akpan & Atan, 2016; Doan, 2019; Rodrik, 1999; Stensnes, 2006) have stressed the key role of quality institution in influencing the impact of trade openness on economic growth. For instance, Acemoglu et al. (2005) indicate that institutions are fundamental cause of long run economic growth which affirms the assertion by Rodrik (1999).

On the empirical front, several studies have been conducted with regard to trade openness and economic growth both in Ghana and other countries. The ensuing paragraphs review past studies on Ghana and this is followed studies on other countries.

Oteng-Abayie and Frimpong (2006) examine foreign direct investment (FDI), trade and economic growth relationship from the period 1970–2002. Using the autoregressive distributed lag model, the findings reveal that trade openness and FDI have a significant positive and insignificant negative relationship respectively with economic growth in both the short and long run. The results



further show that capital in both the short and long run has a significant positive relationship with economic growth whereas labor has a significant negative (insignificant negative) relationship with economic growth in the long run (short run).

Similarly, Sakyi (2011) investigates the extent to which trade openness and foreign aid impact in post liberalization economic growth. Using annual time series data spanning 1984–2007 and applying the autoregressive distributed lag model as estimation technique, the study concludes that trade openness and foreign aid have a significant positive relationship with economic growth in both the short and long run. The results further indicate that government expenditure, labor force participation rate and the interaction of trade openness and foreign aid both in the long and short run exert a significant negative effect on economic growth. Political system is also found to have a significant positive (insignificant positive) relationship with economic growth in the long run (short run). However, the study does not find a significant relationship between labor force growth rate, capital stock and economic growth in both the short and long run.

Using both the parametric (autoregressive distributed lag model) and non-parametric (local linear kernel estimator) as estimation techniques, Adu (2013) investigates the determinants of economic growth using annual time series data from 1960 to 2009. Both the ARDL and the local lineal kernel estimator results reveal that trade openness (inflation) has a significant (insignificant) negative effect on economic growth whereas labor, gross domestic investment, financial development and terms of trade have a significant positive impact on economic growth. Furthermore, Asiedu (2013) also examine the impact of trade liberalization on economic growth employing the autoregressive distributed lag model for the analysis over the period 1986–2010. The study concludes that, trade openness exerts a significant positive (insignificant negative) effect on economic growth in the long run (short run). The results further show that capital and population growth have a significant positive relationship with economic growth both in the short and long run. Foreign direct investment is revealed to impact negatively on economic growth in the long run whereas the effect of inflation is insignificant.

In a related study, Adams and Atsu (2014) investigate the impact of aid dependence on economic growth using the autoregressive distributed lag model for the analysis over the period 1970–2018. The study concludes that trade openness has insignificant positive (negative) impact on economic growth in the long run (short run) whereas aid exerts a negative (positive) significant effect on economic growth in the long run (short run). Whereas gross capital formation is found to exert a significant positive impact on economic growth, the effect of domestic credit to private sector is revealed to be positive but insignificant in both the short and long run. General government final consumption expenditure is also revealed to have a significant positive (insignificant positive) effect on economic growth in the long run (short run). Sakyi et al. (2015a) examine the effect of foreign direct investment and trade openness on economic growth using annual time series data spanning 1970–2011. Applying the autoregressive distributed lag bounds testing approach to cointegration, the study shows that FDI, trade openness and political system without interaction have a significant positive effect on economic growth whereas the interaction of FDI and trade openness is revealed to have a positive but insignificant effect on growth. The study further shows that the interaction of FDI and exports exerts a significant positive effect on economic growth in the long run. It is also revealed that the coefficients of all trade openness measures are positive and statistically significant in the long run.

Employing the autoregressive distributed lag model and using annual time series data spanning 1970–2013, Mireku et al. (2017) examine trade openness and economic growth volatility nexus. The study reveals that trade openness exerts a significant positive impact on economic growth in both the short and long run. The findings further show that financial sector development and financial liberalization have insignificant negative and positive effect on economic growth respectively in the long run, but in the short run, they both exert a significant negative impact on economic growth. Inflation (exchange rate) is revealed to have a positive (insignificant negative)

effect on economic growth whereas financial openness exerts significant negative impact on economic growth in both the short and long run.

Further, Ehigiamusoe and Lean (2018) examine the tripartite relationship between financial development, trade openness and economic growth using time series data from the period 1980–2014. The study applies the autoregressive distributed lag model to cointegration and Granger causality test in error correction model to the dataset. The results reveals that, there exists a long run relationship between financial development, trade openness and economic growth. Specifically, the long run relationship runs from financial development and economic growth to trade openness. However, there exists no long run causality from economic growth and trade openness to financial development. The results further indicate that, in the short run, trade openness causes economic growth whiles economic growth also causes financial development. Again, using annual time series data spanning 1980–2016, Khobai et al. (2018) investigate the long run relationship between trade openness and economic growth. Applying the autoregressive distributed lag model as estimation technique, the findings show that trade openness has a significant positive effect on economic growth in both the long and short run. The study further shows that investment and exchange rate have a significant positive effect on economic growth in the long run. In the short run, investment and exchange rate exert a positive significant impact on economic growth. Inflation is also shown to have an insignificant negative effect on economic growth of Ghana in the long run whereas the short run effect is negative and significant.

Similarly, Nketiah et al. (2019) examine the relationship between foreign direct investment, trade openness and economic growth using annual time series data covering the period 1975–2017. Employing the ordinary least squares as estimation technique, the study finds that trade openness exerts a significant positive impact on economic growth whereas inflation (foreign direct investment) has insignificant positive (insignificant negative) effect on economic growth.

With regard to studies on other countries, Stensnes (2006) examines the relationship between trade openness, institutions and economic growth for 94 countries including Ecuador, Malta, Zambia, Norway, Canada, Japan, Switzerland, Australia, Hungary and Philippines for the period 1975–2000. The results from the ordinary least squares indicate that trade openness (measured by tariffs) as well as its interaction with institutions exert a significant negative impact on economic growth. The study further shows that investment, institutions and human capital have a significant positive impact on economic growth.

In Turkey, Yucel (2009) examines the causal relationship between financial development, trade openness and economic growth using monthly data covering the period 1989M1–2007M11. The study uses the vector autoregressive (VAR) and Granger causality test as estimation techniques. The results from the VAR show that trade openness and financial development have a significant positive and negative impact on economic growth respectively. It is further revealed by the Granger-causality test that trade openness, financial development and economic growth have a bi-directional relationship.

Applying the vector error correction model as estimation technique, Adhikary (2011) explores the linkages between FDI, trade openness, capital formation and economic growth in Bangladesh using annual time series data covering the period 1986–2008. The results indicate that, FDI and capital formation (trade openness) exert a significant positive (significant negative) impact on economic growth. Similarly, Kakar and Khilji (2011) also examine the impact of trade openness and FDI on economic growth in Pakistan and Malaysia over the period 1980–2010. Using Johansen cointegration and Granger-causality test for the analysis, the study reveals that trade openness causes economic growth in both Pakistan and Malaysia. In Pakistan, it is revealed that FDI and exchange rate have no causal relationship with economic growth. Further, the results show that exchange rate Granger-causes economic growth and economic growth also Granger-causes FDI but the opposite holds for only Pakistan.



Also, Sakyi et al. (2015b) examine the extent to which trade openness influence income levels and growth rate in 115 developing countries including Sierra Leone, Somalia, Tanzania, Togo, Uganda, Zimbabwe, Haiti and Burundi from the period 1970–2009. Employing common correlated effects mean group (CCEMG) as well as fully modified and dynamic ordinary least squares as estimation techniques, the study shows that trade openness has a significant positive impact on income in the 115 developing countries as well as the upper and lower-middle income countries in all the estimators. For country-specific analysis, the results from the CCEMG reveal that trade openness has significant positive effect on income for 78 countries (including Ghana, Zambia, Albania, Argentina, Turkey and Lebanon) and a significant negative effect on 7 countries (Uruguay, Suriname, Honduras, Afghanistan, Mali, Gambia and Guinea-Bissau). The results from the causality also shows that, in the short run, there is bi-direction causal relationship between trade openness and economic growth.

In a related study, Akpan and Atan (2016) also examine trade openness, institutions and economic growth nexus across 23 sub-Sahara African countries including Rwanda, Cote d'Ivoire, Cameroon, Swaziland, Togo, Uganda and Mauritania using panel data covering the period 1996–2011. Employing pooled ordinary least squares (OLS) and the dynamic GMM as estimation techniques, the study shows that, trade openness exerts a significant negative effect on economic growth whereas institutions, investment, human capital and population have a significant positive relationship with economic growth in both estimators. However, inflation is found to have insignificant effect on economic growth in both estimators. With respect to trade openness and institutions interaction, the study reveals a significant positive impact on economic growth. In Cote d'Ivoire, Keho (2017) investigates the impact of trade openness on economic growth using annual time series data spanning 1965–2014 and employs the autoregressive distributed lag model for analysis. The study reveals that trade openness (capital and labor) has significant positive (significant negative) effect on economic growth in both the short and long run.

Malefane and Odhiambo (2019) explore the dynamic impact of trade openness on economic growth in Lesotho. Employing the autoregressive distributed lag model as estimation technique and annual time series data spanning 1979–2013, the results reveal that trade openness, investment and inflation have insignificant impact on economic growth in both the short and long run whereas government consumption and financial development exert a significant positive (insignificant positive) impact on economic growth in the long run (short run). Using balanced panel data from the period 1980–2013, Doan (2019) examines the influence of trade and institutional quality on real income across 45 sub-Sahara African countries including Angola, Gambia, Guinea, South Africa, Senegal and Comoros. The study employs the static (random effect estimator) and dynamic (system GMM) panel techniques for the analysis. The results show that actual economic flows (which includes trade), personal contact and capital stock have a significant positive effect on real income whereas cultural proximity and population exert insignificant impact on real income in both the random effect and the system GMM estimators. With regard to institutional quality, the results show that legal institutional quality and political institutional quality (legal institutional quality and economic institutional quality) have a significant positive impact on real income in the random effect estimator (the system GMM estimator).

It is observed from the empirical literature that, while some scholars support the claim that trade openness promotes economic growth, others (see: Adams & Atsu, 2014; Adhikary, 2011; Adu, 2013; Akpan & Atan, 2016; Malefane & Odhiambo, 2019; Stensnes, 2006) also dispute the claim. It is therefore, not surprising, why the debate (empirical literature) on trade openness and economic growth continues to linger, hence, the need for further research to contribute as far as validation of previous studies is concerned. It is also observed from the studies reviewed (those on other countries other than Ghana) that quality of institutions as well as its interaction with trade openness play a vital role in determining economic growth (see: Akpan & Atan, 2016; Doan, 2019; Stensnes, 2006). Yet, past literature on Ghana (see, for instance, Adams & Atsu, 2014; Asiedu, 2013; Ehigiamusoe & Lean, 2018; Mireku et al., 2017; Nketiah et al., 2019; Oteng-Abayie &

Frimpong, 2006) have overlooked or ignored the significant role of institutional quality in economic growth, and hence the present study seeks to incorporate this key variable in the analysis as a contribution to literature especially in the Ghanaian context.

### 3. Empirical methodology

This section presents the methodological framework, estimation strategy as well as data and variable description. The section is divided into three sub-sections. The first sub-section presents model specification of the study. The second sub-section focuses on estimation strategy employed for the analysis whereas the final sub-section is related to data and variable description.

#### 3.1. Theoretical framework and model specification

In examining the impact of trade openness on economic growth taken into consideration the role quality of institutions play, the study follows the AK endogenous growth model and adopt the Cobb-Douglas production function (CDPF) as the theoretical model which is expressed in Equation (1).

$$Y = AK^{\alpha}L^{\beta} \quad (1)$$

where Y, A, K and L represent economic output (economic growth in this study), technological progress, capital stock and labor force respectively and  $\alpha$  and  $\beta$  are the elasticities or denote the shares of capital stock and labor force respectively.

Dividing both side of Equation (1) by labor force gives the per capita output specified in Equation (2).

$$y = Ak^{\alpha} \quad (2)$$

where y and k denote economic output per capita and capital stock per capita respectively.

Further taking the natural logarithm of Equation (2) leads to the log form of Equation (2).

$$\ln y = \ln A + \alpha \ln k \quad (3)$$

where  $\alpha$  is the elasticity of economic output with respect to capital stock. It must be emphasized that, A captures growth in economic output (total factor productivity) which is not caused by increased in either labor force or capital stock. The study assumes that economic factors such as trade openness, quality of institutions, financial development, exchange rate and inflation influence technological progress in Ghana [i.e.,  $A = f(TO, QI, FD, ER, INF)$ ]. Thus, Equation (3) can be re-specified as:

$$\ln y = \ln TO + \ln QI + \ln FD + \ln ER + \ln INF + \alpha \ln k \quad (4)$$

where y and k are explained earlier and TO, QI, FD, ER and INF denote trade openness, quality of institutions, financial development, exchange rate and inflation respectively. Following the assertions by Stensnes (2006) and Akpan and Atan (2016), the study then extend Equation (4) to capture the interaction between trade openness and quality of institutions as expressed in Equation (5).

$$Y = f(TO, QI, FD, ER, INF, K, TO * QI) \quad (5)$$

where  $Y$ ,  $TO$ ,  $QI$ ,  $FD$ ,  $ER$ ,  $INF$  and  $K$  are as already defined.  $TO*QI$  represents the interaction between trade openness and quality of institutions which captures the combine effect of trade openness and quality of institutions on economic growth of Ghana.

Equation (5) is then transformed to its estimable form as follows:

$$\ln Y_t = \alpha_0 + \beta_1 \ln TO_t + \beta_2 QI_t + \beta_3 \ln FD_t + \beta_4 \ln ER_t + \beta_5 \ln INF_t + \beta_6 \ln K_t + \delta (\ln TO * QI)_t + \varepsilon_t \quad (6)$$

where the variables in Equation (6) are as already explained,  $\alpha_0$  and  $\varepsilon_t$  denote the constant term and the stochastic error term respectively, such that the stochastic error term has a mean of zero and constant variance  $[\varepsilon_t \sim N(0, \sigma^2)]$ . Also,  $\ln$  and  $t$  represent the natural logarithm and time trend respectively. The  $\beta$ 's (1, 2, 3, ..., 6) are the respective coefficients of the variables to be estimated whereas  $\delta$  is the coefficient of the interaction term which measures the combined effect of trade and quality of institutions on economic growth. It must be emphasized that, Equation (6) is estimated twice. In the first case, the equation is estimated using all the variables without the interaction term whereas in the second case the equation is estimated with all the variables in addition to the interaction term. The study accordingly refers to these two estimations Model 1 and Model 2 respectively.

### 3.2. Estimation strategy

The study employs the autoregressive distributed lag (ARDL) model and error correction model (ECM) following Pesaran et al. (2001). The study chooses the ARDL for the analysis given the several advantages it has. For instance, the ARDL is applicable irrespective of whether the orders of integration of the series are at the levels  $[I(0)]$  or at the first difference  $[I(1)]$ . It is also effective in relatively smaller samples and permits the use of the ordinary least squares methods for cointegration relationship. The study employs the non-parametric Phillips-Perron (P-P) test by Phillips and Perron (1988), the parametric Augmented Dickey-Fuller (ADF) test by Dickey and Fuller (1979, 1981) and Kwiatkowski, Phillips, Schmidt and Shin (KPSS) test by Kwiatkowski et al. (1992) to ascertain the stationarity properties of the series. Even though the use of ARDL does not require pre-testing of stationarity (unit-root), it is however, important to test the stationarity properties of the series to prevent any spurious results especially when the integrating order of the series are higher than first difference  $[I(1)]$ . In the ADF and P-P tests, the null hypothesis of unit-root (nonstationary) of the series is tested against the alternative hypothesis of stationarity (no unit-root) of the series whereas in the KPSS, the null hypothesis of trend stationarity of the series is tested against the alternative hypothesis of no trend stationarity of the series.

After confirmation of a valid stationarity properties of the series, the conditional ECM in OLS is first estimated. Also, the study specifies the ARDL form of Equation (6) which produces short and long run estimates in a single equation.

$$\begin{aligned} \ln Y_t = & \alpha_0 + \sum_{i=1}^q \rho_i \Delta \ln Y_{t-i} + \sum_{i=1}^q \tau_i \Delta \ln TO_{t-i} + \sum_{i=1}^q \phi_i \Delta QI_{t-i} + \sum_{i=1}^q \theta_i \Delta \ln FD_{t-i} + \sum_{i=1}^q \gamma_i \Delta \ln ER_{t-i} \\ & + \sum_{i=1}^q \Phi_i \Delta \ln INF_{t-i} + \sum_{i=1}^q \varrho_i \Delta \ln K_{t-i} + \sum_{i=1}^q \sigma_i \Delta (\ln TO * QI)_{t-i} + \beta_1 \ln Y_{t-1} + \beta_2 \ln TO_{t-1} \\ & + \beta_3 QI_{t-1} + \beta_4 \ln FD_{t-1} + \beta_5 \ln ER_{t-1} + \beta_6 \ln INF_{t-1} + \beta_7 \ln K_{t-1} + \beta_8 (\ln TO * QI)_{t-1} + \varepsilon_t \end{aligned} \quad (7)$$

where the variables are those already defined,  $\rho_i$ ,  $\tau_i$ ,  $\phi_i$ ,  $\theta_i$ ,  $\gamma_i$ ,  $\Phi_i$ ,  $\varrho_i$  and  $\sigma_i$  are the short run coefficients and  $\beta$ 's (1, 2, 3, ..., 8) are the long run parameters. Also,  $\Delta$ ,  $\alpha_0$ ,  $\varepsilon_t$  and  $\ln$  represent the first difference operator, constant term, stochastic error term and natural logarithm respectively.

The study then follows Pesaran et al. (2001) to establish the cointegration relationship among the variables by using the F-test for the joint significance of Equation (7). The null hypothesis of the F-test claims that, there exists no cointegration (no long-run relationship) among the variables whereas the alternative hypothesis states that long-run relationship (cointegration) exists among the variables. The null and alternative hypotheses are expressed as follows:

$$H_0 : \beta_1 = \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \dots \dots \dots = \beta_8 \quad (7)$$

$$H_1 : \beta_1 \neq \beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq \beta_5 \neq \dots \dots \dots \neq \beta_8 \quad (8)$$

In addition to the computed F-statistic, Pesaran et al. (2001) provide two critical values [lower bound,  $I(0)$  and upper bound,  $I(1)$ ] under which one can conclude whether there exists a long run relationship (cointegration). Given the F-statistic and the critical values, the study reject (fail to reject) the null hypothesis if the computed F-test is greater (lesser) than the upper bound (lower bound) critical values. But if the computed F-test lies within the lower and upper critical values, then the study cannot conclude whether cointegration exists or not. After the presence of a valid cointegration, the short and the long run parameters are estimated. The study uses the Schwartz Bayesian Criterion (SBC) to choose the optimal lag for the model. Pesaran and Pesaran (2010) posit that SBC is capable for handling relatively smaller sample and offers a parsimonious specification of the model, hence, the reason for selecting SBC.

To ensure the study does not suffer from any econometric and statistical problem for reliable and robust results, series of diagnostic tests are conducted. The heteroscedasticity and autocorrelation issues are tested using Breusch-Pagan-Godfrey test and the Breusch-Godfrey LM test respectively. Also, normality and functional form problems are addressed using the Jarque-Bera test and the Ramsey reset test respectively. In these tests, the null hypothesis of the absence of these problems in the estimation is tested against the alternative hypothesis of their presence. The non-rejection (rejection) of the null hypothesis indicates the absence (presence) of the aforementioned econometric problems. Furthermore, to determine the stability of the model within the study period, the study employs the cumulative sum (CUSUM) and cumulative sum of squares (CUSUMSQ) plots.

### 3.3. Data and variable description

The variables description as well as their respective a priori expectation are discussed under this section.

The study employs annual time series data covering the period 1984–2018. The choice of 1984 as the starting period is motivated by the fact that it is the period after the implementation of the various reforms including trade liberalization policies (1983). Data on the variables is sourced from World Development Indicators (WDI) and Worldwide Governance Indicators (WGI). Specifically, data on quality of institutions is sourced from Worldwide Governance Indicators (World Bank, 2019b) whereas those on trade openness, financial development, exchange rate, inflation and capital stock are obtained from World Bank's World Development Indicators (World Bank, 2019a).

Economic growth being the dependent variable in this study is measure by annual growth rate of gross domestic product (GDP). Trade openness defined as the country's interactions with the rest of world in terms of trade (exchanging goods and services) is measured by the sum of exports and imports of goods and services as a share of GDP. Trading with the rest of the world leads to efficient allocation of resources, exchange of technology and skills, access to market and employment opportunities among others, which tend to boost economic growth. Therefore, it is expected that trade openness will impact positively on economic growth. Quality of institutions is measured by government effectiveness defined to reflect perceptions of the quality of public services, the

quality of the civil services and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. The WGI measure for the institutional quality ranges from approximately -2.5 (weak) to 2.5 (strong). Quality of institutions (good institutions) in an economy means good policy formulation and implementation, absence of corruption, free from political interferences and well defined property rights which in all complement economic activities to promote economic growth. Therefore, the study expects quality of institutions to have positive relationship with economic growth.

Financial development in this study is proxied by domestic credit to private sector and the study expect it to have a positive effect on economic growth. This is because improvement in the financial sector is likely to ensure there are more funds which will also facilitate investment and hence economic growth. Exchange rate measured by official exchange rate (Ghanaian cedi to the United State dollar) is expected to have either positive or negative effect on economic growth. A rise in exchange rate (depreciation of the cedi) means prices of domestic goods are relatively cheaper at the foreign market and hence there will be more production and exports, all other things being equal which in turn increases economic output, resulting in the positive relationship. On the other hand, a rise in exchange rate which indicates depreciation of the cedi could lead to outflow of capital which could have a detrimental effect of reducing domestic output or growth of the economy. Inflation defined as consistent increase in the overall price level of goods and services is expected to impact negatively on the economy. Inflation increases cost of production as factor prices increase and as a result lowers investment which triggers a fall in output, and hence, decline in economic growth. The annual growth rate of consumer price index is used as measure of inflation. Capital stock is measured by gross capital formation as a percentage of GDP. The study expects capital stock to have a positive sign, in the sense that, the production function assumes capital stock as a direct input to production, hence, an increase in capital stock increases productivity and hence, a rise in economic growth.

#### **4. Analysis and discussion of empirical results**

This section presents and discusses the estimated results. The study starts the analysis with the unit root test, followed by the cointegration test and afterward discusses the long and short estimates, and lastly the diagnostic test is analyzed.

##### **4.1. Unit root test**

The unit root test results from ADF, P-P and KPSS tests are reported in Table 1.

It is observed that, all the unit root tests (ADF, P-P and KPSS) confirms stationarity of economic growth and inflation variables at the levels. However, trade openness, quality of institutions, financial development and exchange rate are revealed to be stationary at the first difference in both the ADF and P-P tests whereas the KPSS tests shows that they are stationary at the levels. Capital stock on the other hand is stationary only in the P-P and KPSS tests at the levels.

Given that the variables are stationarity at either levels or first difference, the ARDL approach becomes appropriate for the study. The study continues to estimate the long run relationship among the variables using the ARDL bounds testing approach to cointegration.

##### **4.2. Cointegration test**

The results from the cointegration test are reported in Table 2.

From Table 2, the study concludes that, there exists a valid long run relationship (cointegration) between the dependent variable (economic growth) and the explanatory variables (trade openness, quality of institutions, financial development, exchange rate, inflation and capital stock). This is because, the results show that the F-test statistics of 6.8460 and 6.2682 from Models 1 and 2 respectively exceed the upper bound critical values of 4.43 and 4.26 from Models 1 and 2

**Table 1. Unit root test results**

Variable	ADF test				P-P test			
	Levels		First Difference		Levels		First difference	
	No Trend	Trend	No Trend	Trend	No Trend	Trend	No Trend	Trend
lnY	-3.7001***	-3.8414**	-6.9448***	-6.8257***	-3.6254**	-3.6894**	-12.7584***	-11.7062***
lnTO	-3.6019**	-2.6797	-4.9506***	-5.9471***	-3.6019**	-2.6797	-4.9206***	-5.6526***
QI	-3.4066**	-3.3024	-5.0101***	-5.3266***	-2.3479	-2.2333	-6.4976***	-7.5649***
lnFD	-2.3283	-1.8017	-6.5514***	-6.8753***	-2.3845	-1.7246	-6.6027***	-7.5788***
lnER	-3.9347***	-2.1758	-3.5409**	-4.2132**	-3.5930**	-2.1428	-3.5182**	-4.1309**
lnINF	-3.4689**	-4.3075***	-5.0388***	-4.9366***	-3.5461**	-4.1460**	-13.1187***	-15.4397***
lnK	-2.4789	-2.1356	-4.0623***	-3.5071	-3.5461**	-4.1460**	-13.1187***	-15.4397***
KPSS test								
Variable	Levels						First difference	
	Trend						Trend	
lnY	0.1380***						0.2659	
lnTO	0.2008***						0.0825***	
QI	0.1442***						0.3798	
lnFD	0.1912***						0.0897***	
lnER	0.2034***						0.0772***	
lnINF	0.0971***						0.5000	
lnK	0.1537***						0.0577***	

\*\*\* and \*\* in both ADF and P-P tests (KPSS test) denote rejection (non-rejection) of the null hypothesis at 1 and 5 percent significance level respectively.

Source: Authors' estimation

**Table 2. Cointegration test results**

Model	Test statistic	Lower bound critical value	Upper bound critical value
Model 1	6.8460***	3.15	4.43
Model 2	6.2682***	2.96	4.26

\*\*\*Denotes rejection of the null hypothesis of no long run relation among the sample variables at a 1 percent significance level; Model 1 is the estimation without interaction term and Model 2 is the estimation with interaction between trade openness and quality of institutions.

Source: Authors' estimation.

respectively. This implies that the null hypothesis of no cointegration is rejected. The study then proceeds to estimates the long and short run coefficients following the valid long run relationship.

#### 4.3. Long and short run results

Reported in Table 3 are the estimated long run results. Model 1 is the results without interaction between trade openness and quality of institutions and Model 2 is the results with the interaction between trade openness and quality of institutions.

Starting with Model 1 (without the interaction term), it is observed that both trade openness and quality of institutions exert a significant positive impact on economic growth of Ghana, indicating the rejection of the null hypotheses (i) and (ii). Specifically, the coefficient of trade openness reveals that, all other things being equal, a one percent increase (decrease) in trade openness



**Table 3. Estimated long run results**

	<b>Model 1</b>	<b>Model 2</b>
<b>Variable</b>	<b>Coefficient</b>	<b>Coefficient</b>
lnTO	0.6017** (0.2389)	0.5627** (0.2457)
QI	0.9695* (0.5024)	1.6229* (0.8162)
lnFD	−0.4420 (0.2601)	−0.4047 (0.2674)
lnER	0.1546** (0.0695)	0.2196** (0.0953)
lnINF	−0.0977 (0.1159)	−0.0929 (0.1191)
lnK	−1.0239*** (0.2005)	−1.0682*** (0.2116)
lnTO*QI		−1.0988 (1.0318)
Constant	3.8043*** (0.8526)	3.9291*** (0.8811)

\*\*\*, \*\* and \* represent 1, 5 and 10 percent significance level respectively; standard errors are in the parentheses; Model 1 is the estimation without interaction term and Model 2 is the estimation with interaction between trade openness and quality of institutions.

Source: Authors' estimation.

increases (decreases) economic growth by about 0.60 percent at 5 percent significance level whereas the coefficient of quality of institutions also shows that economic growth of Ghana will increase by approximately 0.97 percent if quality of institutions in Ghana improves by a one point at 10 percent level of significance. The positive effect of trade openness on economic growth supports the theoretical augment that trade openness promotes economic growth, as trade openness leads to exchange of technology, efficient allocation of resources, access to new markets and employment creation among others. This result is consistent with findings by Asiedu (2013), Khobai et al. (2018), Mireku et al. (2017), Nketiah et al. (2019), Oteng-Abayie and Frimpong (2006), Sakyi (2011) and Sakyi et al. (2015a), which are all studies on Ghana. The result is also consistent with the classical theory of trade, Heckscher-Ohlin theory and the mercantilist theory. The positive impact of quality of institutions on economic growth implies that quality of institutions play a crucial a role in determining economic growth of Ghana, hence, policymakers and government should pay a meticulous attention to institutions in the economy. Similar studies in other countries (see: Akpan & Atan, 2016; Doan, 2019; Stensnes, 2006) have also reported positive relationship between institutional quality and economic growth.

The results further show that exchange rate has a significant positive effect on economic growth at 5 percent significance level. The coefficient indicates that a one percent increase (decrease) in exchange rate increases (lowers) economic growth by about 0.15 percent at 5 percent level of significance. The positive impact of exchange rate on economic growth can be attributed to the fact that, an increase in exchange rate (depreciation of the cedi) makes domestic goods relatively cheaper at the international market and hence higher demand for domestic goods (implying more exports). The increase in exports tends to promotes economic growth as the country accumulate trade surplus given that exports exceed imports all other things being equal. This finding supports the proposition of the mercantilist that a country will prosper when it exports more of its goods. This result conforms to the finding by Khobai et al. (2018).

Capital stock on the other hand exerts a significant negative impact on economic growth of Ghana. The coefficient reveals that, holding all other things constant, a one percent increase (decrease) in capital stock lowers (increases) economic growth by approximately 1.02 percent at 1 percent significance level. This result is contrary to the study's a priori expectation. The negative effect could be due to the fact that, capital (resources) is not channeled to the productive sectors of the economy and hence, may have detrimental effect on the economy. The result is not consistent with findings by Adams and Atsu (2014), Asiedu (2013) and Oteng-Abayie and Frimpong (2006) on Ghana and Adhikary (2011), Keho (2017) and Doan (2019) in other parts of

the world. However, the negative relationship is in line with findings (though insignificant) by Sakyi (2011). Financial development and inflation are revealed to exert insignificant negative impact on economic growth in the long run. Insignificant relationship between inflation and economic growth has also been reported in other studies both on Ghana and other countries (see: Adu, 2013; Akpan & Atan, 2016; Asiedu, 2013; Khobai et al., 2018; Mireku et al., 2017; Nketiah et al., 2019) and the insignificant relationship between financial development and economic growth is consistent with the study by Mireku et al. (2017).

Turning to the estimation with the interaction term (Model 2), it is observed that the results are statistically not different from the results in Model 1 but only differ in the magnitudes. However, the coefficient of the interaction term (trade openness and institutional quality) is revealed to be insignificant. The insignificant coefficient implies that, institutional quality has no influence on the impact of trade openness on economic growth. Stated differently, institutional quality does not complement trade openness to significantly impact on economic growth in the Ghanaian context, hence leading to the non-rejection of the null hypothesis (iii). The negative insignificant impact of the interaction between trade openness and economic growth contradicts findings by Akpan and Atan (2016), however, is consistent with the study by Stensnes (2006) in terms of the direction of the relationship (not in terms of significance).

With respect to the short run results, the estimates are reported in Table 4. It is revealed that the short run results are not statistically different from the long run results with the exception of exchange rate. The coefficients of exchange rate in both models change to negative and still significant. Specifically, the coefficient in Model 1 (Model 2) shows that a one percent increase in exchange rate causes economic growth to fall by about 0.89 percent (0.84 percent) at 5 percent significance level. The negative effect in the short run can be attributed to the fact that, increase in exchange rate which implies depreciation of the cedi (lower value of the domestic currency) results in outflow of capital which also lowers investment in the home country. The reduction in investment then tends to lower output, and hence, reduces economic growth. The short run negative relationship between exchange rate and economic growth is in line with Mireku et al. (2017)

**Table 4. Estimated short run results**

	<b>Model 1</b>	<b>Model 2</b>
<b>Variable</b>	<b>Coefficient</b>	<b>Coefficient</b>
$\Delta \ln TO$	0.5967** (0.2256)	0.5419** (0.2298)
$\Delta QI$	0.9615* (0.4843)	1.5629** (0.7246)
$\Delta \ln FD$	-0.4384* (0.2486)	-0.3897 (0.2512)
$\Delta \ln ER$	-0.8866** (0.3222)	-0.8359** (0.3238)
$\Delta \ln INF$	-0.0968 (0.1199)	-0.0895 (0.1195)
$\Delta \ln K$	-0.0547 (0.2351)	-0.0533 (0.2340)
$\Delta \ln TO * QI$		-1.0582 (0.9521)
ECM(-1)	-0.9918*** (0.1476)	-0.9630*** (0.1492)
R-square	0.7235	0.7376
Adj. R-square	0.6199	0.6236
DW-statistic	2.3991	2.3014
F-statistic	6.9793	6.4665
Prob. (F-statistic)	0.0001	0.0001

\*\*\*, \*\* and \* represent 1, 5 and 10 percent significance level respectively; Standard errors are in the parentheses; Model 1 is the estimation without interaction term whereas Model 2 is the estimation with interaction between trade openness and quality of institutions.

Source: Authors' estimation.

findings. Financial development in the short run tend to have a significant negative impact on economic growth at a 10 percent level of significance in Model 1. The coefficient suggests that economic growth of Ghana will fall by approximately 0.44 percent if financial development increases by a one percent. The negative effect could be due to the fact that, though the funds are available, requirements for private sector investors to access these funds may be cumbersome (example, availability of collateral and guarantors) and this reduces their investment capabilities. The reduction in investment then reduces output in the economy, and hence, economic growth also declines. Also, the results further indicate that capital stock exerts insignificant negative impact on economic growth of Ghana.

The negative and significant ECM (−1) implies that the economy will be restored to its long run equilibrium when there is a shock to any of the explanatory variable in the short run. Specifically, the long run equilibrium will be restored at a speed of approximately 99 and 96 percent in Models 1 and 2 respectively. The coefficients of determination ( $R^2$ ) show that the explanatory variables employed in the study explains approximately 72 and 74 percent of the total variation in economic growth in Models 1 and 2 respectively whereas the probability values (F-statistic) indicate that the estimated models are well fitted.

#### 4.4. Diagnostic test

The results from the diagnostic tests are reported in Table 5. The study concludes from the diagnostic tests that, the estimated models (1 and 2) do not suffer from any econometric problem. This is because, the probability values of all the tests exceed the 5 percent significance level, implying that the null hypotheses of absence of serial correlation, heteroscedasticity, non-normal distribution and poor functional form are not rejected. With regard to the stability of the estimated models (1 and 2), the plots of CUSUM and CUSUMSQ (see Figure A1 and Figure A2 in Appendix A) indicate that both models are stable as the plots lie within the 95 percent confidence interval.

#### 5. Summary and concluding remarks

This study has estimated the impact of trade openness on economic growth of Ghana taken into consideration the role quality of institutions play. Using annual time series data over the period 1984–2018, the study employs the autoregressive distributed lag model as the estimation technique. The results show that trade openness and quality of institutions exert a significant positive impact on economic growth of Ghana in both the long and short run. However, the interaction effect of trade openness and quality of institutions on economic growth is revealed to be insignificant in both short and long run periods. The results further indicate that exchange rate has a significant positive effect on economic growth in the long run but the short run effect is negative and significant. Capital stock is revealed to exert a significant negative effect on economic growth in the long run but the short run effect is insignificant. Financial development is revealed to have

**Table 5. Diagnostic test results**

	Model 1	Model 2
Diagnostic test	Test statistic	Test statistic
Serial correlation	2.5205 (0.1034)	1.0722 (0.3603)
Heteroskedasticity	1.0133 (0.4570)	1.3008 (0.2872)
Normality	0.4480 (0.7993)	0.2514 (0.8819)
Functional form	0.3096 (0.5833)	0.4416 (0.5132)
CUSUM	Stable	Stable
CUSUMSQ	Stable	Stable

Probability values are in the parentheses.

Source: Authors' estimation.

a significant negative effect on economic growth in the short run but in the long run the effect is negative but insignificant. Inflation is however found to have insignificant effect on economic growth in both the short and long run.

Base on the findings, the study concludes that trade openness and quality of institutions in Ghana play a significant role in economic growth of Ghana. It is also concluded that institutional quality has no influence on the impact of trade openness on economic growth in the context of Ghana. The study therefore suggests that, for Ghana to benefit fully from trade openness, policy-makers and government of Ghana have to enhance its trade policies by putting in place measures that seek to encourage or increase exports and limit its imports on foreign goods. This will ensure that, the country accumulates trade surplus which will in turn promote economic growth. Also, given that, quality of institutions significantly improves economic growth, the study further suggests that, the institutions in the Ghanaian economy (especially the public institutions) should be strengthened, free from political pressures and devoid of any corrupt practices by government officials as corruption is seen as harmful—because it leads to low efficiency and hence, stunting growth. The implication of ensuring these or taken them into consideration is that, it will lead to efficient allocation of resources to the productive sectors of the economy and this will raise productivity and there will be economic growth in the long run and welfare of individuals will also be improved.

#### Acknowledgments

The authors are grateful to Dr. Daniel Sakyi, a Senior Lecturer at the Department of Economics, Kwame Nkrumah University of Science and Technology (KNUST), Kumasi-Ghana for his useful comments on the initial draft of the paper. We are also grateful to the Reviewing Editor of the journal and the two anonymous reviewers for their useful comments. All remaining errors are those of the authors.

#### Funding

The authors received no direct funding for this research.

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#### Citation information

Cite this article as: How does quality of institutions affect the impact of trade openness on economic growth of Ghana?, Emmanuel Duodu & Samuel Tawiah Baidoo, *Cogent Economics & Finance* (2020), 8: 1812258.

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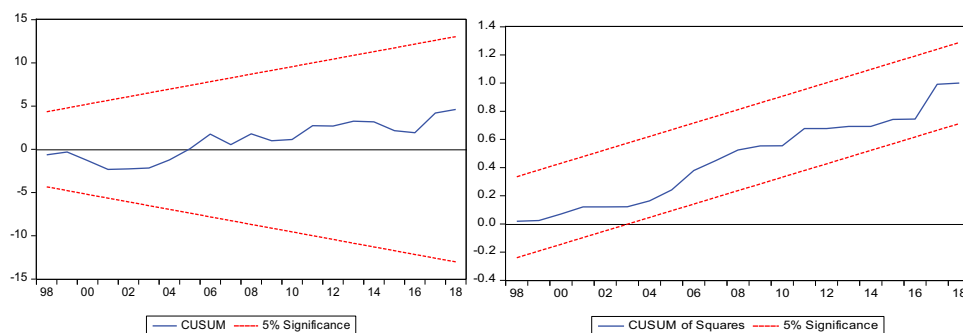
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## Appendix A.

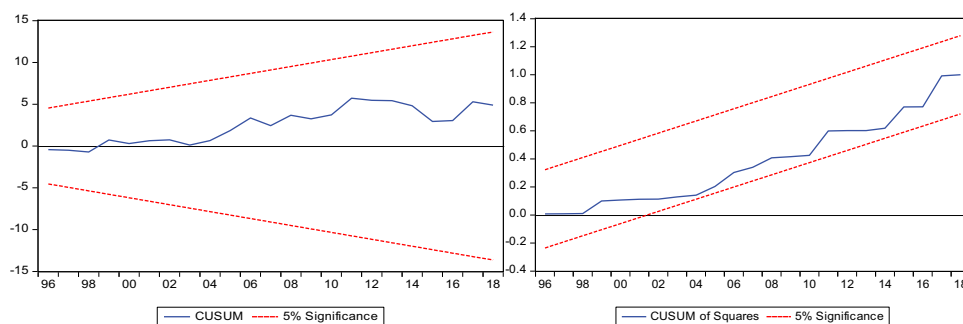
**Figure A1. Stability test for the model without interaction term (Model 1).**

Source: Authors' construction



**Figure A2. Stability test for the model with interaction term (Model 2).**

Source: Author's construction







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