Journal of Economics and Sustainable Development
ISSN 2222-1700 (Paper) ISSN 2222-2855 (Online)
Vol.4, No.5, 2013

Trade Liberalization and Growth: The Ghanaian Experience

Michael Kwame Asiedu[2]

Abstract

This paper examined the impact of trade liberalization policy adopted as part of the Structural Adjustment Program (SAP) on growth rate of real Gross Domestic Product (GDP) of Ghana. The paper used the Autoregressive Distributed Lag approach to estimate the long run and short run parameters for the specified model. Using trade openness as a proxy for liberalization, the study found a positive and significant relationship between trade liberalization and real GDP growth in the long-run in Ghana. Capital stock and population were found to have positive impacts on real GDP growth in both the long-run and short run while Foreign Direct Investment (FDI) was found to have a negative impact on real GDP growth. Inflation though showed a positive relationship with real GDP growth, it was insignificant. The main value of this study is the identification of other key macroeconomic variables that affect the real GDP growth of Ghana.

Keywords: GDP growth, trade liberalization, ARDL, Openness, Ghana

1. Introduction

The early proponents of free trade mainly the classical economists lauded the gains from trade that could accrue to countries when they specialize in the production of goods in which they have comparative advantage, and engage in trade to meet their other needs. Also, new development theorists contend that openness of trade stimulates technological change by increasing domestic rivalry and competition, leading to increased innovation; and, that trade liberalization by allowing new goods to flow freely across national borders increases the stock of knowledge for technological innovations which spur growth. They further argue that trade restrictions or barriers are associated with reduced growth rates and social welfare and countries with higher degrees of protectionism, on average, tend to grow at a much slower pace than countries with fewer trade restrictions. This is because tariffs reflect additional direct costs that producers have to absorb which could reduce output and growth. All these arguments were based on the theory of comparative advantage contained in free trade models attributed to David Ricardo and John Stuart Mill and which were later modified by trade theories embodied in the factor proportions or Hechsher–Ohlin Theory (1933) and Stolper-Samuelson (1941) and Rybzsnski Effects (1955) provide the traditional explanations of trade as the "engine" of growth and development.

The empirical literatures show that trade openness or liberalization affects output growth. Most of the studies have concluded that the openness of the trade regime has positive relation with GDP growth. Some of these studies include Siddiqui and Iqbal (2005), Nugent (2002), Ahmed and Anoruo (2000), Edwards (1992, 1998), Sachs and Warner (1997), Harrison (1996), Iscan (1998), Paulino (2002), Wacziarg (2001), Yanikkaya (2003), among others.

[2] Michael Kwame Asiedu is a lecturer in the Dept. of Business Administration, Presbyterian University College, Okwahu Campus, P. O. Box 59, Abetifi-Kwahu, Ghana and also a PhD candidate at the Kwame Nkrumah University of Science & Technology, Kumasi. E-mail: asiedumk@gmail.com, asiedumk@presbyuniversity.edu.gh Tel: +233242113492

In the light of the above, many developing countries including Ghana have embraced the trade liberalization policy as part of structural reforms with the objective of eliminating the inefficiencies in domestic industries so as to enhance economic growth.

When Ghana gained independence in 1957, the country pursued a strategy of import substitution and implemented a series of restrictive trade policies including increasing tariffs, non-tariffs and exchange rate controls which lasted until 1982. The exchange rate was fixed while import quantities were strictly controlled through the Bank of Ghana foreign-exchange allocations (Armah, 1993). Between 1970 and 1982, both import volumes and import to GDP ratio registered continuous declines and the trend in the export/GDP ratio and the export volume index was downward. Export/GDP ratio fell from 20.7 to 3.6 and import/GDP ratio fell from 18.5 to 3.3. Again, Ghana's share of world exports declined by 68% during the same period. Large balance of payment deficits developed particularly in the early 1980s such that gross official foreign reserves were depleted and external payments arrears accumulated, amounting to about 90% of export earnings by the end of 1982 (World Bank, 1985).

The restricted trade coupled with the misaligned exchange rate eroded the competitiveness of exports while limitation on imported inputs and consumer goods also inhibited export production and production as a whole causing extremely low capacity utilization (Ghartey, 1987). The economy experienced negative growth rate for some of the years particularly between 1978 and 1983 where the annual average real GDP growth rate was –1.34%. The other years however, experienced positive growth rates though at declining rates (World Bank, 1995).

Considering the development at the time, Ghana adopted the policy of trade liberalization as part of the reform and adjustment program of the World Bank and IMF. The purpose of the liberalization policy was to open up the economy to increase competition to improve efficiency in domestic industries so as to enhance economic growth. The liberalization policy also aimed at narrowing the gap between the official and parallel exchange rate to provide foreign exchange to ease import strangulation with the objective of increasing output, particularly in the export sector. Multiple exchange rates were initially implemented to promote exports. The adoption of the trade liberalization policy was also in response to the poor performance of the external trade sector[3].

Included in the liberalization policy were foreign exchange liberalization, import liberalization and export diversification. The use of import licences was abolished in 1989 in addition to the removal of quantitative import restrictions. The tariff system was overhauled and adjusted downwards early in the adjustment program. The tariff schedules were 10%, 20% and 30% compared with schedules of 35%, 60% and 100% prior to the period before 1982. On the export side, reforms were introduced in 1991 so that non-traditional exporters no longer had to surrender their foreign-exchange receipts to the Bank of Ghana, although the ruling still applied to gold and cocoa receipts (Jebuni, et al., 1994).

During the liberalization period, import volumes have increased continuously. The volume of imports increased from US$712.5 million in 1986 (representing 12.43% of GDP) to US$1728.0 million in 1993 also representing 28.51% of GDP. This was partly due to trade liberalization releasing pent-up demand. But it was also due to positive income growth rates and large capital inflows. The decline in the anti-export bias of the trade and payment regime has led to increases in export volumes particularly in the traditional sectors of cocoa, gold and

[3] Aryeetey, *et al* (2000) Economic Reforms in Ghana: The Miracle and the Mirage, James Currey, London

timber, although there has been little in the way of export diversification. The volume of exports also rose from US$773.4 million in 1986 to US$1234.70 million in 1994 representing 13.49% of GDP and 22.63% of GDP respectively. The share of Non-traditional export has also increased averaging 5.8% between 1986 and 1995. Despite large increases in export volumes, declining terms of trade and a massive surge in externally funded imports required to increase industrial production have ensured a deficit. Meanwhile, real GDP growth from 1986 up to the latter part of the 1990s averaged 4.5% per annum and an average inflation of 29.4% from 1984–1992 and 27.9% in the 1993–2000 period. Inflation however, reached its peak of 59.5% in 1995 (WDI, 2001).

Clearly, it could be concluded from the above that the inclusion of the trade liberalization policy as part of the reform program was a laudable decision. The dominant economic issue however, is how and how far liberalization of trade enhances the drive to rapid economic growth. Thus, this study attempts to analyze the extent to which the liberalization policy has impacted on the GDP growth of Ghana.

The rest of the paper is organized as follows: Section 2 provides the empirical strategy with emphasis on data description and model specification. The econometric methodology adopted is presented in Section 3. Section 4 discusses the empirical results while the fifth section concludes the paper.

2. Empirical Strategy

This paper explores the connection between trade liberalization and GDP growth. Using annual time series data covering the period 1986–2010 obtained from WDI database[4]. This period is chosen because it was during this period that the trade liberalization policy actually took full effect with the abolition of all quantitative control on both imports and exports as well as liberalization of the exchange rate.

The dependent variable is represented by real Gross Domestic Product (GDP) which is the total value of goods and services produced within the borders of an economy during a given period of time measured in market prices. It is calculated using 2000 constant prices. The explanatory variables include openness (OPENNESS), population (POP), Inflation (INFL), foreign direct investment (FDI) and gross domestic fixed investment (K). Openness is the sum of exports and imports of goods and services measured as a ratio to gross domestic product. It is used as a measure of liberalization. Population (POP) here includes all residents in a country regardless of their legal status or citizenship except for refugees not permanently settled in the country of asylum. Inflation as measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a fixed basket of goods and services that may be fixed or changed at specified intervals, such as yearly. Foreign direct investments are the net inflows of investment to acquire a lasting management interest (10 percent or more of voting stock) in an enterprise operating in an economy other than that of the investor. Gross domestic fixed investment includes plants, machinery and equipment and it is used as a proxy for capital stock.

2.1 Model Specification

This paper uses the aggregate production function and applies the Autoregressive Distributed Lag (ARDL) model for estimation. The production function is given as

$$Y_t = f(A, K, L) \quad \text{..... (1)}$$

[4] World Development Indicators 2008 CD-ROM developed by World Bank

where Y_t is real GDP at time t, A is the total factor productivity (TFP) while K and L are the usual capital and labour inputs respectively. Here, A captures the total factor productivity of growth in output not accounted for by increase in capital and labour which is endogenously determined by economic factors.

Therefore, in Ghana and for that matter in this paper, it is assumed that

$$A = g(OPENNESS, POP, INFL, FDI) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (2)$$

Substituting equation (3) into equation (2) yields:

$$GDP_t = h(OPENNESS_t, POP_t, INFL_t, FDI_t, K_t, L_t) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (3)$$

However, data on the active employed labour force are not readily available (Ramirez, 2006), so many empirical studies (e.g. Li and Liu, 2005; Vamvakidis, 2002; Pattillo et al., 2002) use population as a proxy for labour. Hence, labour, L_t is dropped from the model.

Therefore, equation (3) becomes

$$GDP_t = h(OPENNESS_t, POP_t, INFL_t, FDI_t, K_t) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (4)$$

After adding the stochastic component of GDP to equation (4), we can express the growth equation in an explicit empirical model as equation (5)

$$GDP_t = \beta_0 + \beta_1 OPENNESS_t + \beta_2 POP_t + \beta_3 INFL_t + \beta_4 FDI_t + \beta_5 K_t + \mu_t \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad (5)$$

where μ_t is the error term. All the other variables have already been defined.

From equation (5), the specific model for the real GDP for the Ghanaian economy in log-linear form is given as:

$$\ln GDP_t = \beta_0 + \beta_1 \ln OPENNESS_T + \beta_2 \ln POP_t + \beta_3 \ln INFL_t + \beta_4 \ln FDI_t + \beta_5 \ln K_t + \mu_t \quad \ldots\ldots (6)$$

where the β_i represent the elasticity coefficients

Equation (6) above shows the long-run equilibrium relationship.

Trade openness enhances competition, promotes large markets, technology transfer and hence efficiency in production and it is expected have a positive relationship with real GDP growth. A rise in population increases the market size and raises aggregate demand in the economy which in turn enhances investment and hence growth. Besides, population growth adds to the total labour force which affects labour supply and output. It is thus expected that population growth affects real GDP growth positively. Inflation rate (annual CPI) is a reflection of macroeconomic instability. A high rate of inflation is generally harmful to growth because it raises the cost of borrowing and thus lowers the rate of capital investment. The coefficient of inflation is thus expected to be negative. The coefficient of FDI is expected to be positive since FDI complement domestic investment which is expected to increase total investment and hence increase in total output and growth. Gross domestic capital formation (a proxy for capital stock) is expected to positively affect real GDP growth.

3. Econometric Methodology

3.1 Autoregressive Distributed Lag (ARDL) Model

In order to analyse the long-run relationships as well as the dynamic interactions among the various variables of interest empirically, the autoregressive distributed lag cointegration procedure developed by Pesaran *et al* (2001) was used.

Thus, following Pesaran *et al* (2001) as summarized in Choong *et al* (2005), the ARDL is applied by modelling the long-run equation (6) as a general vector autoregressive (VAR) model of order *p* in z_t.

$$z_t = \beta_0 + \alpha_t + \sum_{i=1}^{p} \phi_i z_{t-i} + \mu_t , \qquad t = 1, 2, 3, 4, \ldots, T \qquad \ldots\ldots\ldots\ldots\ldots\ldots \qquad (7)$$

where β_0 represents (k + 1) – a vector of intercept (drift)

α represents (k + 1) – a vector of trend coefficients.

Pesaran *et al* (2001) further derived the following vector equilibrium correction model (VECM) corresponding to (7).

$$\Delta z_t = \beta_0 + \alpha_t + \pi z_{t-1} + \sum_{i=1}^{p} \tau_i \Delta z_{t-i} + \mu_t , \qquad t = 1, 2, 3, 4, \ldots T \qquad \ldots\ldots\ldots\ldots\ldots\ldots \qquad (8)$$

where (k + 1) × (k + 1) – matrices

$\pi = I_{k+1} + \sum_{i=1}^{p} \psi_i$ and $\tau_i = -\sum_{j=i+1}^{p} \psi_j$ $i = 1, 2, \ldots\ldots, p - 1$ contain the long-run multiplier and short-term dynamic coefficients of the VECM.

z_t is the vector of variables y_t and x_t respectively; Y_t is an I(1) dependent variable defined as *ln* Y_t (in this case *ln GDP*); x_t ($OPENNESS_t$, POP_t, $INFL_t$, FDI_t, K_t) is a vector matrix of 'forcing' I(0) and I(1) regressors.

Assuming further that there is unique long run relationship among the variables the conditional VECM becomes:

$$\Delta y_t = \beta_{y0} + \alpha_t + \theta_{yy} y_{t-1} + \theta_{xx} x_{t-1} + \sum_{i=1}^{p-1} \lambda_i \Delta y_{t-i} + \sum_{i=0}^{p-1} \theta \Delta x_{t-1} + \mu_{yt} \qquad \ldots\ldots\ldots\ldots\ldots\ldots \qquad (9)$$

From the equation above, the conditional VECM can be specified as:

$$\Delta \ln GDP_t = \beta_0 + \theta_1 \ln GDP_{t-1} + \theta_2 \ln OPENNESS_{t-1} + \theta_3 \ln POP_{t-1} + \theta_4 \ln INFL_{t-1} +$$

$$\theta_5 \ln FDI_{t-1} + \theta_6 \ln K_{t-1} + \sum_{i=1}^{p} \beta_{1i} \Delta \ln GDP_{t-i} + \sum_{j=1}^{q} \beta_{2j} \Delta \ln OPENNESS_{t-j} + \sum_{k=1}^{q} \beta_{3k} \Delta \ln POP_{t-k}$$

$$\sum_{l=1}^{q} \beta_{4l} \Delta \ln INFL_{t-1} + \sum_{m=1}^{q} \beta_{5m} \Delta \ln FDI_{t-m} + \sum_{p=1}^{q} \beta_{6p} \Delta \ln K_{t-p} + \mu_t \qquad \ldots\ldots\ldots\ldots \qquad (10)$$

where θ_i are the long run multipliers and β_0 is the drift and μ_t are the error terms.

3.2 ARDL Bounds Testing Procedure

The first step in the ARDL bounds testing approach is to estimate equation (10) by ordinary least square (OLS) in order to test for the existence or otherwise of a long-run relationship among the variables. This is done by conducting an F-test for the joint significance of the coefficients of lagged levels of the variables.

The hypothesis would be:

H_0: $\theta_1 = \theta_2 = \theta_3 = \theta_4 = \theta_5 = \theta_6 = 0$

H_1: $\theta_1 \neq \theta_2 \neq \theta_3 \neq \theta_4 \neq \theta_5 \neq \theta_6 \neq 0$

The test which normalizes on GDP is denoted by F_{GDP} (GDP | OPENNESS, POP, INFL, FDI, K)

Two asymptotic critical values bounds provide a test for cointegration when the independent variables are I(d) (where $0 \leq d \leq 1$): a lower value assuming the regressors are I(0) and an upper value assuming purely I(1) regressors.

In the second stage of the ARDL bounds approach, once cointegration is established the conditional ARDL (p, q_1, q_2, q_3, q_4, q_5), the long-run model for GDP_t can be estimated as:

$$\ln GDP_t = \beta_0 + \sum_{i=1}^{p} \theta_1 \ln GDP_{t-1} + \sum_{I=0}^{q1} \theta_2 \ln OPENNESS_{T-1} + \sum_{i=0}^{q2} \theta_3 \ln POP_{t-1} + \sum_{i=0}^{q3} \theta_4 \ln INFL_{t-1}$$

$$+ \sum_{i=0}^{q4} \theta_5 \ln FDI_{t-1} + \sum_{i=0}^{q5} \theta_6 \ln K_{t-1} + \mu_t \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (11)$$

This involves selecting the orders of the ARDL (p, q_1, q_2, q_3, q_4, q_5) model in the six variables using Akaike Information Criterion[5].

The third and the last step in the ARDL bound approach is to estimate an Error Correction Model (ECM) to capture the short-run dynamics of the system. The ECM generally provides the means of reconciling the short-run behaviour of an economic variable with its long-run behaviour.

The ECM is specified as follows:

$$\Delta \ln GDP_t = \gamma + \sum_{i=1}^{p} \beta_{1i} \Delta \ln GDP_{t-i} + \sum_{j=1}^{q} \beta_{2j} \Delta \ln OPENNESS_{t-j} + \sum_{k=1}^{q} \beta_{3k} \Delta \ln POP_{t-k} +$$

$$\sum_{l=1}^{q} \beta_{4l} \Delta \ln INFL_{t-1} + \sum_{m=1}^{q} \beta_{5m} \Delta \ln FDI_{t-m} + \sum_{p=1}^{q} \beta_{6p} \Delta \ln K_{t-p} + \rho ECM_{t-1} + \mu_t \quad \ldots.(12)$$

From equation (12), β_i represent the short-run dynamics coefficients of the model's convergence to equilibrium. ECM_{t-1} is the Error Correction Model. The coefficient of the Error Correction Model, ρ measures the speed of adjustment to obtain equilibrium in the event of shocks to the system.

4. Empirical Results

4.1 Test for Stationarity

The stationarity test is based on the DF-GLS[6]. The results of the unit root test are presented in Table 4.0 The DF-GLS test involves testing the null hypothesis of non-stationarity of the variables against the alternative hypothesis of stationarity. The test regression included both an intercept and a linear trend for the log levels as well as intercept with no linear trend for the first differences of the variables.

Table 4.0 Results of the Stationarity Test

[5] Akaike, H. (1973) Information Theory and the Extension of the Maximum Likelihood Principle

[6] It is a modification of the conventional Augmented Dickey-Fuller (ADF) test since it applies Generalized Least Square (GLS) detrending prior to running the ADF test regression. It is relatively more efficient in small sample size case (Elliot, Rothenberg and Stock, 1996).

		Log Level	**First Difference**		
Variable	Lags	DF-GLS stat	Variable	Lag	DF-GLS Stat
LGDP	3	-1.0801	Δ*LGDP*	1	-4.7946**
LCAP	3	0.20203	Δ*LCAP*	1	-3.3479**
LFDI	3	-1.7487	Δ*LFDI*	1	-3.7338**
LINFL	3	-2.2526	Δ*LINFL*	1	-3.5166**
LPOP	2	-1.9041	Δ*POP*	1	-34.8757**
LOPENNESS	3	-1.6931	Δ*OPENNESS*	1	-3.1070**

** denotes the rejection of the null hypothesis of non-stationarity at 1% significance level.

The results from the table indicate that all the variables are integrated of order 3 (i.e. I(3)). However, all the variables become stationary after the first difference as they are integrated of order 1 (i.e. I(1)). Thus, the null hypothesis of non-stationarity can be rejected and the alternative hypothesis of stationarity accepted.

4.2 Results of the Bounds Test for Cointegration

The initial step of the ARDL approach is to estimate the conditional VECM by ordinary least square in order to test for the presence of long run relationship among the variables (Pesaran, et al 2001). This is done by conducting an F-test for the joint significance of the coefficients of lagged levels of the variables. Thus, each of the variables in the model is taken as a dependent variable and a regression is run on the others. This F-statistic tests the joint null hypothesis that there is no long-run relationship between them. The results of the computed F-statistic when each variable is normalized (that is, considered as a dependent variable) in the ARDL–OLS regressions are presented in Table 4.1.

Table 4.1 Results of the Bounds Test for Cointegration

F_{GDP} *(GDP /OPEN, POP, INFL, FDI, K)*	8.5352	0.003**	Cointegration
F_{POP} *(POP /GDP, OPEN, INFL, FDI, K)*	33.2734	0.001**	Cointegration
F_{INFL} *(INFL /GDP, OPEN, POP, FDI, K)*	2.1547	0.145	No Cointegration
F_{FDI} *(FDI /GDP, OPEN, POP, INFL, K)*	1.3895	0.315	No Cointegration
F_{K} *(K /GDP, OPEN, POP, INFL, K)*	1.1794	0.395	No Cointegration

Lower Bound I(0) = 3.516 and Upper Bound I(1) = 4.781 at 1%. ** denotes the rejection of the null hypothesis of no cointegration at 1%.

From Table 4.1, the computed F-statistic F_{GDP}(GDP | OPENNESS, POPGR, INFL, FDI, K) = 8.5352 is higher than the upper bound critical value of 4.781 at 1 percent significant level. Also, F_{POGR}(POPGR | GDP, OPENNESS, INFL, FDI, K) = 33.2734 is higher than the upper bound critical value of 4.781 at 1 percent

significance level. This implies that the null hypothesis of no cointegration is rejected meaning that there exists long-run cointegration relationships between the variables when the regressions are normalized on both GDP_t and $POPGR_t$ variables. Since this study is based on growth theory, GDP_t is used as the dependent variable, hence the results of the other regressions are neglected.

4.3 Results of the Long-run Growth Equation

Table 4.2 reports the results of the estimated long-run growth equation using the ARDL approach. The results indicate a positive and significant relationship between real GDP growth and openness. This suggests that in the long-run liberalization can help diversify the economy which can result in economic growth. This result is consistent with theoretical expectation of the classical views on the role of trade in the macro economy as well as other empirical studies (see Yanikkaya 2003; Wacziarg 2001; and Sachs and Warner 1995). The results also show a positive and significant relationship between real GDP growth and gross fixed capital formation (a proxy for capital stock). This means that a rise in the capital leads to a rise in investment and consequently a rise in real GDP growth. This is consistent with other previous studies (see Aryeetey and Fosu 2005). Foreign direct investment was found to have negative and significant impact on real GDP growth. This is quite implausible since it is expected that FDI inflows enhances knowledge and technology transfer, thereby resulting in growth. However, this result is consistent with the results obtained by Frimpong and Oteng (2006). As pointed out by Frimpong and Oteng (2006) most of the FDI inflows into the country go to the mining and construction sectors of the country. This however, does not generate direct growth impact on the economy as a whole. The results also indicate that inflation impacts positively but statistically insignificant on real GDP growth. The results also show a statistically significant positive relationship between population on one hand and real GDP growth on the other hand. This results show that a rise in population adds to the labour force and also increases the market size and raises aggregate demand which in turn enhances investment and hence output growth. This result is consistent with other previous studies (see Siddique and Iqbal 2005; Harrison 1996).

Table 4.2 Results of the Long-run Growth Equation

ARDL(1,1,0,1,1,0) selected based on Akaike Information Criterion
Dependent variable is LOGGDP

Regressor	**Coefficient**	**Standard Error**	**T-Ratio**	**P-Value**
Ln*OPENNESS*	0.31577	0.17023	1.8550	0.091
Ln*K*	0.30420	0.10033	3.0320***	0.011
Ln*FDI*	-0.19525	0.029850	-6.5412***	0.001
Ln*INFL*	0.097414	0.065382	1.4899	0.164
Ln*POPGR*	3.2015	1.4482	2.2107**	0.049
CONSTANT	-59.2026	23.4210	-2.5278	0.028

*** (**) denote the rejection of the null hypotheses at 1% (5%) level of significance.

4.4 Results of the Error Correction Model

Table 4.3 reports the results of the error correction model[7]. All the coefficients of the variables maintain their signs as in the long run equation except the coefficient of OPENNESS whose sign changed from positive to negative. However, apart from capital and population, all the other variables (openness, FDI and inflation) are not statistically significant. This suggests that these variables have relatively lower impacts on growth in the short-run.

The regression for the underlying ARDL model passed the diagnostic tests. From the results, the first order serial correlation problem is eliminated as can be seen from the DW statistic of 2.259 and LM statistic of 0.9146 which is an indication of the acceptance of the null hypothesis of no serial correlation in the residuals. The model also has a high R-squared (86.17%) implying a high predictive power of the determinants. The high R-squared and high F-statistic show a tight fit for the model. The Ramsey's RESET test also revealed that the model was correctly specified while the normality test indicates that the residuals are normally distributed. Heteroscedasticity is also not a serious problem. The parameters or coefficients of the model are also stable over the sample period according to the Cumulative Sum (CUSUM) and Cumulative Sum of Squares (CUSUMQ) test for stability.

Table 4.3 Error Correction Model for the Selected ARDL Model

ARDL(1,1,0,1,1,0) selected based on Akaike Information Criterion

Dependent variable is dLnGDP

Regressor	**Coefficient**	**Standard Error**	**T-Ratio**	**P-Value**
dLnOPENNESS	-0.30408	0.33351	-0.91176	0.377
dLnLOGK	0.39323	0.12316	3.1929**	0.007
dLnFDI	-0.037806	0.044731	-0.84518	0.412
dLnINFL	0.013034	0.061935	0.21045	0.836
dLnPOPGR	4.1384	1.9840	2.0860***	0.056
CONSTANT	-76.5291	32.2671	-2.3717***	0.033
ecm(-1)	-1.2927	0.16015	-8.0715**	0.001

ecm = LOGGDP -0.31577*LOGOPENNESS -0.30420*LOGK + 0.19525*LOGFDI - 0.097414*LOGINF -3.2015*LOGPOP + 59.2026*C

R-Squared = 0.89121 R-Bar-Squared = 0.80219
Akaike Info. Criterion = 16.5415 Schwarz Bayesian Criterion = 11.3189
DW-statistic = 2.2592

** (***) denote the rejection of the null hypotheses at 1% (5%) level of significance.

[7]The Error Correction Model (ECM) provides the means of reconciling the short run behaviour of an economic variable with its long-run behaviour. It captures the short run dynamics of the system.

5. Conclusion

Trade liberalization is often considered to be conducive for economic growth. In addition to the comparative advantage argument of the classical economists, trade liberalization enhances competition, promotes large market, transfer of technology and hence efficiency in production. In the light of this, Ghana adopted the trade liberalization policy as part of structural reforms in 1986. This study therefore aimed at finding out the impact of the trade liberalisation policy on the growth rate of real GDP of Ghana from 1986–2010. The empirical results of the study suggest that trade liberalization enhances real GDP growth in Ghana in the long run. In both the long run and short run error correction model, the coefficients of capital, population and inflation were found to be growth enhancing in Ghana while foreign direct investment (FDI) was not. The influence of OPENNESS was not consistent. The study recommends the provision of tax holidays and tax relieves to investors who wish to go to the agriculture and manufacturing sectors as well as improvement in the infrastructural base of the country such as roads, communications, among others particularly in the rural areas. Also, review of the land tenure system to avoid cumbersome process of acquiring land can also help attract investors into the agriculture sector. Additionally, there should be export diversification and other measures to add value to Ghanaian exports so that the economy will benefit from trade openness.

References

Ahmed, Y. and Anoruo, E. (2000). *Openness and Economic Growth: Evidence from Selected Asian Countries*. The Indian Economic Journal 47, No. 3, New Delhi

Aryeetey, E. and Fosu A. K. (2002). *Economic Growth in Ghana: 1960-2000*, Draft Chapter for AERC Growth Project Workshop, Cambridge

Edwards, S. (1992). *Openness, Trade Liberalization and Growth in Developing Countries*, Institute for Policy Reform Working Paper Series No. 35, Washington DC

Dickey, D.A. and Fuller, W.A. (1979). *Distributions of the estimators for autoregressive time series with a unit root*, Journal of the American Statistical Association, Vol. 74, pp. 427-31.

Edwards, S., (1998). *Openness, productivity and growth: what do we really know?* Economic Journal 108

Frimpong, J. M. and Oteng-Abayie, E. F. (2006). *Bounds Testing Approach: An Examination of Foreign Direct Investment, Trade and Economic Growth relationships*, MPRA Paper No. 352

Harrison, A. (1991). *Openness and Growth: A Time Series Cross-Country Analysis for Developing Countries*, World Bank Policy Research Papers No. 809, Washington, DC

Iscan, T. (1998). *Trade Liberalization and Productivity: A Panel Study of the Mexican Manufacturing Industry,* Journal of Development Studies, Vol. 34, No. 5

Nugent, J. (2002). *Trade Liberalization: Winners and Losers, Success and Failures. Implications for SMEs*, Forum Series on the Role of Institutions in Promoting Economic Growth, The IRIS Center at the University of Maryland, College Park, Maryland

Pesaran, M. H., Shin, Y., Smith, R. J., (2001). *Bounds Testing Approaches to the Analysis of Level Relationships,* Journal of Applied Econometrics, 16, 289-326

Rivera-Batiz, F. L. (1996). *Trade Liberalization and the International Distribution of the Gains from Growth*", in Dev Gupta and Choudry eds. *Globalization and Development: Growth, Equity and Sustainability,* Klower Academic Publishers, Boston

Rodrick, D. (1998). *Trade Policy and Economic Performance in Sub-Saharan Africa*, Expert Group on Development Issues (EGDI:1), Swedish Ministry of Foreign Affairs.

Sachs, J. D. and Warner, A. M. (1997). *Sources of Slow Growth in African Economies*, Journal of African Economies, Oxford.

Santos, P. (2002). *Trade Liberalisation and Export Performance in Selected Developing Countries*, Journal of Developing Economics.

Sinha, D. and Sinha, T. (2000). *Openness, Investment and Economic Growth in Asia*, The Indian Economic Journal 49, New Delhi.

Siddiqui, A. H. and Iqbal, J. (2005). *Impact of Trade Openness on Output Growth for Pakistan: An Empirical Investigation,* Market Forces, Vol. 1 No. 1

United National Conference on Trade and Development (2003). *Investment Policy Review: Ghana*, UNCTAD/ITE/IPC/Misc. 14/Rev. 1, Geneva.

Wacziarg, R. (2001). *Measuring the Dynamic Gains from Trade*, World Bank Economic Review Vol. 15, No. 3

Yanikkaya, H. (2003). *Trade Openness and Economic Growth: A cross country empirical investigation*, Journal of Development Economics.

Figure 1

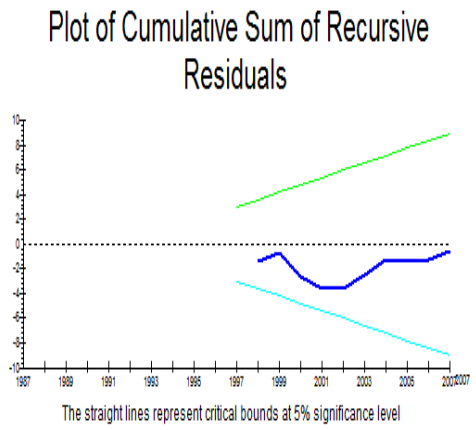
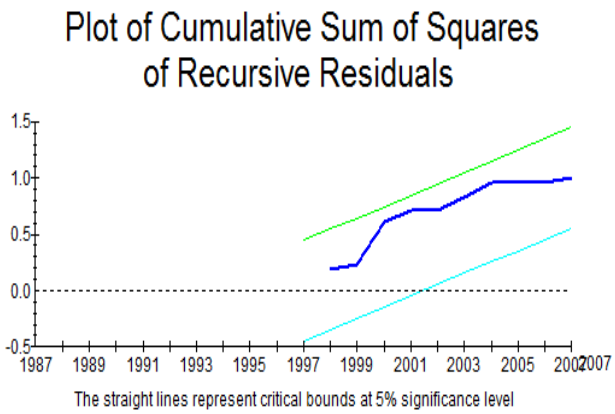


Figure 2



This academic article was published by The International Institute for Science, Technology and Education (IISTE). The IISTE is a pioneer in the Open Access Publishing service based in the U.S. and Europe. The aim of the institute is Accelerating Global Knowledge Sharing.

More information about the publisher can be found in the IISTE's homepage: http://www.iiste.org

CALL FOR PAPERS

The IISTE is currently hosting more than 30 peer-reviewed academic journals and collaborating with academic institutions around the world. There's no deadline for submission. **Prospective authors of IISTE journals can find the submission instruction on the following page:** http://www.iiste.org/Journals/

The IISTE editorial team promises to the review and publish all the qualified submissions in a **fast** manner. All the journals articles are available online to the readers all over the world without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. Printed version of the journals is also available upon request of readers and authors.

IISTE Knowledge Sharing Partners

EBSCO, Index Copernicus, Ulrich's Periodicals Directory, JournalTOCS, PKP Open Archives Harvester, Bielefeld Academic Search Engine, Elektronische Zeitschriftenbibliothek EZB, Open J-Gate, OCLC WorldCat, Universe Digtial Library , NewJour, Google Scholar