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Original Research Article

ORGANISED CRIME, FOREIGN DIRECT INVESTMENT AND ECONOMIC GROWTH IN GHANA

Abstract

Aims: Ghana has put measures in place to increase its economic growth. It is established that a reduction in crime rate is a good impetus for growth. The study therefore investigated the relationship between organised crime, FDI and economic growth in Ghana.

Study Design: the study uses the positivist philosophy.

Place and Duration of the study: Ghana, between the periods 2000 to 2014

Methodology: This was done by means of the Autoregressive Distributed Lag (ARDL) approach.

Results: The study found a cointegrating relationship between economic growth and its determinants. The regression results show that organised crime and FDI are important determinants of economic growth in Ghana since they exerted statistically significant negative and positive effects on economic growth respectively both in the short-run and long-run in Ghana. In addition, interest rate, and inflation also exerted negative and statistically significant effects on economic growth both in the short-run and long-run in Ghana. Further, real effective exchange rate, physical capital and labour force exerted positive and statistically significant effects on economic growth both in the short-run and long-run in Ghana.

Conclusion: It is therefore recommended that policymakers still put pragmatic measures to reduce crime rate, increase FDI inflows, physical capital, and labour force, as well as maintaining low inflationary rate. Finally, Bank of Ghana should maintain a stable exchange rate while financial institutions are to reduce their interest rate on lending.

Keywords: Organised Crime, Foreign Direct Investment, Economic Growth, Cointegration

1.1 Introduction

Economic and financial crimes are the greatest threat to national economic and development [1]. Crime is an act or an instance of negligence that is against the law and punishable upon conviction. A crime against an individual includes any threat of force or the

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actual use of force against somebody, as well as accidents, which result in death due to an individual's intent or negligence [2]. A crime against property, which can also involve violence against a person while committing the crime, includes any attempt or the actual deprivation of somebody's belongings as well as willfully damaging them [2].

The damage caused by crime has a significant negative impact on society welfare, which can lead to serious impediments for the creation and maintenance of a developed and well-functioning economy. The impact of crime on the economy is substantial, because it generates great costs to society at different levels, from individual to the national level [3]. Organized crime is much more than an isolated criminal phenomenon. It is well-accepted that criminal organizations typically involve the collusion or direct participation of the public sector in their illegitimate activities.

The experts agree that confidence in Africa is lower than is justified by the fundamentals. While the reasons behind this are debatable, low levels of investment can largely be explained by the perception that rule of law does not prevail in Africa [3]. The United Nations Economic Commission on Africa has identified crime as one of the most robust correlates of economic growth, and African countries are generally rated toward the bottom of the scale in terms of this perception indicator. According to World Bank Investment Climate survey data from nine African countries, over 29% of business people in Africa reported that crime was a major constraint on investment, about 50% more than the global average. Those reporting direct losses to crime varied from 11%-80% of respondents in each country, and the cost of these losses varied between 2%-12% of total sales. Expenditure on security ran at about 3% of gross sales in several countries polled [3].

Ghana is one of the peaceful countries within sub-Saharan Africa [4]. The political stability enjoyed by the country and friendly disposition of Ghanaians offer visitors the necessary motivation to visit Ghana. However, against the backdrop of a steadily improving global recognition, is the emergence of a new trend of crimes which are slowly but surely gaining root in the country: such as serial killings, armed robbery, drug trafficking, fraud and other forms of crime [4].

Although the identification and the estimation of organised crime costs have received wide attention in economic literature, the detrimental effect of crime to the (legal) economic activity becomes stronger as FDI increases. Organised crime acts like a tax on the entire

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economy: it discourages domestic and foreign direct investments, reduces the competitiveness of firms, and reallocates resources, creating uncertainty and inefficiency. In this study, the economic growth will be regressed on organised crime rate and FDI to estimate the effects of organised crime and FDI on economic growth and this will contribute knowledge on effect of organised crime and FDI on economic growth.

The relationship between crime and economic growth has gained importance in the academic literature and many tried to estimate what are the direct and indirect costs of crime on the society [5]. As a result, the amount of studies, which examine this relationship in order to assess the impact of crime on economic progress, is growing. Despite that, the results indicate that a clear conclusion on the association between them has not been defined. Many studies report that crime has a very significant negative influence on economic growth [6]; [7]; [8], whereas other conclude that the effect is unclear [9]; [10] 2004) or even absent [11]; [12]. Some suggest that, the relationship between organised crime and economic growth is moderated by foreign direct investment [13].

On the empirical side of the problem, a study that aimed at finding out the reasons of deceleration of Colombia's economic growth, [6] concluded that the increase in crime rate have a significant negative impact on the economic growth.

Contrary to univocal studies which showed that crime indeed has a negative effect on economic growth, there are observations which show a vague relationship between these two factors. [9] check the effect of the interaction of crime and macroeconomic uncertainty on economic growth using a panel of 25 countries over the period 1991 to 2007. The authors conclude that the increasing levels of crime do not have an independent effect on economic growth under favorable economic conditions.

Economic theory has pointed to a causal relationship between economic growth and FDI that can run in either direction [14]. [15] found a positive relation between foreign direct investment and economic growth, and further claims that there is no evidence that FDI raises income inequality. Contrary to the other papers referenced in this literature review, [14] did not find any strong effect from FDI on growth.

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Due to the inconclusiveness in the results concerning the relationship among organised crime, FDI, and economic growth, this study therefore adds and partially fills in the gaps to the current organised crime-FDI-economic growth literature by examining the effects of organised crime and FDI on the economic growth in Ghana having included a larger set of determinants of growth.

2.1.1 Data and Methodology

The study used quarterly series data from 1980 to 2013. The series on organised crime, FDI were sourced from the Kaufmann governance indicators while series on physical capital, labour force, inflation, real effective exchange rate, and real GDP were drawn from the World Development Indicators (WDI), 2013; whereas series on interest rate were obtained from the Bank of Ghana (BOG). The study therefore tests for short-run and long-run relationships among the variables using Autoregressive Distributed Lag (ARDL) approach.

2.1.2 Model Specification

Following the standard literature of [2], [1], [4], [15], [16], and [17] the economic model for economic growth is specified as:

RGDP=f (OC, FDI, K, L, INFL, REER, INTR)…… (1)

Where *RGDP* is the of real GDP, OC is organised crime, FDI is foreign direct investment, K is the physical capital, L is the labour force, *INFL* is the inflation rate, *REER* is the real effective exchange rate, and *INTR* is interest rate. The model in Equation (1) above can be written as an econometric model specified as:

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$$RGDP_t = \beta_0 + \beta_1 K_t + \beta_2 L_t + \beta_3 OC_t + \beta_4 FDI_t + \beta_5 INFL_t + \beta_6 REER_t + \beta_7 INTR_t + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Where the coefficients $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6$ and, β_7 are the parameters of the respective variables, β_0 is the constant term (drift), t denotes time and ε is the error term. The following are expected.

$\beta_1 > 0, \beta_2 > 0, \beta_3 < 0, \beta_4 > 0, \beta_5 < 0, \beta_6 > 0, \beta_7 < 0$

3.1.1 Results and Discussion

3.1.2 Descriptive Statistics

The descriptive statistics of the relevant variables involved are presented in Table 1. It can be seen from Table 1 that all the variables have positive average values (means). The minimal deviation of the variables from their means as shown by the standard deviation gives indication of slow growth rate (fluctuation) of these variables over the period. Most of the variables were positively skewed implying that the majority of the values are less than their means. It is evident from the Table 1 that only variables, that is economic growth, organized crime, and labour force, are negatively skewed implying that majority of the values are greater than their means.

Table 1: Summary Statistics of the Variables

	RGDP	OC	FDI	K	L	INF	INT	REER
Mean	5.806	0.479	1.272	6.022	1.143	4.017	4.536	1.272
Median	5.790	0.477	0.992	5.980	1.140	3.412	4.327	0.992
Maximum	7.350	0.563	2.581	8.100	1.393	9.472	6.886	2.581
Minimum	3.940	0.324	0.218	3.766	0.747	1.928	2.986	0.218
Std. Dev.	0.358	0.049	0.840	0.992	0.068	1.867	1.269	0.840

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Skewness	-0.763	-0.236	0.125	0.196	-2.535	1.215	0.583	0.125
Kurtosis	21.139	3.139	1.310	2.273	24.502	3.670	2.039	1.310
Sum	325.152	26.80	71.217	337.244	64.035	224.96	254.000	71.217
Sum Sq.Dev.	7.042	0.131	38.843	54.107	0.258	191.79	88.513	38.843
Observations	56	56	56	56	56	56	56	56

Note: Std. Dev. represents Standard Deviation while Sum Sq. Dev. represents Sum of Squared Deviation.

Source: computed by the author using Eviews 6.0 Package

3.1.3 Unit Root Test

Although the bounds test (ARDL) approach to cointegration does not necessitate the pretesting of the variables for unit roots, it is however vital to perform this test to verify that the variables are not integrated of an order higher than one. The aim is to ascertain the absence or otherwise of *I* (2) variables to extricate the result from spurious regression. Thus, in order to ensure that some variables are not integrated at higher order, there is the need to complement the estimated process with unit root tests.

Table 2 presents the results of the unit root test. From Table 2, all the variables are non-stationary in levels. However, all the variables in their first differences show that the variables are stationary. In order to be sure of the order of integration of the variables, the test was conducted with intercept and time trend in the model. The optimal number of lags included in the test was based on automatic selection by Schwarz-Bayesian Criterion (SBC) and Akaike Information Criterion (AIC). The study used the P-values in the parenthesis to make the unit root decision, (that is, rejection or acceptance of the null hypothesis that the series contain unit root) which arrived at similar conclusion with the critical values.

The rejection of the null hypothesis for the test is based on the MacKinnon (1991) [27]critical values as well as the probability values.

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Table 2: Results of Unit Root Test with constant and tend: ADF Test

Levels			First Difference			
Variables	ADF-Statistic	Lag	Variables	ADF-Statistic	Lag	*I(O)*
LNRGDP	-1.3492 [0.6036]	1	ΔLNRGDP	-6.1739[0.0000]***	0	*I*(1)
OC	-1.8706 [0.3447]	1	ΔOC	-4.7257[0.0002]***	0	*I*(1)
FDI	-1.6868 [0.4345]	1	ΔFDI	-4.9194[0.0006]***	0	*I*(1)
K	-2.0296 [0.2739]	1	ΔK	-4.4545[0.0005]***	0	*I*(1)
L	-0.8564 [0.7974]	3	ΔL	-4.3540[0.0007]***	0	*I*(1)
INF	-2.5104 [0.1165]	3	ΔINF	-6.1175[0.0000]***	2	*I*(1)
INT	-2.1484 [0.2260]	0	ΔINT	-7.1367[0.0000]***	3	*I*(1)
REER	-2.3624[0.1255]	1	ΔREER	-4.3052[0.0008]***	0	*I*(1)

Note: *** indicate the rejection of the null hypothesis of non stationary at 1% level of significance, Δ denotes first difference, and *I(O)* is the order of integration. The values in parenthesis are the P-values.

Source: Computed by the author using Eviews 6.0 Package

From the unit root test results above, the null hypothesis of the presence of unit root for all the variables in their levels cannot be rejected since the P-values of the ADF statistic are not statistically significant at any of three conventional levels of significance. However, at first difference, all the variables are stationary. This is because the null hypothesis of the presence of unit root (non-stationary) is rejected because the P-values of the ADF statistic are statistically significant at 1 percent significant levels for all the estimates.

It is therefore clear from all the unit test results discussed above that all the variables are integrated of order one I(1). Since the test results have confirmed the absence of I (2) variables, ARDL methodology is now used for the estimation.

The subsequent sections discuss the results of cointegration test results, long-run and short-run results as well as Granger causality test results.

3.1.4 Bounds Test for Cointegration

In the first step of the ARDL analysis, the presence of long-run relationships in equation (4) using equation (5) is tested. Given that the study employed quarterly data, a maximum lag length of 4 is used in the bounds test. Pesaran and Pesaran (1997) [18]suggest a maximum lag length of 4 for quarterly data in the bounds testing approach to cointegration. After the lag length

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was determined, the F-test statistic computed within the bounds test framework is compared with the upper and lower critical values in [18]. The results of the bound test procedure for cointegration analysis between economic growth and its determinant are presented in Table 3.

As show in Table 3, the joint null hypothesis of lagged level variables (that is, variable addition test) of the coefficients being zero (no cointegration) is rejected at 1 percent significance level. This is because the calculated F-statistic value of 4.614 ($G_{GDP}(.)$=4.614) exceeds the upper bound critical value of 4.540 at 99% level. This means there exist a long run relationship between economic growth and its determinants.

Table 3: Results of Bounds Tests for the Existence of Cointegration

	90% Level		95% Level		99% Level	
K=7	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
	2.141	3.250	2.476	3.646	3.267	4.540
Dependent Variable					F-Statistic	
G_{GDP} (GDP|OC, FDI, K, L, INF, INT, REER)						4.614

Note: Critical values were obtained from Pesaran and Pesaran (1997), Table F, pp. 478, and *K* is the number of regressors.

Source: Computed by the author using Microfit 4.1

Thus, the above results indicate that there is a unique cointegration relationship among the variables when economic growth is normalized. Thus, the variables are the long-run determinants of economic growth in Ghana.

Having established the existence of long-run relationship between economic growth and its determinants, the ARDL cointegration method is then used to estimate long-run parameters of equation (5).

3.1.5 Long Run Relationship

Since economic growth and its determinants are cointegrated, the long-run parameters of the ARDL model are estimated and the results are presented in the Table 4. The long-run ARDL model was estimated based on the Schwarz Bayesian Criterion (SBC).

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As shown in Table 4, all the estimated coefficients have their a priori expected signs. From the results, the coefficient of organised crime is statistically significant at 1 percent significance level, indicating that if the country's crime rate were to increase by 1 percent, economic growth will decrease by approximately 0.09 percent in the long run. This means that increases in crime rate has the potential of influencing economic growth in Ghana at the aggregate level over the study period. This negative effect of organised crime on economic growth lends support to the argument by [2] which claim that high crime rate is associated with decreases in economic growth.

This result confirms most findings in many empirical studies in the literature. Specifically, it concurs with a study by [1], [4], [15] who found a negative effect of crime rate on economic growth Nigeria.

Table 4: Estimated Long-Run Coefficients using the ARDL Approach

ARDL(2, 2, 0, 2, 0, 2, 2, 2) selected based on SBC			Dependent Variable: LNRGDP	
Regressor	Coefficient	Standard Error	T-Ratio	P-values
Constant	0.91917	0.30770	2.9873***	[0.005]
OC	0.08723	0.00958	9.1054***	[0.000]
FDI	0.03414	0.01276	2.6755***	[0.009]
K	0.01150	0.00534	-2.1536**	[0.03]
L	0.01632	0.00830	1.9663*	[0.05]
INF	-0.01791	0.00861	-2.0801**	[0.04]
INT	-0.01576	0.00252	-6.2539***	[0.000]
REER	0.05122	0.00879	5.8271***	[0.000]

Note: ***, **, and * denote significance levels at 1%, 5% and 10% respectively.

Source: Computed by the author using Microfit 4.1

Furthermore, the coefficient of FDI carried the expected positive sign and is statistically significant at 1percent significance level. Thus, if the country's capital inflows increase by 1 percent, economic growth will increase by approximately 0.03 percent in the long-run (Table 4). That is, FDI which captures inflows of foreign capital has had a significant positive effect on

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economic growth in Ghana. This result is in line with [19], and [20] theory which assume that technological progress is the principal driving force of economic growth.

Moreover, the coefficient of physical capital had it expected positive sign, and it is statistically significant at 5 percent. This indicates that, if the country's fixed capital formation increases by 1 percent, holding all other things constant, economic growth will increase by approximately 0.01 percent in the long run. This means that physical capital does significantly affect economic growth in the long run in Ghana. This is in line with the findings by [21].

Further, the coefficient of labour force also had it expected positive sign and is statistically significant at 10 percent significant level. This means that if labour force increases by 1 percent, economic growth will also increase by approximately 0.02 percent in the long run holding all other things constant in Ghana. This also confirms the study by [21].

Also, the coefficient of the inflationary rate had a negative impact on long run economic growth and is statistically significant at 5 percent significance level. The result indicates that a percentage increase in the general price level will lead to a fall in the long run economic growth in Ghana by approximately 0.02 percent.

Moreover, the coefficient of interest rate had its expected negative sign in the long-run in. It is statistically significant at 1 percent significance level. The result shows that a 1 percent increase in interest rate in the long-run will lead to 0.02 percentage point decrease in economic growth of the country as was also. Again, this result is in line with the findings by [21], [22], and Salisu and Ogwumike (2010) [23]Sub-Saharan Africa.

Finally, the results also show that real effective exchange rate (LNREER) has a positive and statistically significant effect on economic growth in Ghana. With a positive coefficient of 0.05, it is anticipated that a 1 percent increase in real effective exchange rate will lead to

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approximately 0.05 percent increase in economic growth. The coefficient of real effective exchange rate is statistically significant at 1 percent significance level. This finding is in line with the findings of [2] and Oshiokoya (1995)[24]. Therefore, real exchange rate has a significant effect on economic growth in Ghana.

The long-run results indicate that any disequilibrium in the system as a result of a shock can be corrected in the long-run by the error correction term. Hence, the error correction term that estimated the short-run adjustments to equilibrium is generated as follows.

$$ECM = LNRGDPP + 0.08723 * OC - 0.03414 * FDI - 0.01150 * K - 0.01632 * L + 0.0179 * INF + 0.01576 * INT - 0.05122 * REER + 0.91917 * C$$

3.1.6 Short Run Relationship

Table 5 presents the results of the estimated error-correction model of economic growth for Ghana using the ARDL technique. The model is selected based on the SBC. The results from the ARDL model as displayed in Table 5 suggest that the ultimate effect of previous period value of economic growth on current values of economic growth in the short-run is positive and statistically significant at 1 percent significant level. The implication is that current values of economic growth are affected by previous quarters' values of economic growth in Ghana. This is expected in that previous growth and expansion in the economy serves as an indication of prosperity and may attract more investment leading to more growth. This result is in line with finding in the empirical studies by [16].

The results also showed the expected negative sign of error correction term lagged one period ($ECM_{t-1)}$ and it is highly significant at 1 percent significant level. This confirms the existence of the cointegration relationship among the variables (economic growth and its

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determinants) in the model yet again. The ECM stands for the rate of adjustment to restore equilibrium in the dynamic model following a disturbance.

Table 5: Estimated Short-Run Error Correction Model using the ARDL Approach

ARDL(2, 2, 0, 2, 0, 2, 2, 2) selected based on SBC Dependent Variable: Dlnrgdp

Regressor	Coefficient	Standard Error	T-Ratio	P-values
Constant	0.58304	0.26166	2.2283**	[0.03]
dLNRGDP(-1)	0.36536	0.09741	3.7507***	[0.000]
dOC	-0.07164	0.01757	-4.0774***	[0.000]
dFDI	0.02092	0.00308	6.7922***	[0.000]
dK	0.00344	0.00160	2.1500**	[0.04]
dL	0.00529	0.00296	1.7872*	[0.08]
dINF	-0.00555	0.00305	-1.8197*	[0.07]
dINT	-0.00738	0.00209	-3.5311***	[0.001]
dLNREER	0.07853	0.00606	12.9588***	[0.000]
ECM(-1)	-0.20955	0.06863	-3.0533***	[0.000]

R-Squared	0. 73485	R-Bar-Squared	0.64095
S.E.ofRegression	0.13835	F-stat. F(8, 79) 8.1242	[0.000]***
MeanofDependentVariable	0.033735	S.D. of Dependent Variable	0.17675
ResidualSum of Squares	1.75739	Equation Log-likelihood	54.0684
AkaikeInfo. Criterion	42.0684	Schwarz Bayesian Criterion	30.4430
DW-statistic	2.0526		

Note: ***, **, and * denote significance levels at 1%, 5% and 10% respectively

Source: Computed by the author using Microfit 4.1

The coefficient of the error correction term (ECM) is around -0.20955. In other words, the significant error correction term suggests that a deviation from the long-run equilibrium subsequent to a short-run shock is corrected by about 21% at the end of each quarter in a year. The rule of thumb is that, the larger the error correction coefficient (in absolute terms), the faster the variables equilibrate in the long-run when shocked [25].

Consistent with the long-run results, the coefficient of organised crime is statistically significant at 1 percent significance level, implying that if the country's crime rate were to increase by 1 percent, economic growth will decrease by approximately 0.07 percent in the short run. This once again means that increases in crime rate have the potential of influencing economic growth in Ghana at the aggregate level over the study period. This negative effect of

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organised crime on economic growth still lends support to the study by [2] which claim that high crime rate is associated with decreases in economic growth. This result still confirms most findings in many empirical studies in the literature. Specifically, it concurs with a study by [1], [4], [15] who found a negative effect of crime rate on economic growth Nigeria.

The coefficient of FDI has the theorized positive impact on economic growth in the short-run. The coefficient of FDI is statistically significant at 1 percent significant level. From the results, a 1 percentage point increase in FDI openness will induce financial development to increase by approximately 0.02 percent in the short-run. This indicates the crucial role that FDI plays in Ghana's growth process as its coefficient is positive in the dynamic model just as in the long run model.

Again, the coefficient of physical capital also maintained its positive sign and is statistically significant at 5 percent significant level which is consistent with the long-run results. The result therefore suggests that if physical capital goes up by 1 percent, economic growth will increase by approximately 0.003 percent in the short-run. Thus, the short-run and long-run results indicate that physical capital has been an engine for economic growth in Ghana. The positive effect of physical capital on economic growth seems less high in short-run (0.003) compared to the long-run (0.01). In the empirical literature this results is consistent with the findings by [16].

Furthermore, the coefficient of labour force maintained its positive sign and is statistically significant at 10 percent significance level which is consistent with the long-run result. This means that in the short-run, if the country's labour force increases by 1 percent, economic growth increases by approximately 0.005 percent, which is less than as in the long-run

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with coefficient of 0.016 percent. This shows how important it is to maintain high growth in labour force relative in the Ghanaian economy.

Also, consistent with the findings of [21], Barro (2003)[22], and Salisu and Ogwumike (2010) [23]Sub-Saharan Africa, the coefficient of inflation rate in the dynamic equation maintained its expected negative sign. It is statistically significant at 10 percent significance level which is relates to the long-run result. The result shows that a 1 percentage point increase in inflation rate in the short-run will decrease economic growth by approximately 0.005 percent. The negative effect of inflation rate on economic growth is less severe in short-run (-0.005) than in the long-run (-0.02).

Again, consistent with the long-run estimate, the coefficient of interest rate maintained its negative sign and statistically significant at 1 percent significant level. The results indicate that a 1 percentage point increase in interest rate will decrease economic growth by about 0.007 in the short run. The result is again in line with empirical finding by [21], Barro (2003)[22], and Salisu and Ogwumike (2010) [23]Sub-Saharan Africa.

Finally, real effective exchange rate still maintained its expected positive sign as in the long-run. With a positive coefficient of 0.09, it is anticipated that a 1 percent increase in real effective exchange rate will lead to approximately 0.09 percent increase in economic growth. The coefficient of real effective exchange rate is statistically significant at 1 percent significance level. This finding is in line with the findings of [2] and Oshiokoya (1995)[24]. Therefore, real exchange rate has a significant effect on economic growth in Ghana. The Adjusted R-Square shows that around 64 percent of the variations in economic growth are explained by the regressors in the model. It can be seen that the R-Square value 0.64 is less than the Durbin DW-statistic value of 2.05 indicating that the results are not spurious.

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3.1.7 Model Diagnostics and Stability Tests

In order to check for the estimated ARDL model, the significance of the variables and other diagnostic tests such as serial correlation, functional form, normality, heteroskedasticity and structural stability of the model are considered. As shown in Table 6, the model generally passes all diagnostic tests in the first stage. The diagnostic test shows that there is no evidence of autocorrelation and the model passes the normality and the test proved that the error is normally distributed. Additionally, the model passes the white test for heteroskedasticity as well as the RESET test for correct specification of the model.

Table 6: Model Diagnostics

Diagnostics	Test Statistic
F_{Auto} (4,36)	1.5975 [0.196]
X^2_{Auto} (4)	2.1401 [0.827]
X^2_{Reset} (1)	0.5069 [0.402]
X^2_{Norm} (2)	1.9563 [0.138]
X^2_{White} (1)	0.4132 [0.984]

Note: X^2_{Auto}, X^2_{Reset}, X^2_{Norm}, *and* X^2_{White} are Lagrange multiplier statistics for test of serial correlation, functional form misspecification, non-normal errors and heteroskedasticity respectively. These statistics are distributed as Chi-square values with degree of freedom in parentheses. Values in parentheses [ ] are probability values.

Source: Computed by the author using Microfit 4.1

Finally, when analyzing the stability of the coefficients, the Cumulative Sum (*CUSUM*) and Cumulative Sum of Squares (*CUSUMQ*) are applied. Following, the stability of the regression coefficients is evaluated by stability tests and they can show whether or not the parameter estimates are stable over time. This stability test is appropriate in time series data, especially when one is uncertain about when structural change might have taken place. The result for *CUSUM* and *CUSUMQ* are shown in Figures 1 and 2. The null hypothesis is that the coefficient vector is the same in every period and the alternative is that it is not (Bahmani-

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Oskooee, 2004)[26]. The *CUSUM* and *CUSUMQ* statistics are plotted against the critical bound of 5 percent significance level. According to [26], if the plot of these statistics remains within the critical bound of the 5 percent significance level, the null hypothesis that all coefficients are stable cannot be rejected.

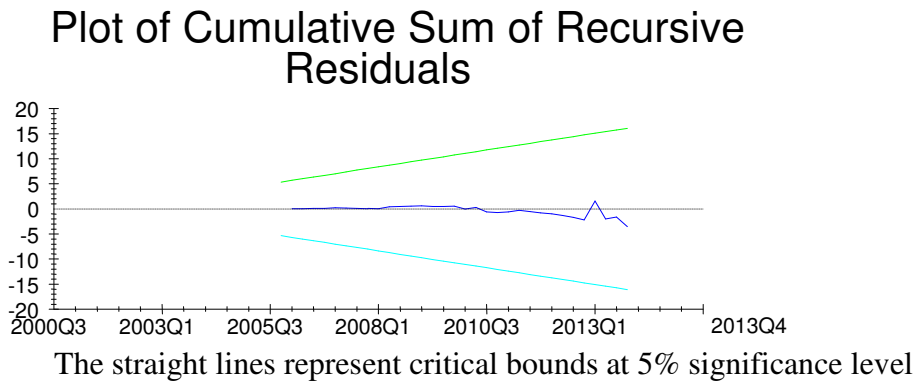

Figure 1: Plot of Cumulative Sum of Recursive Residuals

Note: The variable on the vertical axis is residuals whiles the variable on the horizontal axis is years in quarters.

Source: Generated by the author using Microfit 4.1

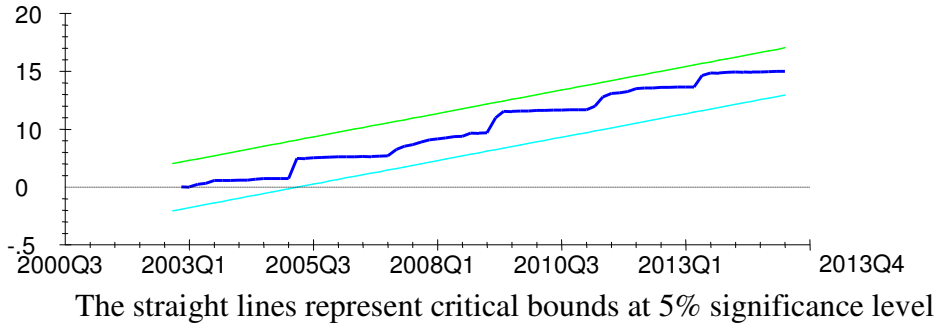

Figure 2: Plot of Cumulative Sum of Squares of Recursive Residuals

Note: The variable on the vertical axis is the square of the residuals whiles the variable on the horizontal axis is years in quarters.

Source: Generated by the author using Microfit 4.1

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As shown in Figures 1 and 2, the plot of both the *CUSUM* and *CUSUMSQ* residuals are within the 5 percent critical bound (boundaries). That is to say that the stability of the parameters has remained within its critical bounds of parameter stability. It is clear from both graphs in Figures 1 and 2 that both the *CUSUM* and *CUSUMQ* tests confirm the stability of coefficients of the financial development functions.

4.1.1 Conclusions and Policy Recommendations

The study indicataed FDI, physical capital, labour force, and real effective exchange rate are statistically important determinants of economic growth in Ghana and positively impact it. Further, the results presented in this study imply that organised crime, inflation, and interest rate are statistically important determinants of economic growth but have a negative impact, both in the long-run and in the short-run.

Taking into consideration the conclusions from the study, the following recommendations are proposed.

The security services needs to put in place effective measures fight against crime activities in the country with all it concomitant benefits. Thus, the Government of Ghana needs to ensure a reduced crime rate to boost economic growth.

Another policy implication of the study is that the Bank of Ghana and other regulators need to ensure that low inflationary rate is maintained in the Ghanaian economy.

Further, one of the most effective variables for economic growth in this study was FDI. Thus, the Ghana Investment Promotion Centre (GIPC) needs to create an enabling business environment to attract more foreign investors in order to help increase economic activities to promote economic growth.

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Moreover, financial institutions in Ghana need to also consider reducing their interest rate to attract borrowing from the private sector so as to boost development in the financial sector leading to more growth in the economy.

Finally, the finding that physical capital, labour force, and real effective exchange rate positively economic growth shows how important it is to maintain high physical capital, increase labour force , and stabilising the exchange rate in the Ghanaian economy. Thus, to ensure high economic growth in the country, the Government needs to first ensure that there is growth in the physical capital, labour force as well as maintaining macroeconomic stability.

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