Original Research Article

Effect of Trade Openness and Real Exchange Rate on Economic Growth in Tanzania

Abstract

The main objective of this study was to assess the effect of trade openness and real exchange rate on economic growth in Tanzania. Specifically to determine the effect of trade openness, real exchange rate, and directional causality of trade openness on economic growth. The annual time series data were collected for the period of 47 years ranging from 1970 to 2016. The study employed Autoregressive Distributed Lag (ARDL) to assess the long-run and short-run effects of independent variables (trade openness, real exchange rate, and foreign direct investment) on dependent variable (Gross Domestic Product) proxy economic growth. The results from the (ARDL) provide evidence that in both the short and long-run trade openness has a positive significant effect on economic growth, while real exchange rate and foreign direct investment have a positive significant effect in the long run while there is no short run on the real exchange rate to economic growth. On the other hand, foreign domestic investment was revealed to have a positive insignificant effect on economic growth in the short run. As it was estimated that with trade openness more trade is developed in terms of exports and imports which in turn boosts the economy. Finally, the study recommended that there is a need for developing countries to develop more domestic industries and attract more investors into the economy.

Keywords: Trade openness, Foreign Direct Investment, and Economic Growth.

1.0 Introduction

Globally in the world economy since 1950 there has been a huge liberalization of world trade, first under the support of the General Agreement on Tariffs and Trade (GATT), established in 1947, and now under the support of the World Trade Organization (WTO) which replaced the GATT in 1993. Tariff levels in developed countries have come down dramatically, and now average approximately 4 percent. Tariff levels in developing countries have also been reduced, although they remain relatively high, averaging 20 percent in developing countries. Non-tariff barriers to trade, such as quotas, licenses, and technical specifications, are also being gradually dismantled, but rather more slowly than tariffs. They have been motivated by the conviction that liberalizing trade would increase the volume of trade, promote economic growth, and improve living standards worldwide.

It is usually accepted that open economies grow faster compared to closed ones. The globalization movement, which accelerated especially in the 1980s, enforced this situation to come into view more clearly. According to (Fischer, 2003), globalization is defined as the "ongoing process of greater economic interdependence among countries reflected in the increasing amount of cross-border trade in goods and services, the increasing volume of international financial flows, and increasing flows of labor". During most of the 20th century, import substitution strategies (ISI) played a dominant role in most developing countries'

development strategies. But, while developing countries in Latin America, following ISI strategies, achieved lower growth rates, East Asian countries that passed export promotion policies, experienced a higher economic performance. This possibly explains the growing interest of many researchers to investigate the relationship between trade liberalization and economic performance since the late 1970s. Through the years researchers have been forced to use a variety of econometric tools to define the exact relationship between trade openness and economic growth. There are some issues however concerning the accuracy of the extent to which trade openness and economic growth are related. Even though their relationship is somehow fragile, there is no significant evidence that international trade is harmful to economic growth and may lead to more importation than exportation (Fiestas, 2005).

Trade openness of the world shows the average for 2015 was 90.62 percent. The highest value was in Luxembourg 405.33 percent and the lowest value was in Sudan 19.1 percent. The benefits of trade openness are not automatic, policies, such as measures aimed at fostering macroeconomic stability and a favorable investment climate, must accompany trade openness. (Kim & Lin, 2009), found that trade openness contributes to long-run economic growth, with effects varying according to the level of economic development. The effect of trade liberalization on growth depends on the liberalization level. An income threshold exists above which greater trade openness has beneficial effects on economic growth and below which increased trade has detrimental consequences (Agnor & Montiel, 2004)

If there is high-level trade openness it helps to improve the transfer of new technologies, facilitating technological progress and productivity improvement, and these benefits depend on the degree of economic openness. As seen in many African countries, the principal motive of governments especially in recent years has been to obtain high and sustainable economic growth to succeed in a challenging world of trade relations (Manni, 2012). In attaining this principled goal, countries have embarked on popular economic policies that allow the reduction and removal of barriers to trade such as tariffs, quotas, and import controls. Among many policies that most countries including Tanzania have decided to opt for is trade liberalization of economies (Herath, 2010).

1.1 Trade openness, the exchange rate with economic growth

According to (Kim & Lin, 2009), it was found that trade openness contributes to long-run economic growth, with effects varying according to the level of economic development. The effect of trade liberalization on growth depends on the liberalization level. An income threshold exists above which greater trade openness has beneficial effects on economic growth and below which increased trade has detrimental consequences (Agnor & Montiel, 2004). The management of the exchange rate is considered to be a major policy objective in Tanzania to achieve a set of various objectives of economic growth, control of inflation, and maintenance of external competitiveness. Policy discussions regularly emphasize it as the empirical literature provides compelling evidence to suggest that a wrongly managed exchange rate regime can be a major obstacle to improved economic performance (Kanaan, 2000) Reform of the exchange rate management was an important component of trade liberalization measures that Tanzania undertook, eventually replacing the earlier “fixed rate” system with a “freely-floating” regime.

1.2 Trade Liberalization in Tanzania

In the late 1960s, Tanzania embarked on a development strategy of substituting domestically produced goods for export, based on the concept of "socialism with self-reliance" articulated in the 1967 Arusha Declaration. Trade liberalization Tanzania suffered from large financial imbalances throughout the early 1980s, and its external payments situation continued to be precarious, with recurrent foreign exchange shortages and a heavy reliance on the balance of payments support. From 1980–to 1985, the real effective exchange rate increased by about 16 percent, and real exports decreased by about 10 percent, annually. Accelerated reforms undertaken since 1995 in Tanzania have resulted in a significantly liberalized trade regime essentially based on tariffs. (Kanaan, 2000)

The reaction of exports to the encouragement structure built into the trade liberalization program has been unsatisfactory in terms of the values of export earnings and the absence of export diversifications. Indeed, the available evidence from various kinds of literature indicates that the economic performance has been rather disappointing. Between 1990 and 2003, the Tanzanian economy registered a negative current account balance to GDP ratio. The GDP per capita in constant US$ dropped from $267 in 1990 to $262 in 1999 before rising to $308 in 2003. The trade to GDP ratio also declined consistently from 50% in 1990 to 39% in 1999 before recovering to 45% in 2003 (Kazungu, 2009)

According to (Kazungu, 2009) influenced partly by the prevailing wisdom in the academic and policy circles, the government of Tanzania like many other developing countries adopted a series of trade liberalization measures. Trade liberalization has among other things, entailed a substantial reduction in the role of government in production and marketing, abolition of controlled prices, removal of export taxes, relaxation of foreign exchange and import controls; and bolstering of the participation of the private sector in the economy. The World Bank provides data for Tanzania from 1990 to 2015 show Tanzania's Trade openness exports plus imports as percent of GDP. The average value for Tanzania during that period was 47.46 percent with a minimum of 33.49 percent in 2000 and a maximum of 65.69 percent in 1993. As shown in Figure 1.

Source: World Bank.

Figure 1 Trends of Tanzania's trade-openness from 1990 – 2015.

However, Tanzania like many other countries in the Third World suffers from trade restrictions and exchange rates, when records of trade openness and exchange rate were inadequate and uncoordinated and an overview of the nation's obligations would not have been possible, while assumptions about economic growth were made that in the event proved much too hopeful. But the main cause was the severe economic recession of the eighties, leading over several years to a negative growth rate per head and an economy increasingly unable to bear the weight of trade openness.

1.3 Motivation of the study

Globally, trade openness and exchange rate are the fundamental keys to the economic growth of the country. Most of the authors' studies on the effect of trade openness on economic growth but there is not a conclusive result and it is still controversial. Some of the authors found positive, mixed, and negative effects of trade openness on economic growth. For example (Keho, 2017), (Olasode, 2015), and (Nduka K, 2013) found trade openness has strong positive strength for economic growth while (Vlastou, 2010), found that openness harms economic growth. On another hand (Kazungu, 2009) found the impact of trade liberalization on land productivity was mixed in the coffee, tea, and Wheat, liberalization dummies appear to be negative and significant. That evidence arises in the study by different authors (Kazungu, 2009), (Vlastou, 2010), and (Keho, 2017) shows that economic growth is affected positively and negatively or is mixed by trade openness and exchange rate. At a certain level now many authors like (Mkubwa, Mtengwa, & Babiker, 2014) (Baboo, 2014) and (Nduka, Chukwu, & Kalu), agreed that the growth of an economy there should be trade openness to improve economic growth. In Tanzania GDP growth rate remains well from 6-7% over the past 1the 3 years (NBS Tanzania 2002-2014), even though this growth does not reach the government goal of growth of 8%. At 7%, in 2016, Tanzania's economy expanded quickly, putting it close to the top of the fastest-growing economies in Sub-Saharan Africa.

As the government of Tanzania under fifth president Magufuli tries to remove some restrictions to some sectors (agriculture and investment) and reduce barriers to exchanging goods between nations this helped Tanzania's economy to grow. Trade to GDP ratio also declined consistently from 50% in 1990 to 39% in 1999 before recovering to 45% in 2003, although have reported that export to GDP ratio increased from the low level ie 1990, it started to decline in a roller coaster fashion after 1995 (Kazungu, 2009) Impact on increasing and decreasing levels of openness on economic growth is of great concern to most developing countries. This has necessitated the need for an empirical analysis of the effect of trade openness and exchange rate on the economic growth of Tanzania. This study intended to assess the effect of the trade openness and exchange rate on economic growth in Tanzania

2.0 Literature Review

2.1 Theoretical review

2.1.1 Hecksher – Ohlin Trade Theory

The model assumes that a nation should produce and export a product for which a large number of relative abundance resources are used. Since different goods require different factor proportions and different countries have different relative factor endowments. Countries will tend to have comparative advantages in producing those goods that use their abundant factors more intensively. (Olhin(1993) & Hecksher (1919), 2013) Argued that identical technology, constant returns to scale, and a given factor-intensity relationship

between final products were necessary conditions for one country to enter into trade with another country thereby leading to economic growth. The country with abundant capital will be able to produce relatively more capital-intensive goods, while the country with abundant labour will be able to produce relatively more labour-intensive goods.

2.1.2 Classical theory

Developed by Adam Smith in Wealth of Nations (1776), the classical theory of economic growth was a combination of economic work done by Adam Smith, David Ricardo, and Robert Malthus in the eighteenth and nineteenth centuries. The theory states that if the economy has a steady-state GDP any deviation off of that steady state is temporary and will eventually return. This is based on the concept that when there is a growth in GDP, the population will increase. On the contrary, classical economists believe that participation in foreign trade could be a strong positive force for economic growth. They argue that it is not possible for a nation to endlessly maintain a positive balance of trade. Instead, countries' exchange of goods and services generates productivity gains through the increased division of labour and specialization. This means that each country should produce and export commodities whose internal opportunity costs are smaller while importing commodities whose internal opportunity costs are higher. In addition, countries should focus on acquiring foreign capital and technology (Nduka, Chukwu, & Kalu, 2013). This theory is supported by Olhin(1993) & Hecksher (1919) in their Hecksher – Ohlin Trade Theory. This theory argues that identical technology, constant returns to scale, and a given factor-intensity relationship between final products were necessary conditions for one country to enter into trade with another country thereby leading to economic growth. The country with abundant capital will be able to produce relatively more capital-intensive goods, while the country with abundant labour will be able to produce relatively more the labor-intensive good. Furthermore, the model assumes that a nation should produce and export a product for which a large number of relative abundance resources are used. Since different goods require different factor proportions and different countries have different relative factor endowments. Countries will tend to have comparative advantages in producing those goods that use their abundant factors more intensively.

2.1.3 Neo-Classical Theory

Two economists, T.W. Swan, and Robert Solow made important contributions to economic growth theory in developing what is now known as the Solow-Swan growth model. The theory focuses on three factors that impact economic growth: labor, capital, and technology. Therefore, the production function of neoclassical growth theory is used to measure the growth and equilibrium of an economy and is written as $Y = AF(K, L)$. "Y" denotes an economy's gross domestic product (GDP), "K" represents its share of capital, "L" describes the amount of unskilled labor in an economy and "A" represents a determinant level of technology. However, because of the relationship between labor and technology, an economy's production function is often re-written as $Y = F(K, AL)$.

2.2 Empirical Literature review

Baboo, (2014) on his paper focus on the relationship between openness and economic growth for Indian Ocean Rim Countries by using a panel data framework, he adopts the panel unit root and panel co-integration technique in his paper, the panel was consisting of 15 countries over time-period from 1997 to 2011. The countries forming part of the association were

Australia, India, Indonesia, Kenya, Madagascar, Malaysia, Mauritius, Mozambique, Bangladesh, Seychelles, Singapore, South Africa, Sri Lanka, Tanzania, and Thailand. He used three openness indicators Imports plus Exports as a percentage of GDP, Imports as a percentage of GDP, and Exports as a percentage of GDP. He adopted Fully Modified Ordinary Least Square (FMOLS) to estimate his model. And the results found that there is a positive relationship between openness and growth. Fifteen countries consisted in the panel and from the period 1997-2011, Singapore, Seychelles, Malaysia, and Mauritius are among those countries which are more open and have the highest growth rate. And he concludes that Openness is not an engine of growth but acts as a catalyst for promoting growth through research and development, wider market access, and allowing a reduction in production cost.

Olasode et al,(2015) in their study focused on the impact of trade openness on economic growth in Nigeria. The study used data from the National Bureau of statistics over time from 1981 to 2012, analysis was done by using the Augmented Dickey-Fuller test of stationarity, and co-integration. The variable used like Foreign Domestic Investment (FDI), growth fixed capital formation, trade openness, and Exchange rate for Nigeria. The study found that there is a positive relationship among real gross domestic product (RGDP), foreign direct investment net flow (FDN), the exchange rate (EXCH), and trade openness (TROP) in Nigeria. And conclude that the estimated parameter for short-run and long-run dynamic of trade openness function exist over the entire period, shows the future tendency of further stability. The export increases and leads to an increase in the Gross domestic product (GDP).

Bader, (2016), analyzed the effect of exports and imports on economic growth in the Arab countries during the period 1995 to 2013. The study used a panel data approach in 17 countries: (Jordan, United Arab Emirates, Bahrain, Tunisia, Algeria, Saudi Arabia, Sudan, Oman, Qatar, Kuwait, Lebanon, Egypt, Djibouti, Mauritania, Morocco, Yemen, and Palestine). The outcome indicates that exports and imports have a positive effect on economic growth. (Andrews, 2015), examined the relationship between export, import, and GDP for Liberia, using historical data from 1970 to 2011. The study confirmed the existence of bidirectional causation between GDP and imports and uni-directional causation between exports and GDP and exports and imports. The results showed that Liberia is not driven by exports alone but rather a mixture of exports and imports, with the latter having a long-run impact.

Wong, (2015) Investigated the impact of openness to international trade and financial development on economic growth in Malaysia. An error correction model was estimated, which indicated that openness to international trade has a significant impact on economic growth. Strong evidence shows that openness to international trade Granger-causes economic growth and not vice versa, also the empirically investigated the causal relationship between financial development, trade openness, and economic growth in Japan covering the period 1960-2003. Results showed that there was a long-run equilibrium relationship between financial development, trade, and economic growth in Japan except between domestic credit (the second measure of financial development), trade, and growth. As far as causality is concerned, economic growth is seen to be Granger-cause openness, thus supporting the growth-driven trade hypothesis for Japan.

Zahonogo, (2016) Investigated how trade openness affects economic growth in forty-two developing countries, focusing on Sub-Saharan Africa. The study covered the period 1980 to 2012 and made use of the dynamic growth model. The findings were that there exists a

trading threshold below which greater trade openness has beneficial effects on economic growth and above which the trade effect on growth declines. Variables used in the study were economic growth (dependent variable) as measured gross domestic product per capita, gross domestic product, a ratio of external debt to export, investment, education variable, the ratio of external debt to GDP financial development inflation rate, trade openness, governance index, population growth rate, external debt services to export, exports and imports. The findings suggest that trade openness may impact growth favorably in the long run, but the effect is not linear. And confirm that trade openness has a positive and significant effect on economic growth only up to a threshold, above which the effect declines.

In their paper Mkubwa, Mtengwa, & Babiker, (2014) studied the impact of trade liberalization on economic growth in Tanzania, using data from the Bank of Tanzania (BOT) over some time from 1970 to 2010, by using a simple linear regression model. The dependent variable was real GDP while trade openness was the independent variable. And the findings of the study confirmed a significant positive relationship between trade liberalization and the economic growth of Tanzania. And they recommended that there is a need for improving the balance of trade by increasing exports as possible. The exportation of manufactured goods is highly recommended since manufactured goods fetch higher prices in the market. More industries need to be developed to expand production and export supply capacity in the country. Also, trade and investment policies require some reforms to adjust to changing economic environment. The policies should gear towards more free trade and the elimination of trade barriers. This will help the country to attract more trade and investments which promote economic growth. Moreover, the government should also improve the agriculture sector which employed about 70% of the total population in the country. Agriculture is the backbone of the economy however the sector itself is very poor. Therefore it needs for modernizing and commercializing the agriculture sectors to be market-oriented. The rural population can give subsidies in terms of agriculture infrastructures to add value to the produced agricultural commodities. The farmers should be given more access to markets so as obtain income.

Other literature on the impact of trade liberalization on economic growth was that of (Kazungu, 2009) who studied trade liberalization and the structure of production in Tanzania. He explores the role of trade and trade liberalization policies in Tanzania's economy. He used parametric and non-parametric tests, to evaluate the impact of liberalization policies on the growth rate of exports. But he mainly focused on the agriculture sector. And his findings of the study confirmed the impact of trade liberalization on land productivity was mixed in the case of coffee, tea, and Wheat, liberalization dummies appear to be negative and significant; while in some traditional exports, its impact was negative and significant, in others the impact was positive but not significant. First, the presence of diminishing return is incongruent with the widely advocated view that trade liberalization measures would help to promote productivity growth in the comparative advantage sector. Second, there is an urgent need for renewed intervention in the agricultural sector to reverse diminishing returns to land.

Several empirical studies have been conducted on the relationship between trade openness and economic growth in different areas over the world. In Tanzania, there are few empirical studies conducted on the relationship between trade openness and economic growth. However, the studies which were conducted in Tanzania mainly focused on the effect of trade liberalization on economic growth with exception of the study by Kazungu, 2009 who

investigated Trade Liberalization and the Structure of Production in Tanzania. Furthermore, the literature reveals that most studies have found a positive effect of trade openness on economic growth while few studies have a negative relationship between trade openness and economic growth. This implies that trade openness increases economic growth up to a certain threshold beyond which it has some negative effect on economic growth. Therefore the contradiction of results has created a debate on the effect of trade openness on economic growth across the world. Therefore, this study will contribute to the existing literature by using time series data from 1970 to 2016 to assess the effect of trade openness on economic growth in Tanzania, by adding another variable real exchange rate.

3.0 Research Methodology

This study assesses the effect of trade openness and real exchange rate on economic growth in Tanzania from 1970 – to 2016. The study adopted the model of Abeid (2017). This study employed annual secondary data of 47 years (N=47) from 1970 to 2016 collected from Bank of Tanzania reports and World Bank report. The selection of data from 1970-2016 to aimed to capture growth patterns during different government regimes, industrialization policy, and economic reforms undertaken during this period. Therefore, initially, data was assessed for stationarity (unit root test) followed by lag selection, testing of co-integration which results in the identification of the model for assessing the effect between the variables ended with model diagnostic tests to assure its good fit for the study.

3.1 Unit root test

Time-series data were checked for stationarity to know the order of integration to help in the selection of appropriate models according to the order of integration. To perform this test Augmented Dickey-Fuller (ADF) was used to test the stationarity of the variable because it is more powerful than the Dickey-Fuller test (DF) for stationarity. The ADF test ensures that the null hypothesis is accepted unless there is strong evidence against it to reject it in favor of the alternate Stationarity hypothesis. Additionally, (Mahadeva & Robinson, 2004) connotes that regression on non-stationary variables may give unbiased standard errors, consequently, resulting in spurious regression, a regress that seems to give a good fit of the data and statistically significant coefficients explaining the relationship between variables which in reality do not exist. It is from this point of view was imperative to conduct unit root tests correcting for it by differencing variables that are not stationary at levels. The models below are the ADF estimates

Whereby;

t, is the time index, α is an intercept constant, β is the coefficient on a time trend, ψ is the coefficient presenting process root, that is, the focus of testing, k is the lag order of the first-difference autoregressive process, ε_t is an independent identically distributes residual term, $\Delta X_t$is the first difference operator, $X_{t-1}$is one period lagged value of the variable $X_t$and ΔX_{t-i} is the difference of the lagged dependent variable (Sjo, 2008)

3.2 ARDL Bounds test of Co-integration

The bounds test was used to test for the long-run relationship among the variables. The F-statistic was used to test whether the variables are co-integrated or not. It tested the null hypothesis that there is no long-run relationship between the variables [Ho: λ1 = λ2 = λ3 = λ4 = 0], that is, coefficients of lagged variables are equal to each other and they are zeros against

the alternative hypothesis that the variables have a long-run relationship [Ha: $\lambda 1 \neq \lambda 2 \neq \lambda 3 \neq \lambda 4 \neq 0$], that is, the coefficients of lagged variables are not equal to each other and they are not zero. The guideline was to reject the null hypothesis if the calculated F-Statistic is greater than the upper bound critical value at a 5% level of significance. Building on Ahmed Monir, 2013 and Türsoy, 2017, the existence of a long-run run relationship led to the estimation of the long-run ARDL model of the short-run dynamics were then calculated by employing the Error Correction Model defined in the equation.

$$\Delta GDP_t = \eta_o + \sum_{i=1}^{k} \alpha_i \Delta GDP_{t-1} + \sum_{i=1}^{k} \theta_i \Delta Open_{t-1} + \sum_{i=1}^{k} \vartheta_i \Delta EXch_{t-1} + \sum_{i=1}^{k} \delta_i \Delta Fdi_{t-1} + \nu ECT_t + \varepsilon_{1t} \quad (3.8)$$

Where; ECT is an Error Correction term that according to (Iheo 2016), must be negative and significant.

3.3 Autoregressive Distributed Lag Model (ARDL)

Autoregressive Distributed Lag Model (ARDL) consists of both distributed lagged variables for the response variable and lagged explanatory variables (Brooks, 2008). It captures the effects of both lagged response variables and lagged explanatory variables. (Nkoro & Uko, 2016) Maintains that the model fits better variables that are not integrated in the same order, especially I(0) and I(1) variables and it is strictly not applicable when variables are integrated into the second-order I(2). (Nkoro & Uko, 2016) explain that the modeling of ARDL involves estimation of the Error Correction Model (ECM), defined in equations (3.4) and (3.5).

$$\Delta Y_t = \eta_o + \beta_i t + \sum_{i=1}^{k} \alpha_i \Delta Y_{t-1} + \sum_{i=1}^{k} \theta_i \Delta X_{t-1} + \lambda_1 Y_{t-1} + \lambda_2 X_{t-1} + \phi \omega_t + \varepsilon_{1t} \quad (3.4)$$

$$\Delta Y_t = \eta_o + \beta_i t + \sum_{i=1}^{k} \alpha_i \Delta X_{t-1} + \sum_{i=1}^{k} \theta_i \Delta Y_{t-1} + \lambda_1 Y_{t-1} + \lambda_2 X_{t-1} + \phi \omega_t + \varepsilon_{2t} \quad (3.5)$$

Where; X and Y are independent and dependent variables respectively, $\omega_t$is a vector of Exogenous variables, ε_1 and ε_2 are random errors with no serial correlation; $\lambda 1$ and $\lambda 2$ are long-run multiplier αi and $\theta_i$are short-run dynamics, ϕ is a parameter for exogenous variable, $\eta 0$ is a constant (drift term) and k is the maximum lag order of the ARDL model. Extending equation (3.5) above to include lagged variables for the dependent and independent variables used in the study, the estimated ECM took the form.

$$\Delta GDP_t = \eta_o + \sum_{i=1}^{k} \alpha_i \Delta Open_{t-1} + \sum_{i=1}^{k} \theta_i \Delta EXch_{t-1} + \sum_{i=1}^{k} \theta_i \Delta Fdi_{t-1} + \lambda_1 Open_{t-1} + \lambda_2 EXch_{t-1} + \lambda_3 Fdi_{t-1} + \phi Dummy + \varepsilon_{1t} \quad (3.6)$$

3.3.1 Model Specification

The study exposes the relationship between the GDP and open, exchange rate, and foreign direct investment. The basic ARDL model that was estimated in this study of the following general form;

$$GDP = \beta_o + \beta_1 open + \beta_2 exch + \beta_3 Fdi + \beta_4 Dummy + \varepsilon_t \quad (3.12)$$

Whereby

β_0: The constant term., β_1: coefficient of variable (open), β_2: coefficient of variable (Real exchange rate), β_3 coefficient of variable (foreign direct investment), **t,** the time trend, and $\boldsymbol{\varepsilon}$: The random error term assumed to be normal, identically and independently distributed.

3.4 Granger Causality Test

Granger causality is used to examine the causal relationship between variables. This means that, if the value of independent variables granger causes the value of a dependent variable, then the value of the past independent variables should significantly help predict the value of the dependent variable's future. (Kumar, 2004). The mathematical equation for Granger is presented as follows;

$$\Delta\begin{bmatrix}\mathrm{GDP_t}\\ Open_t\\ Exch_t\\ Fdi_t\end{bmatrix}=\begin{bmatrix}n_1\\ n_2\\ n_3\\ n_4\end{bmatrix}+\sum_{\mathrm{i=1}}^{\mathrm{p}}\Delta\begin{bmatrix}\alpha_{1i}\theta_{1i}\vartheta_{1i}\varphi_{1i}\\ \alpha_{2i}\theta_{2i}\vartheta_{2i}\varphi_{2i}\\ \alpha_{3i}\theta_{3i}\vartheta_{3i}\varphi_{3i}\\ \alpha_{4i}\theta_{4i}\vartheta_{4i}\varphi_{4i}\end{bmatrix}\times\begin{bmatrix}GDP_{t\text{-}1}\\ Open_{t\text{-}1}\\ Exch_{t\text{-}1}\\ Fdi_{t\text{-}1}\end{bmatrix}+\begin{bmatrix}n_1\\ n_2\\ n_3\\ n_4\end{bmatrix}[\mathrm{ECT_{t-1}}]+\begin{bmatrix}\varepsilon_{1t}\\ \varepsilon_{2t}\\ \varepsilon_{3t}\\ \varepsilon_{4t}\end{bmatrix}\qquad(3.14)$$

Whereby

, Δ is a lag operator, $\mathrm{ECT_{t-1}}$ is a lagged error correction term derived from a long run co-integration, ε_{1t}, ε_{2t}, $\varepsilon_{3t}\varepsilon_{4t}$, and$\varepsilon_{5t}$ are white noise, serially uncorrelated and p is the number of lags.

4.0 Results and Discussions

4.1 Unit root test

Table 1 summarizes the results for the Augmented Dick Fuller test, which was used in testing data stationarity. ADF was used to test the null hypothesis that the data are not stationary (has unit root) against the alternative hypothesis that the data are stationary (has no unit root). 5% level of significance was used and the guideline was to reject the null hypothesis if the ADF statistic is less than the critical (0.05).

Table 1. Unit root tests output for ARDL model variables

		At Level, I(0)		**At Level 1, I(1)**	
Variable	**Description**	**t-Stat**	**Prob.**	**t-Stat**	**Prob.**
LNGDP	ADF Test	-1.3732	0.5867*	-8.6307	0.0000***
	5% level	-2.9297		-3.5155	
LNFDI	ADF Test	-4.2972	0.0013**		
	5% level	-2.9266			
LNEXCH	ADF Test	-0.5650	0.8981*	-4.9411	0.0012***
	5% level	-2.9281		-3.5155	
LNOPEN	ADF Test	-4.3720	0.0013**		

	5% level	-2.9434

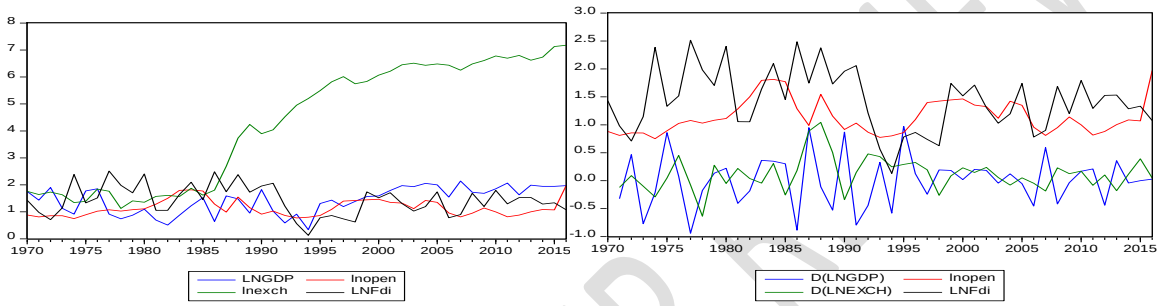
Source*: Author's compilation from **Eviews** 10 Output*

** The probability is not significant, the variable is not stationary at level, I(0)*

*** The probability is significant, the variable is stationary at level, I(0)*

**** The probability is significant, the variable is stationary at level 1, I(1)*

When the test statistics are more than a 5% critical value, the null hypothesis is rejected which is indicating the stationarity of the variable and, if test statistics are less than the critical value, the null hypothesis is rejected. The augmented Dick-Fuller test was used to test data stationarity with Ho: I(1) against Ha: I(0) at level; Ho: I(2) against Ha: I(1) at level one. At a 5% level of significance, the guideline was to reject the null hypothesis if the calculated probability is less than 0.05. As tabulated in Table 1 the variables LNFDI and LNOPEN were integrated at level I(0) whereas LNGDP, LNEXP, and LNEXCH were stationary at level I(1).



Source: ***Eviews** 10 output:*

Figure 2. Line Graph for Non-Stationary vs stationary

4.2 ARDL long run Form Bounds test for Co-integration

Table 2. ARDL Bound tests

Test statistic	Value	P-Value.	I(0)	I(1)
F-statistic	5.3785	0.05	2.79	3.67
K	3			

Source: *Authors compilation from **Eviews 10** Output.*

The study used a bounds test for co-integration to test for the long-run relationship among variables. It was used to test the null hypothesis that there is no long-run relationship between the variables against the alternative hypothesis that the variables have a long-run relationship. The guideline was to reject the null hypothesis if the calculated F-Statistic of the bounds test is greater than the upper bound I(1) critical value at a 5% level of significance. As reported in Table 2 the F-statistic (5.378) was greater than the upper critical value bound (3.67). Therefore long-run relationship running from LnOpen, LnExch, LnFDI, to the dependent var

4.3 ARDL Error Correction Model.

Table 3. ARDL Model for short-run

		ECM Regression		
Variable	coefficient	Std. Error	t-Statistic	Prob.
D(LNOPEN)	0.41800	0.2181	1.9163	0.0652
D(LNFDI)	0.15616	0.0985	1.5851	0.1268
D(LNFDI(-1))	0.37430	0.1210	3.0938	0.0043
DUMMY	0.2870	0.1089	2.6363	0.0133
CointEq(-1)*	-0.8850	0.1599	-5.5318	0.0000
R-squared				0.685433
Adjusted R-squared				0.544420
Akaike info criterion				0.9480
Durbin-Watson stat				2.0064

Source: *Authors compilation from **Eviews**10 Output:*

Table 3 reports ECM for ARDL. The co-integrating equation (CointEq (-1)) has a negative coefficient (−0.885) and is very significant (p-value <0.001), meaning that the variables converged with the speed of 88.5% towards the long-run equilibrium if there was disequilibrium of the economy in the short run. However, trade openness, Foreign Direct Investment when lagged by one, and dummy variables were found to be significant meaning that they have effects or they influence economic growth in the short run. It is found that in the short run one unit increase (appreciation) of trade openness will increase growth by 0.418 units, one unit increase of FDI lagged by one will increase growth by 0.3743 units, and also dummy variable which captures the effects of new changes that were introduced in the economy since 1995 like the establishment of a cash budget, introduction of BOT ACT 1995 and the establishment of Tanzania revenue authority was significant with the positive coefficient which means that these new changes in the economy play a big role in increasing growth.

Table 4. ARDL Long Run Coefficients

		Levels Equation		
Variable	coefficient	Std. Error	t-Statistic	Prob.
LNOPEN	0.3357	0.3357	1.0584	0.0986
LNEXCH	0.0993	0.0513	1.9333	0.0630
LNFDI	0.1301	0.2708	-0.4805	0.0345
C	0.6737	0.5236	1.2867	0.2084

Source: Authors compilation from Eviews10 Output:

The effect of trade openness on economic growth.

Trade openness revealed a positive significant effect on economic growth in Tanzania in both the long run and short run. Its coefficient was 0.335 with 0.09 probability in long run and 0.418 with 0.06 probability in the short run. This means that a one-unit increase in trade openness leads to an increase in economic growth by 34% in long run and 42% in the short run. (Sakyi, 2010) Found a positive and statistically significant in both the short run and the long run in Ghana using an ARDL bounds test. This positive relationship implies that as long as trade openness increases it is very helpful to the economy domestic production and exportation also will be increasing by the fact that the trade openness will encourage domestic industries to produce more which will lead to exporting more than imports. Due to the increased level of openness, production will increase, which will lead to a more rapid increase in trade openness and thus will lead to economic growth, (Yeboha, 2012). This finding coincides with the classical economists' belief that participation in foreign trade could be a strong positive force for economic growth.

The effect of real exchange rate on economic growth.

The real exchange rate seems to have a small positive about 9% significant effect on economic growth in the long run. The one-unit increase in real exchange rate increases economic growth by 0.09 units. This positive relationship indicates that, if the exchange rate increases in the economy, therefore for 1TZS increase in the exchange rate, increase the economic growth rate by 0.09, it will lead to increase economic growth in the country keeping other variables constant. This line with Nelson et al (2016) found that an increase in trade openness by a naira will raise the exchange rate by 32% on average holding all other variables constant. (Devereux & Engel, 2003), moreover, an increase in the exchange rate will increase the value of a local currency and also lowers importation which will eventually encourage domestic production. In Tanzania, we suffer but not much in the exchange rate, for instance, the exchange rate of USD to TZS is about 2,082Tsh this value is high and it lead to a decrease in the value of money. If we compare our neighbor country Kenya their currency is high compared to Tanzania's currency which is why their economic growth is good and healthy.

The effect of the foreign direct investment on economic growth

Furthermore, it can be observed that foreign direct investment (FDI) exerts a positive influence on economic growth. Its coefficient of (0.13) suggests that a one percent increase in FDI leads to approximately a 0.13 increase in economic growth at a five percent level of significance. The study is however coincides with the work of (De Mello Jr, 1997). (De Mello Jr, 1997), argued that FDI influences economic growth by serving as an important source of capital, which complements domestic private investment in developing productive capacity. Also, foreign investments come to the host country with a package, including capital, technology, and marketing skills. They can, thus, improve competition, efficiency; provide additional jobs and financial resources in an economy and hence leading to robust economic performance. For example investment in mining helps Tanzanians to get jobs.

4.4 Diagnostic tests

4.4.1 Serial Correlation

The test checks if the residuals are correlated or not. The purpose is to validate the efficiency of the model, the null hypothesis which says that "there is no serial correlation" against the

alternative hypothesis, which says that "there is serial correlation". Breusch-Godfrey serial correlation LM tests were used to test for serial correlation. The result did not give strong evidence to reject the null hypothesis since, the probability for the Breusch-Godfrey serial correlation LM test (0.23) reported in Table 5 were both statistically insignificant, hence justifying the absence of serial correlation.

Table 5 Breusch-Godfrey Serial Correlation LM test

F-statistic	0.028316	Prob. F(1,28)	0.8676
Obs*R-squared	0.043442	Prob. Chi-Square(1)	0.8349

Source: Authors compilation from Eviews 10 Output

4.3.2 Heteroskedasticity

Glejser test and Autoregressive Conditionally Heteroskedasticity (ARCH) test were used. Glejser regressed the absolute value of residuals on the explanatory variables, (Garson, 2012) whereas the ARCH test regressed the squared residuals on the lagged squared residuals and a constant. The tests were used to test the null hypothesis that the residuals are not Heteroskedasticity against the alternative hypothesis that residuals are Heteroskedasticity.

Table 6. Glejser and ARCH tests for ARDL model

Glejser			
F-statistic	1.759902	Prob. F(13,29)	0.1005
Obs*R-squared	18.96317	Prob. Chi-Square(13)	0.1242
Scaled explained SS	10.56968	Prob. Chi-Square(13)	0.6468
ARCH			
F-statistic	0.575098	Prob. F(1,40)	0.4527
Obs*R-squared	0.595294	Prob. Chi-Square(1)	0.4404

Source: *Authors compilation from **Eviews** 10 Output*

Glejser test which regresses the absolute residuals on the original regressors and the autoregressive Conditional Heteroskedasticity (ARCH) test that regresses the squared residuals on the lagged squared residuals and a constant were used to test the null hypothesis that the residuals are homoscedastic (residuals are not Heteroskedasticity) at 5% level of significance. The guideline was to reject the null hypothesis if the Chi-Square probability for Obs*R-Squared is less than 0.05. The calculated probabilities (0.1242 for the Glejser test and 0.4404 for the ARCH test) as displayed in Table 6 did not give enough evidence to reject the null hypothesis. Therefore, concluded that the residuals were homoscedastic.

4.4.2 Normality

Eviews output for Jarque-Bera statistic shown in Figure 3 proves that the residuals were normally distributed. At a 5% level of significance, the Jarque-Bera statistic was 0.9952 with its corresponding probability of 0.6079. The guideline was to reject the null hypothesis "residuals are normally distributed" if the probability of the calculated Jarque-Bera statistic is less than 0.05. Since 0.6079 is greater than 0.05, the null hypothesis was not rejected, giving evidence for residuals to be normally distributed.

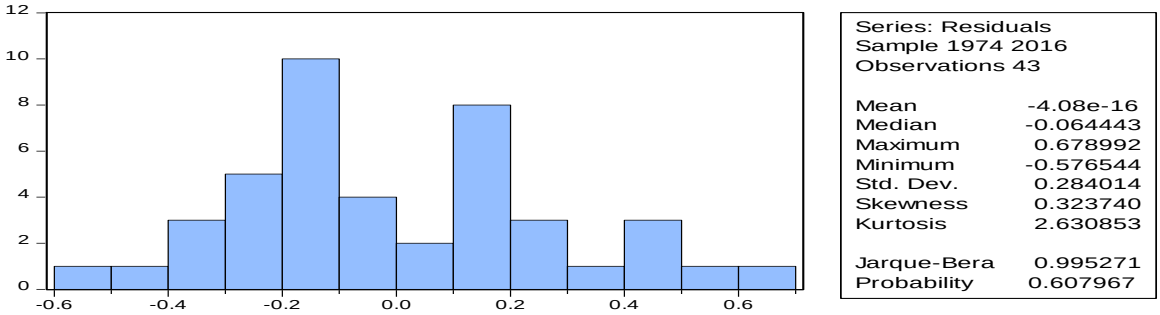


Figure 3. Jarque-Bera Normality test

Source: Authors compilation from Eviews 10 Output

4.4.3 Multicollinearity

Multicollinearity was tested by Variance Inflation Factors (VIF). VIF is used to measure Multicollinearity such that the value of VIF below 10 is desired (Garson, 2012). The results reported in appendix I(a) indicate that Multicollinearity was not a problem in the model since the VIF values were within the required limit (the value of VIF below 10 is desirable).

4.5 CUSUM tests

The study used CUSUM and CUSUM of squares tests in testing the stability of the model at a 5% level of significance. Figure 4. CUSUM which are the plots of recursive residuals and cumulative sum recursive residuals respectively are within the boundary of the critical region.

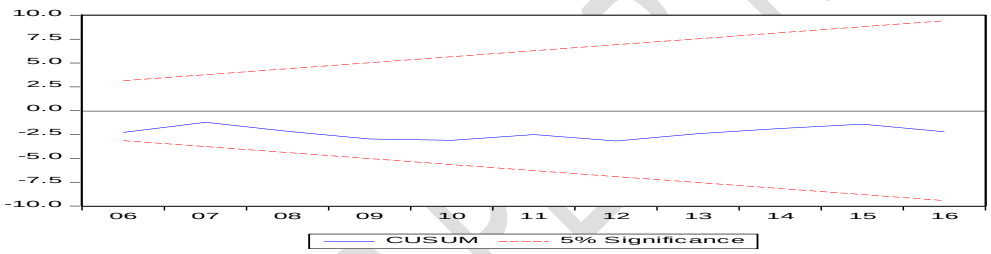


Figure 4. CUSUM test for Autoregressive model

4.5.1 Ramsey Tests for Model Specification

Ramsey Regression Equation Specification Error Test (RESET) test is a general specification test for the linear regression model. Additionally precisely, it tests whether non-linear combinations of the fitted values help explain the response variable. Ramsey was used to testing model specifications.

Table 7. Ramsey RESET test for ARDL model

	Value	Df	Probability
F-Statistic	3.776	(1,28)	0.0620

Source: Authors compilation from Eviews 10 Output

Table 7 reports the Ramsey RESET test, a test for functional form misspecification. The F-Statistic (1, 28) = 3.7796 with a probability 0.0620 is shown. At a 5% level of significance, the result does not give evidence to reject the null hypothesis that the model is correctly specified (coefficient of squared fitted value is not different from zero), hence confirming that the model was well specified.

4.5.2 Granger Causality

Table 8 the F-Statistic was used to test the null hypothesis that variables do not Granger cause each other against the alternative hypothesis that there is granger causality at least in one direction. The decision rule used was to reject the null hypothesis if the F-statistic probability is less than the critical value probability at a 10% level of significance. As shown in Table 8 there was a uni-directional causality between LNOPEN and LNGDP at a 10% significance level, meaning that trade openness is attributed to GDP growth. On another hand there is bi-directional causality between LNEXCH and LNGDP at a 10% significance level, meaning that foreign domestic investment is attributed to the level of the exchange rate, similarly to the exchange rate the changes in exchange rate affects foreign domestic investment. This result is similar to (Bader, 2016) which used a panel data approach. Also 2005, Wong Hock found Strong evidence that openness to international trade Granger-causes economic growth. Also, a unidirectional relationship between trade openness and economic growth was found (Olufemi, 2004) in Nigeria by using panel data and suggesting that Nigeria should increase the exportation in the country.

Table 8. Pairwise Granger Causality Tests

Null Hypothesis	**Observation**	**F-Statistics**	**Prob**
LNOPEN does not Granger Cause LNGDP	45	2.01099	0.1472
LNGDP does not Granger Cause LNOPEN		2.55146	0.0906
LNEXCH does not Granger Cause LNGDP	45	3.24385	0.0495
LNGDP does not Granger Cause LNEXCH		2.97446	0.0625
LNFDI does not Granger Cause LNGDP	45	0.30948	0.7356
LNGDP does not Granger Cause LNFDI		0.58870	0.6815
LNEXCH does not Granger Cause LNOPEN	45	0.17306	0.8417
LNOPEN does not Granger Cause LNEXCH		0.38719	0.6815
LNFDI does not Granger Cause LNOPEN	45	0.37492	0.6897
LNOPEN does not Granger Cause LNFDI		0.92891	0.4033
LNFDI does not Granger Cause LNEXCH	45	0.52332	0.5965
LNEXCH does not Granger Cause LNFDI		1.77735	0.1822

Source: *Authors compilation from **Eviews**10 Output:*

5.0 Summary, Conclusions, and Recommendations

5.1 Summary

The main objective of this study was to assess the effect of trade openness and real exchange rate on economic growth in Tanzania using the annual time series data covering the period 1970-2016. Specifically, the study tends to determine the effect of trade openness on economic growth, determine the effect of real exchange rate on economic growth, and ermine the direct causality of trade openness on economic growth. Descriptive statistics, unit root test, lag length selection, co-integration test, and EC model were used for assessing the short-run and long-run effect of trade openness, real exchange rate, and foreign direct investment on economic growth. Also, residuals of the model were diagnosed to validate the good fit of the model using various tests like stability test, serial correlation test, multicollinearity test, and heteroscedasticity and normality test. The model was identified as a good fit for this study. Variable was converted to natural logarithms, LnGDP, Lnopen, LnExch, and LnFdi respectively. Due to the integration of variables in I(0) and I(1) orders, the study adopted one model, Autoregressive Distributed Lag Model (ARDL).

Autoregressive Distributed Lag Model was used in testing the study hypothesis because the variables were I(0) and I(1). Estimation procedures include unit root tests and co-integration tests to make sure that valid, reliable, and sound results are obtained. Augmented Dick Fuller test for unit root was used whereas Akaike Information Criteria (AIC) was employed in lag selection. Residual diagnostic tests, stability tests, model specification tests, and coefficient diagnostic tests were done to ensure the overall fit and suitability of the models hence the reliability of the results. On the other hand, the dummy variables were statistically significant (p-value = 0.04) with a positive coefficient (0.19). This means that action plans and policies for economic reforms adopted since 2004 such as Investment Policy Reviews, had a positive impact on scaling up the economy, they helped the economy to grow more than before. As in line with (Bigsten & Danielsson , 1999) and (Muganda, 2004).

5.2 Conclusions

The study has assessed the determinants of economic growth in Tanzania over the period 1970 to 2016. Specifically ascertained if there is an effect of trade openness, real exchange rate, and direction causality of trade openness on economic growth. It was discovered that trade openness has a positive effect on economic growth in both the short and long run, while the real exchange rate has a positive effect on economic growth over a long period. Finally, the study findings revealed that there is one-way direction causality on the gross domestic product to trade openness. On another hand, foreign direct investment was found to have positive and no significance without one period lag in the short-run but has positive significance in long run.

5.3 Recommendations

Based on the objectives and findings of this study, the researcher suggests the following,

i. Government should encourage trade openness as a result of domestic production and local trade increase to raise the level of exportation. This means '*Tanzania ya Viwanda*' shoreallyreal be implemented as the focus. This can be achieved by creating a favorable environment for investments to both national and international investors.

ii. The Bank of Tanzania should control the real exchange rate that has a positive influence on economic growth in the long run due to its impact on the competition of domestic products.

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APPENDICIES

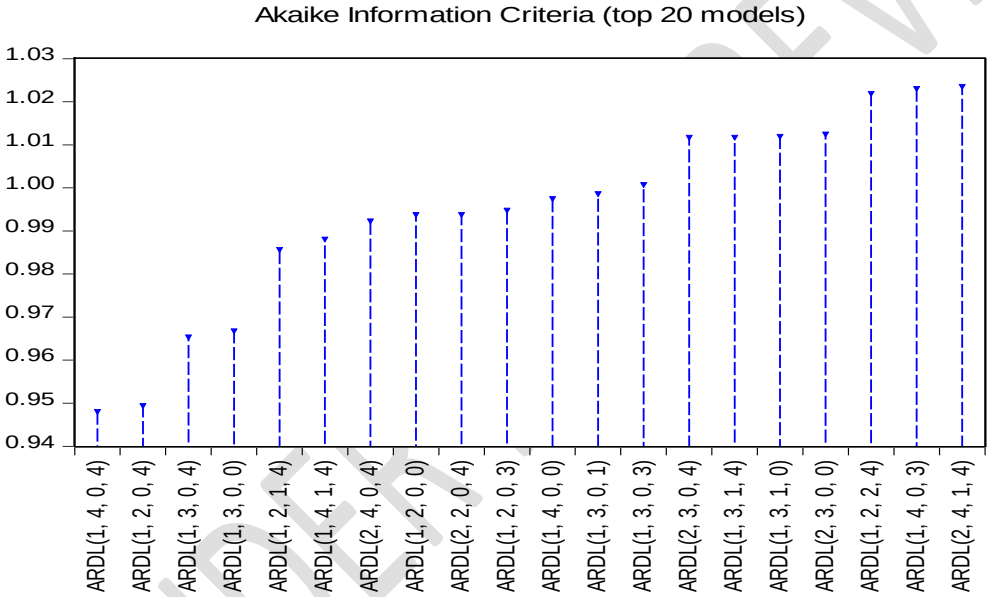
Appendix I

(a)Multicollinearity

Variance Inflation Factors
Date: 10/03/18 Time: 19:58
Sample: 1970 2016
Included observations: 43

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
LNGDP(-1)	0.034523	28.07360	3.112271
LNOPEN	0.062407	33.71534	2.106117
LNOPEN(-1)	0.148175	76.04986	4.285965
LNOPEN(-2)	0.173405	88.38518	5.131313
LNOPEN(-3)	0.182526	92.21129	5.565879
LNOPEN(-4)	0.114255	57.49908	3.529422
LNEXCH	0.002741	25.33240	4.728048
LNFDI	0.017546	15.84912	1.958114
LNFDI(-1)	0.015200	13.75083	1.689789
LNFDI(-2)	0.013056	11.66843	1.512531
LNFDI(-3)	0.012617	11.20189	1.482561
LNFDI(-4)	0.014038	12.42749	1.648648
DUMMY	0.030440	3.126807	2.254209
C	0.202901	74.68333	NA

(b) Model selection summary



Appendix II. Q-Statistics Serial Correlation test for ARDL Model

Date: 10/04/18 Time: 14:40
Sample: 1970 2016
Included observations: 43
Q-statistic probabilities adjusted for 1 dynamic regressor

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob*
		1	-0.014	-0.014	0.0085	0.926
		2	-0.096	-0.097	0.4474	0.800
		3	-0.137	-0.141	1.3584	0.715
		4	0.015	-0.001	1.3689	0.850
		5	-0.035	-0.064	1.4322	0.921
		6	-0.058	-0.082	1.6101	0.952
		7	-0.087	-0.103	2.0146	0.959
		8	0.139	0.109	3.0827	0.929
		9	0.020	-0.012	3.1057	0.960
		10	-0.107	-0.119	3.7818	0.957
		11	-0.080	-0.061	4.1675	0.965
		12	0.086	0.054	4.6286	0.969
		13	-0.115	-0.171	5.4807	0.963
		14	0.072	0.067	5.8297	0.971
		15	0.135	0.162	7.0896	0.955
		16	-0.108	-0.191	7.9242	0.951
		17	-0.206	-0.233	11.084	0.852
		18	-0.021	0.027	11.117	0.889
		19	0.021	-0.035	11.153	0.919
		20	0.258	0.161	16.732	0.670

*Probabilities may not be valid for this equation specification.