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Trade Openness and Economic Growth: An Empirical Investigation of Tanzania

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Abstract: There is still disagreement among researchers concerning the link between a country's openness to trade and its economic growth. Despite a number of studies utilizing different methodologies and approaches to study the link over time, the results are still mixed conflicting. With this reason, the author examines the effect of trade openness on economic growth in Tanzania to contribute to the exiting debate in literature. Methodology This study uses time series data for period spanning from 1992 to 2020 to investigate the relationship between trade openness and economic growth. The Autoregressive Distributed Lag framework (ARDL) developed by Perasan, Shin and Smith, (2001) was adopted. Using ARDL model is appropriate for the small sample size and also requires different order of integration of series. In addition, bound testing technique was applied to determine the long-run and short-run relationship. Findings It was found that trade openness positively influences economic growth both in the short-run and long run. The results confirm the trade-led growth hypothesis for the case of Tanzania. Thus, Tanzania has to further encourage trade openness by reducing barriers and restrictions in order to promote trade openness. This finding implies that, the positive trade openness–economic growth could be attributed to the direct impact of the current rise in international trade volume of the country. Originality Different from other previous studies, this study adopts an ARDL model to investigate the relationship between trade openness and economic growth in Tanzania. This approach is more reliable in a study involving variables integrated of different orders. Many studies on the impact of trade openness on growth are based either on cross-country analysis. In addition, previous studies have either used policy-oriented measures of trade openness which are known to be subjective or they used outcome-oriented measures of openness that may only capture a country's share of trade. As a result, specific case studies are not considered resulting to the lack of statistical rigor.

Keywords: Trade openness; Economic growth; ARDL; Bound test.

INTRODUCTION

Integration into the world economy has proven a powerful means for countries to promote economic growth, develop and poverty reduction. Openness is an indispensable enabler of growth which leads to job creation and poverty reduction. It also provides new market opportunities for domestic firms, stronger productivity and innovation through competition and increase individual choice. However, sustained growth for a country to achieve the desired growth require policies that make an economy open to trade and investment with the rest of the world are needed for sustained growth.

The study of the relationship between trade openness and economic growth has long been a subject of discussions and controversy in literature. The theoretical literature provides that trade openness and economic growth is positive (Romer, 1993; Barro and Sala-i-Martin, 1995; Grossman and Helpman, 1991). They argue that countries that are more open have greater ability to diffuse technologies from the rest of the World. They also pointed out that, trade openness is crucial in stimulating economic growth in both developing and developed countries.

Kaltan, Loayza, (2005), provide that openness to trade promotes the efficient allocation of resources through comparative advantage, allows the dissemination of knowledge and technological progress and encourages competition in domestic and international markets. On the contrary, Krugman, (1994) and Rodrick and Rodriguez, (2001) argue that the effect of openness on growth is doubtful and that is still an open question. They identified one of the main problems in the assessment of the effect of openness on growth to be the endogeneity of the relation. Endogeneity is the property of variable being influenced within a system. This means that a variable correlate with other factors within the system being studied.

Trade liberalization in many countries has been subject of hot discussions in recent decades. It is quite reasonable that economies generally desire to be open to foreign trade. According to Yakubu and Akanegbu, (2015), trade exposes domestic firms to best practices of foreign firms and to the demand of discerning customers and encouraging greater efficiency. This can be achieved through capturing the static and dynamic gains from trade through a more effective allocation of resources; greater competition; an increment in the flow of knowledge and investment and of course, a faster pace of capital accumulation and technological progress (Babatunde, 2009).

The study of trade openness in developing countries particularly in Africa, suggest that the benefits of trade reforms have not been realized across countries, with some few countries benefiting, and others lose from the trade reforms.

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Studies on the effects of trade openness and economic growth are subject of numerous theoretical and empirical debates (see Ersory and Deniz, 2011; Sakyi, 2010; Chaudry. *et al*., 2010; Effiom. *et al*., 2011). Many studies on the impact of trade openness on growth are based either on cross-country analysis. In addition, previous studies have either used policy-oriented measures of trade openness which are known to be subjective or they used outcome-oriented measures of openness that may only capture a country's share of trade. As a result, specific case studies are not considered resulting to the lack of statistical rigor. Therefore, the need to further explore the link between trade openness and economic growth is crucial especially for the case of Tanzania.

Different from other previous studies, this study adopts an ARDL model to investigate the relationship between trade openness and economic growth in Tanzania. This paper uses impex rate as a measure of trade openness. This measure is sought to be objective at the same time captures the dimension of trade openness. The measure is presently used by most political economists in empirical analysis.

The paper is structured as follows; section two provides literature review, section three presents methodology used in the investigation, section four presents results and discusses findings and finally section five provides conclusion and policy implication.

REVIEW OF LITERATURE

The new theories, including the endogenous growth theory, support the view that trade openness has a positive influence on economic growth. For instance, Romer, (1990) argues that free international trade tends to speed up economic growth. Within the endogenous growth framework, one of the ways through which trade openness is believed to affect economic growth is the transmission of technology (Karras, 2003). Thus, technology transfers and other factor movements are more possible in an open compared to a closed economy. Drawing on an argument from the endogenous growth theory, Adhikary, (2011) posits that trade openness may affect economic growth by facilitating flows of international capital as well as by redirecting factor endowments to more productive sectors. Apart from facilitating factor movements and capital flows, trade openness can also affect economic growth through its effect on labour productivity and export capability. In this view, an economy that is more open to trade is inclined to have increased specialisation and division of labour, thus improving productivity and export capability (Constant and Yaoxing, 2010).

According to the theory of comparative advantage, if a country wants to trade with another country the latter will produce goods in which it has a comparative advantage. It specializes in the sector for which it has better factor endowments and produces goods on a larger scale. As a result, productivity and ex-ports of this sector will go up and this will boost the overall economic growth.

Theoretical literature argues that trade openness stimulates economic growth through the increase in spillover effect (see Romer, 1990). The developed countries innovate and developing countries imitate the technology (Grossman & Helpman, 1991). Young, (1991) describes that trade openness between developed and developing countries contribute to human capital accumulation in the developing countries.

Rivera-Batiz, (1995) stated various channels by which trade openness impacts on economic growth. The first is the re-allocation effect on economic growth because trade openness can increase the quantity of human capital in the leading industries. The second trade openness is causing the spillover effect of the transmission of knowledge across countries. According to this explanation trade openness increases flow of technological knowledge across countries, and this has a positive impact on long-run economic growth. Rivera-Batiz also explained if the domestic human capital system is not able to grip efficiently the innovative knowledge that generates by trade openness, then trade openness is negatively related to economic growth. The third type of effect has described the competition effect that is associated with the issue of imitation or replication, which means the developed economy innovates and less developed economy imitates (Grossman, Helpman, 1991).

Empirical Literature Review

For decades, a growing body of literature has investigated the causal relationship between trade openness and economic growth both in developed and developing countries. In empirical studies, the impact of trade openness on economic growth is a topic of great interest to many researchers; nevertheless, there are still conflicting views (Zahonogo, 2016).

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Academic debates on the effects of trade openness and economic growth are still divided. While some studies support the positive effects of trade openness on economic growth (see Dollar, 1992, Edwards, 1992 and 1998; Sachs and Warner, 1997a; Harrison, 1996; Frankel and Romer, 1999; Greenaway. *et al*., 2002; Lee. *et al*., 2004; Kim, 2011), others maintain the view that trade openness harms the development of such growth (see Edwards, 1993; Rodrik and Rodriguez, 2000; Sachs and Warner, 1997). Yet, another view of empirical studies maintains that trade openness soley benefits developing countries are insignificant. For example, Grossman and Helpman, (1990, 1991) and Rodrik, 1999 show that the benefits of free trade or trade openness between developing and developed Countries profits the later, since developing Countries have a lower marginal propensity to export compared to developed Countries. However, Lindert and Williamson, (2003) believe that small countries benefit more from trade openness, especially when they trade with more advanced and developed economies.

Hye and Lau, (2015) investigated the impact of trade openness on economic growth within the context of Pakistan, and concluded that trade tends to exert a negative effect on economic growth. However, the cross-effect of trade openness and HCA contributed to accelerated economic growth. The findings of the study suggested that the level of HCA must be improved through sustained investment in education and technical training to gain the full advantages of the positive trade–growth nexus. Although in the light of the attendant studies, it is apparent that the nexus between trade openness and economic growth can be both positive and negative, contingent on sampled countries and the moderating variable, more empirical studies are necessary to further the debate. Similarly, Brueckner and Lederman, (2015) examined the link between trade openness and economic growth in Sub-Saharan Africa by using the instrumental variables approach. They observed that the estimated result by instrumental variables indicate that economic growth has a significant negative and contemporaneous impact on trade openness, however trade openness is positively related to economic growth.

On the other hand, Hye, (2012) finds a negative and significant association between trade openness and economic growth in case of Pakistan. Hye and Lau, (2015) investigate the relationship between trade openness and economic growth in the case of India by using a new endogenous growth model for theoretical support, auto-regressive distributive lag model and rolling window regression method in order to determine long run and short run association between trade openness and economic growth. They conclude that trade openness index is negatively related to economic growth in the long run and the rolling window regression results indicate that the impact of trade openness index of economic growth is not stable throughout the sample. Further, the short run results show that trade openness index is positively related to economic growth. The Granger's causality test result shows trade openness-led growth and human capital-led growth exist both in the short and long run.

Keho, (2017) studied relationship between trade openness and economic growth using a multivariate framework with capital and labor as controlling variables. In his study an ARDL bounds testing approach to cointegration has been applied to test the long-run relationship among the variables. Further, the Toda and Yamamoto Granger-causality approach was used to unravel the direction of causality between trade openness and growth. The results found evidence that suggests trade openness has positive effects on economic growth both in the short and long run for Cote d'Ivoire. In addition, a study by Brueckner and Lederman, (2015) which employ the instrumental variable approach to a panel of 41 Sub-Saharan African countries found that trade openness promotes economic growth both in short and long-run.

In contrast to the trade-led growth hypothesis, some studies such as Vamvakidis, (2002), Rigobon and Rodrik, (2005); and Ulasan, (2015) find week evidences to support trade-led growth. Similarly, in case of a cross-country study using a panel of 27 least developed countries, Tekin, (2012) reports no significant causality between trade openness and GDP growth.

The mixed results from previous studies on the trade-growth nexus are attributed to many factors. For example, one possible reason may be that studies involving cross-country samples may not recognize the heterogeneity across countries included in the sample list. In fact, each country is unique in terms of development state of technology, economic structure, institutional development, and trade policy. Besides, some countries may be import-oriented, while others may be export-oriented. So, it may not be logical

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to ignore the cross-country heterogeneity. Recognizing these problems associated with cross-country samples, an attempt has been made in this study to examine the impact of trade openness on economic growth using Tanzania as a country specific case. Another reason for lack of conclusive evidence is inappropriate way in which trade is defined and also in how trade openness is measured and the quality of data and methodology used for existing literature.

Model Specification

The specification of the model involves the determination of the dependent and independent variables that have been used in the model. It expresses the mathematical relationship that exists between the dependent and the independent or explanatory variables.

In this study, we use real annual growth rate as our dependent variable denoted as logarithm of annual growth rate (LGDP) while the explanatory variables established from the literature to have some desired effect on economic growth include trade openness (OPE), Foreign Direct Investment (FDI), and inflation (INF).

The relationship between dependent and independent variables can be represented in the following equation;

$$Lgdp = f(fdi, ope, inf) \quad (1)$$

Where, LGDP stands for annual growth rate, FDI is referred to the foreign direct investment, OPE is the trade openness and INF represents inflation.

The relationship between the dependent variables and economic growth can be expressed mathematically as follows;

$$Lgdp = \beta_0 + \beta_1 fdi + \beta_2 lope + \beta_3 linf + \varepsilon \quad (2)$$

Where β_0 is the intercept, β is the coefficients of the variables ε is a stochastic disturbance term such that ~N (0, σ2).

The empirical investigation in this study involves examining the stationarity of the variables using unit root tests. The presence of long-run and short-run relationships between the variables are tested by using autoregressive distributed lag (ARDL) co-integration procedure introduced by Pesaran and Shin, (1999) and Pesaran, Shin, and Smith, (1997, 2001). One of the important features of this test is that it is free from unit-root pre-testing and can be applied regardless of whether variables are I(0) or I(1).

If all variables are I (1) (integrated of order one) and cointegrated (Masih and Masih, 1996), short-run elasticities can be computed using the vector error correction model (VECM) method suggested by Engle and Granger, (1987). In this case, an error correction mechanism exists by which changes in the dependent variables are modeled as a function of the level of the disequilibrium in the cointegrating relationship, captured by the error-correction term (ECT), as well as changes in the other explanatory variables to capture all short-term relations among variables.

The ARDL model is presented as follows;

$$\Delta y = \propto_0 + \sum_{i=1}^{n} \beta_1 \Delta y_{t-1} + \sum_{i=0}^{n} \beta_2 \Delta y_{t-1} + \sum_{t=0}^{n} \beta_3 \Delta linf_{t-1} + \sum_{t=0}^{n} \beta_4 \Delta lope_{t=0} + \delta_1 lgdp_{t-1} + \delta_2 fdi_{t-1} + \delta_3 linf_{t-1} + \delta_4 lope_{t-1} + \varepsilon_t \quad (3)$$

Where Δ denotes change in the different operators; denotes independent variable; presents drift constant; n is the optimal lag length; is number of lags; the βj (1,..4) with the summation signs corresponds to the short run dynamics of the variables; (1…4): depicts the long run relationship of variables; is the white noise error term.

The ARDL bound testing procedure is based on the joint F- statistic or Wald test statistic that test the null hypothesis of no co-integration among the variables that is;

$H_0 : \lambda_1 = \lambda_2 = \lambda_3 = \lambda_4 = 0$; Against the alternative hypothesis of co-integration among variables given by;

$$H_1 : \lambda_1 \neq \lambda_2 \neq \lambda_3 \neq \lambda_4 \neq 0$$

The null hypothesis of no co-integration is rejected if the estimated F-statistics are greater than the Perasan's upper bound critical value. Conversely, if the F-statistic value is lower than critical bound

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value, we cannot reject the null hypothesis of no co-integration. If it happens that the F-statistic value falls between the upper and lower bound critical value, this creates the condition of inclusive and the null hypothesis can either be accepted or rejected. In case there is evidence of long run relationship (co-integration) among the variables, the following long-run model can be estimated:

$$lgdp_t = \propto_0 + \sum_{i=0}^{n} \delta_1 \, lgdp_{t-1} + \sum_{i=0}^{n} \delta_2 fdi_{t-1} + \sum_{i=0}^{n} \delta_3 linf_{t-1} + \sum_{i=0}^{n} \delta_4 lope_{t-1} \quad (4)$$

Lastly, if there is existence of long-run relationship among the variables, the Error Correction model is employed to obtain the short-run dynamic coefficient which is ECM (t-1). This coefficient indicates the speed of adjustment towards equilibrium. Hence, the ARDL specification of short run dynamics can be estimated as follows:

$$\Delta lgdp_t = \alpha_0 + \sum_{i=0}^{n} \beta_1 \, \Delta lgdp_{t-1} + \sum_{i=0}^{n} \beta_2 \Delta fdi_{t-1} + \sum_{i=0}^{n} \beta_3 \, linf_{t-1} + \sum_{i=0}^{n} \beta_4 \, lope_{t-1} + \gamma ECM_{t-1} + \varepsilon_t \quad (5)$$

To ascertain the goodness of fit for the ARDL model, the model was further subjected to a number of diagnostic tests to check its appropriateness. As a result of this, serial correlation LM test for serial correlation, stability test to check for stability of the model and normality test were performed. The results from serial correlation LM test indicate that we cannot reject the null hypothesis of no serial correlation at 5 percent level of significance. In addition, the model does not suffer from heteroskedasticity and that the model is stable.

DATA AND METHODOLOGY

This study uses time series data covering the period from 1992 – 2020 to determine the effect of trade openness on economic growth in Tanzania. Data referred thereon have been sourced from the World Development Indicators (WDI) provided by the World Bank. Non-stationary data, as a rule, are unpredictable and cannot be modeled or forecasted. The results obtained by using non-stationary time series may be spurious in that they may indicate a relationship between two variables where one does not exist. In order to receive consistent, reliable results, the non-stationary data needs to be transformed into stationary data. Since the estimation of time series data may produce a spurious regression, producing high R– square and high t-ratios while variables used in the analysis have no real relationships (Gujarati & Porter, 2009). The authors had to test for unit root to verify to whether the data series are stationary or non-stationary. It is therefore a precondition for any time series analysis to be tested for stationarity. The ADF test tests the hypothesis that a time series yt is I (1) against the alternative that it is I (0) assuming that yt is an ARMA process (and ARMA process has both autoregressive and moving average terms. Further, ARDL framework developed by Perasan, Shin and Smith, (2001) is employed. Using ARDL model is appropriate for the small sample size and also requires different order of integration of series at I (0), I (1) or combination order of I (0) and I (1). In addition, bound testing technique is used to determine the long-run and short-run relationship. Breusch-Godfrey serial correlation LM test and CUSUM test are also used to check for serial correlation and stability of the model.

Description of Variables

Measurement of variables used in this study was operationalized according to parameters established from earlier researchers.

Gross Domestic Product (GDP)

This is the dependent variable; it is measured as total market value of goods and services produced in a country within a given period of time. Gross Domestic Product (GDP) measures the growth rate of a country output within a given period of time. It is the average annual growth rate of real gross domestic product in percentage.

Trade Openness

The two major categories of empirical measures of trade openness are: Trade intensity, e.g. (imports+exports)/GDP, trade openness indices based on quantities.

Trade policy/ trade barriers. Studies suggest that trade openness increases economic growth of a country; therefore, a positive relationship between trade openness measure and GDP is expected, but if a country were not open to trade then we would expect the negative sign.

Trade openness is measured by the exports plus imports as a percentage of gross domestic products. Trade openness is the measure of the volume of trade between Tanzania and the rest of the world.

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Inflation (INF) Inflation a control variable and is a proxy of annual change in percentage point of consumer price index (CPI). In an economy, high inflation is a sign of macroeconomic imbalances and reduces economic growth.

Foreign direct Investment measures the investment made in Tanzania by the external sector. This variable is expected to have a direct or positive relationship with economic growth in Tanzania.

EMPIRICAL RESULTS

Descriptive Statistics

The summary statistics of the variables under consideration were obtained and presented in Table 2 below;

Table 2: Descriptive statistics

	FDI	LINF	GDP	LOPE
Mean	0.018597	1.158711	0.571853	1.714479
Median	0.149947	1.075313	0.666810	1.770359
Maximum	7.825492	1.862343	1.528091	1.912822
Minimum	-9.363511	0.730962	-0.324004	1.316443
Std. Dev.	3.165425	0.315894	0.425982	0.162687
Skewness	-0.402262	0.992802	-0.478937	-1.224218
Kurtosis	5.811714	2.917436	3.438059	3.646345

Source: Author‘s own calculations

Descriptive statistics are used to describe the basic features of the data in a study. The mean and median indicate that there is no outlier in the data and the standard deviation shows small variation of data from the mean. A greater value of standard deviation indicates greater spread of the data from the mean. Skewness also shows that data are normally distributed and kurtosis indicates that there are no outliers in the data set.

Unit Root Tests

In order to apply the co-integration approach, the first step is to determine the order of integration of each variable under consideration. This is because the ARDL technique cannot be used if the order of the integration is of higher order than I (1). The Augmented Dickey Fuller (ADF) test was employed to check if the variables are stationary at either level or at first difference. The rule of thumb for unit root test is that we fail to reject the null hypothesis of presence of unit root at 5% level. The results of ADF test are presented in Table 3 and all the variables used in this study such as GDP, FDI and LOPE are stationary at first difference except LINF which is stationary at level. After unit root test, ARDL approach was employed since all the variables are a mixture of I (0) and I (1).

Table 3: Results of ADF test

	At level		First difference	
Variables	constant	Constant and trend	constant	Constant and trend
LGDP	-3.4I4**	-3.138	-7.126***	-5.069**
FDI	-2.342	-3.697	-7.422**	-7.436***
LINF	-4.287**	-5.110***	-4.793**	-6.701**
LOPE	0.846	1.718	-6.992**	-4.804**

Notes: ***, **, * imply the statistical significance at the 1%, 5% and 10% level respectively.

ARDL Model Approach

The use of ARDL model approach involves conducting the bound test for the null hypothesis of no co-integration. The results of ARDL model are presented below;

Table 4: Bounds test for co-integration analysis

Critical value	Lower bound value	Upper bound value
1%	4.590	6.368
5%	3.276	4.630
10%	2.696	3.898

Note: computed F-statistics = 5.507 significant at 0.05 marginal values. Critical values are cited from Narayan, (2005) table case III (unrestricted intercept and no trend).

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From Table 4 the computed F-statistic is 5.507. The relevant critical value bounds for this test as per Narayan, (2005) at the 95 percent level are given by 3.276 (lower) and 4.630 (upper) bound values. Since the F-statistic exceeds the upper bound of critical value band, the null hypothesis of no cointegration is rejected. The test results suggest that there exists a long-run relationship between variables GDP, FDI, LINF and LOPE. Having rejected the null hypothesis of no co-integration among the variables, the next step was to estimate an ARDL model for the long-run relationship. The econometric results of the long-run ARDL model (1, 1, 0, 1) are presented in Table 5.

Table 5: Long-run estimates for ARDL Model *(Dependent variable D (GDP))*

Variable	Coefficient	Std. Error	t-Statistic	Prob
C	-2.300137	1.308739	-1.757522	0.1023
GDP(-1)	-0.783346	0.281160	-2.786120	0.0154
FDI(-1)	-0.071416	0.053980	-1.323005	0.2086
LOPE(-1)	1.815376	0.723942	2.507627	0.0262
LINF(-1	-2.151291	0.502382	-4.282180	0.0009

Source: Author's own calculations

The results from Table 5 indicate positive and significant relationship between trade openness and economic growth ($\beta = 1.815$, $p < 0.05$). The results reveal that a percentage point increase in trade openness would "all things remain constant" raise economic growth by approximately 1.82%. This finding is consistent with Keho, 2017, Were, (2015) and Lawal. *et al*., (2016) who found positive effects of trade openness on economic growth both in the short and long run. This finding implies that, the positive trade openness–economic growth could be attributed to the direct impact of the rise in foreign direct investment and multinational firms operating in the country. In addition, the positive linkage between trade openness and economic growth could be associated with export-led policies. Surprisingly, foreign direct investment shows a negative coefficient and insignificant at the 5 percent level. This might be associated with the presence of the so called Dutch disease. That is a resource boom in a country mostly after the huge investments in the sector, diverts country's resources away from activities that are more conducive to growth in long run. First symptom of this phenomenon is an appreciation of the country's exchange rate caused by resource boom, which in turn causes a contraction in the manufacturing exports (Bulte. *et al*., 2003). The booming resource sector draws capital and labours away from manufacturing, leading its costs to rise (Neary and van Wijnbergen, 1986). The result is that the competitiveness of country's non-tradable commodities rises, while that of tradable – manufacturing commodities falls in the world markets, reducing the potential for export-led growth of manufactures in the long run.

Estimated Coefficients of the Short-Run Dynamics (ECM)

Table 6 presents the results of the estimated ECM. The first part shows the estimated coefficients of short run dynamics and the second part is the estimates of the error correction term (ECT) that measures the speed of adjustment whereby short-run dynamics converge to the long-run equilibrium path in the model.

Table 6: Short-run estimate for ARDL model *(Dependent variable D (LGDP))*

Variable	Coefficient	Std. Error	t-Statistic	Prob
C	0.004117	0.082652	0.049816	0.9609
D(LGDP(-1))	0.476155	0.295667	1.610445	0.1268
D(FDI(-1))	-0.002040	0.015277	-0.133513	0.8955
D(LINF(-1))	-0.518248	0.155880	-3.324656	0.0055
D(LOPE(-1))	1.660604	0.516919	3.212503	0.0068
ECM(-1)	-1.162895	0.362563	-3.207427	0.0055

Source: Author's own calculations

The short-run results from the ARDL framework and its associated diagnostic tests are reported. To check the robustness of results, a series of diagnostic tests were performed after the error correction model. The diagnostic tests suggest absence of model misspecification, serial

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correlation, heteroskedasticity errors and non-normality in the residuals. The results indicate a significant negative coefficient for the ECM, suggesting that the magnitude of the speed of adjustment from the short-run to long-run equilibrium is very high at 1.163. Thus, verifies the existence of cointegration among variables. ECM shows the speed of adjustment in long-run equilibrium after short-run shocks. The ECM coefficient show that any deviation from the short-run equilibrium between variables and can be adjusted and recovered each year at 1.163% in the long run.

From Table 6 the results show that trade openness has a positive and significant effect on economic growth. Specifically, a 1 percent increase in trade openness enhances economic growth by approximately 0.0166 percent, ceteris peribus. The results are consistent with other studies such as Asfaw, (2014), Zarra-Nezhad. *et al*., (2014), and Brueckner and Lederman, (2015), but contradicts with Vlastou, (2010), Polat. *et al*., (2015), Ulaşan, (2015), Were, (2015) and Lawal. *et al*., (2016), validating the trade-led growth hypothesis both in the short and long run. Similarly, inflation shows a negative and significant effect on economic growth in the short-run confirming the economic theory. The implication is that a 1 percent increase in the rate of inflation reduces economic growth by 0.0052 percent all things being equal. On the contrary, foreign direct investment shows a negative and insignificant influence on economic growth in the short-run.

Diagnostic and Stability Tests

Diagnostic Tests

The results of diagnostic test are presented in Table 7. From the table, the results show that the error term of the short-run models are free of heteroscedasticity and that the model does not suffer from serial correlation. In addition, the residuals are normally distributed.

Table 7: Diagnostic test

Test	F-statistics	P-value
Normality	0.4513	0.1856
Heteroscedasticity	0.7521	0.7261
Serial correlation	0.3563	0.3945

Source: Author's own calculations

Test for Stability

To check for the stability of the long-run and short-run coefficients CUSUM and CUSUMSQ tests proposed by Brown. *et al*., (1975) are used. These tests are based on the cumulative sum of the recursive residuals (CUSUM) and the cumulative sum of squared recursive residuals (CUSUMSQ) and are of a graphical nature whereby the residuals are updated recursively and are plotted against the break points for the 5% significance line. The results are reported in Figure 1 and 2. The results fail to reject the null hypothesis at 5 percent level of significance because the plot of the test falls within the critical limits. Therefore, it can be confirmed that the ARDL model is stable.

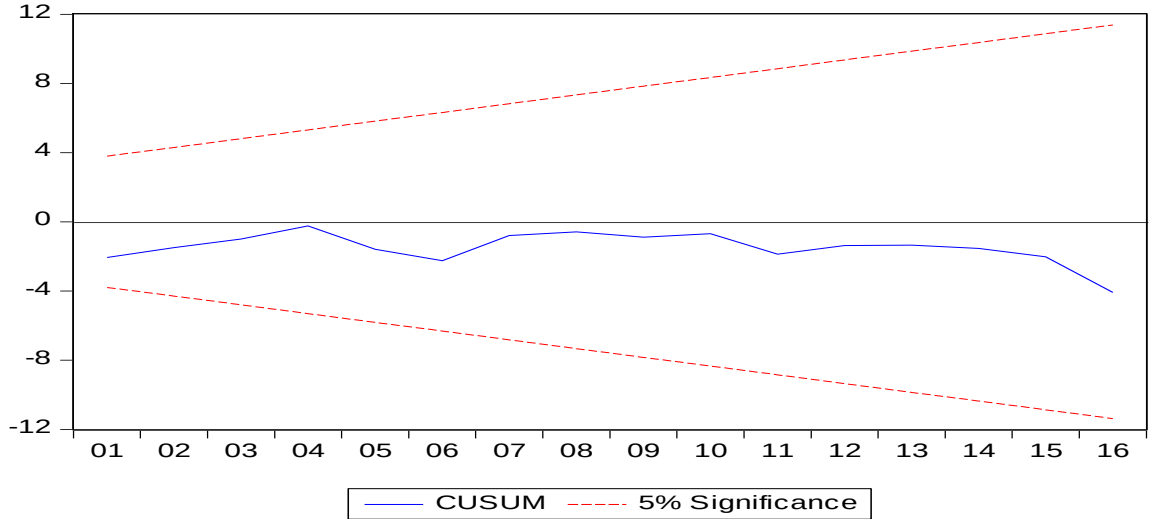

Figure 1: CUSUM test

Source: Author

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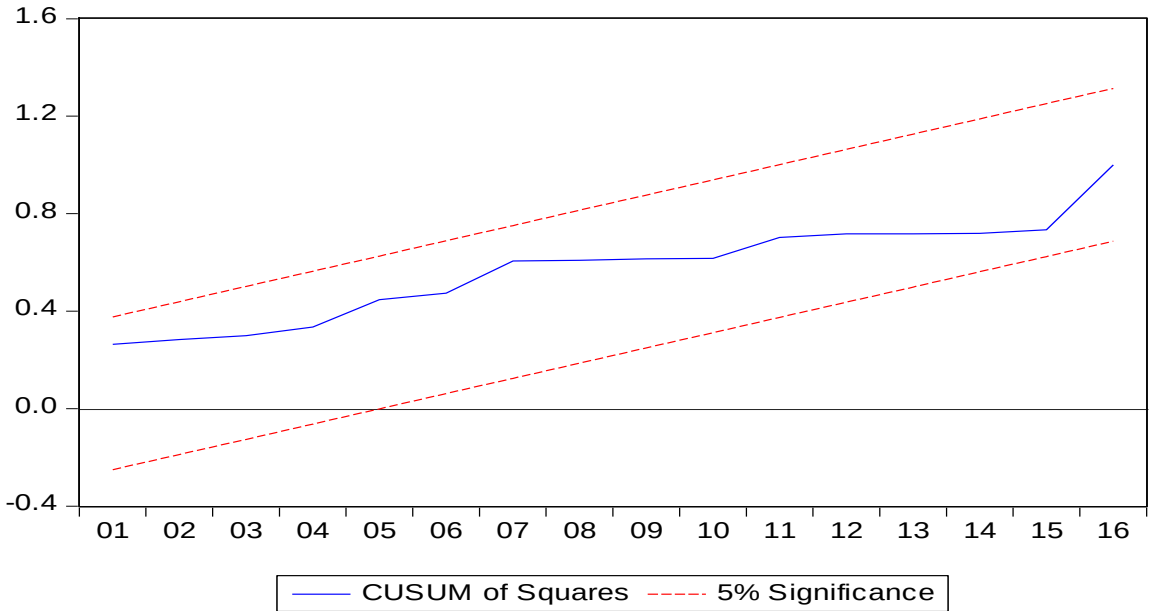

Figure 2: CUSUMSQ test
Source: Author's own calculations

CONCLUSIONS AND POLICY IMPLICATION

The effect of trade openness on economic growth is still a subject of debate in the existing literature. The results from existing literature are mixed and conflicting across methodologies and countries. This study examined the effect of trade openness on economic growth in Tanzania for the period covering from 1992–2019. The ARDL and bounds testing approach were used to investigate the long-run and short-run relationship between trade openness and economic growth. The results found a positive and significant effect of trade openness on economic growth both in short-run and long-run. The results are consistent with the existing literature on the effect of trade openness and economic growth. Specifically, the results validate the trade-led growth hypothesis for the case of Tanzania. However, a caution should be taken when making decisions on free trade since too much on dependence on international trade may be detrimental to fiscal sustainability and economic growth. Policy makers should encourage foreign trade but should also be aware of the consequences heavy reliance on free trade to avoid its negative effects.

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