

**AID-GROWTH RELATIONSHIP:  
EVIDENCE FROM A CO-INTEGRATION ANALYSIS FOR  
THE FIVE POOREST COUNTRIES OF THE WORLD**

**YARDIM-BÜYÜME İLİŞKİSİ:  
DÜNYANIN EN DÜŞÜK GELİRLİ BEŞ ÜLKESİNİN CO-  
İNTEGREASYON ANALİZİNDEN KANITLANMASI**

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**Abstract:** *The impact of Official Development Assistance (ODA) which is geared towards economic growth of the 5 poorest economies of the world (Niger, Congo, Burundi, Malawi, and the Central African Republic) was analysed. Employing a well-structured growth model and yearly data from 1986 – 2015, we examine this growing nexus using a robust model specification, hence testing both the long and short run relationship between economic growth and ODA. The ARDL long-run relationship and an Error Correction Model (ECM) was used to test for the relationship alongside the rate at which the variables returns back to the long-run equilibrium following a shock in the short run. There exist a significant positive association for Niger as well as Malawi in the long run, while other countries displayed no long-run relationship. Interestingly, the relationship in the short run was found only in Congo. The derived conclusion from this paper is that the government have to re-evaluate the sectoral allocation of foreign Aid received to ensure higher efficiency and a prospective economic growth and development of these countries.*

**Keywords:** *Foreign aid, economic growth, RGDPpc, ARDL, ECM*

**Öz:** *Bu çalışmada Resmi Kalkınma Yardımının (RKY), dünyanın en düşük gelirlili 5 ekonomisinin (Nijer, Kongo, Burundi, Malavi ve Orta Afrika Cumhuriyeti) ekonomik büyüme üzerindeki etkisi analiz edildi. Yapılandırılmış bir büyüme modeli ve 1986 - 2015 yıllık verileri kullanarak büyüyen ilişki sağlam bir model spesifikasyonu ile incelenecektir. Bu nedenle çalışma hem ekonomik büyüme hem de RKY arasındaki uzun ve kısa vadedeki ilişkiyi test etmektedir. ARDL uzun süreli ilişkiyi ölçmede ve aynı zamanda Hata Düzeltme Modeli (ECM) ile kısa vadede bir şokun ardından değişkenlerin uzun dönemli dengeye geri döndüğü oranı test etmek için kullanılmıştır. Uzun vadede Nijer ve Malavi için önemli bir pozitif ilişki bulunmuştur, diğer ülkelerde uzun süreli ilişki görülmemiştir. İlginç bir şekilde, kısa vadede ilişki sadece Kongo'da bulundu. Çalışmadan elde edilen sonuca göre, hükümetler daha yüksek verimlilik ve ileriye dönük ekonomik büyüme ve kalkınmayı sağlamak için yabancı yardımların sektörel dağılımını yeniden değerlendirmelidirler.*

**Anahtar Kelimeler:** *Dış yardımlar, ekonomik büyüme, RGDPpc, ARDL, ECM*

## INTRODUCTION

The present economic conditions of the Sub-Saharan African economies constitute the need for foreign aid in these regions. In the year 2000, the United Nations introduced an initiative called Millennium Development Goals aimed at fighting poverty, hunger, illiteracy, and gender discrimination, through the allocation of funds from the advanced economies to the developing economies.

According to Papanek (1973); Dowling and Hiemenz (1982); Brautigam and Knack (2004) developing countries' demand for Official Development Assistance (ODA) has been exemplified as a bridge that closes the gap between a country's earnings and expenditures. Nevertheless, the influence foreign aid has on the growth of the countries' economies remains ambiguous. The World Bank defined Net ODA as liabilities and donations of the Development Assistance Committee (DAC) official agencies to elevate the economic conditions of economies in the DAC list (World Bank, 2018).

For the past years, Sub-Saharan Africa as a recipient has seen a rise of ODA flows from \$42.5 billion in 2009 to \$45 billion in 2012, which later decreased to \$42.8 billion in 2015 (OECD, 2017).

The main aim of the study is to contribute to the literature with impact of ODA on economic growth of the five world poorest countries which are Central African Republic, Burundi, Niger, Malawi, and Congo DR with a per capita GDP of US \$314.72, US \$218.29, US \$391.13, US \$481.45, and US \$388.27 respectively.

Burnside and Dollar (2000) argue that aid can impact economic growth positively, but only if good monetary, fiscal, and trade policies are implemented.

The World Bank reported that the five poorest countries in the world received a total of US\$5.368 billion in 2015. This figure is compared to Nigeria which received the US \$2.432 billion and has recorded more per capita GDP of US \$2562.53 which is more than the five per capita GDP combined of US \$1793.86. It is evident that there is high macro-economic instability in the poor countries (World Bank, 2018).

Economists have had their fair share of scrutiny on countries receiving foreign aid with no economic growth. Bauer (1972) and Easterly (2001) opine that foreign aid enriches the elites only and gives birth to government bureaucracy and corruption.

The five countries mentioned in this study all have one thing in common, which is corruption and improper allocation of foreign aid to various economic sectors to aid the economic growth. It is of no doubt that economic growth has been gravely affected by foreign aid (Nwaogu and Ryan, 2015).

Perhaps this is why poor countries fall in this predicament, as the World Governance Indicators of the World Bank rank these countries with low indices. This indicates that there are low transparency and accountability of the public sector. Nevertheless, this holds true in sub-Saharan African countries as corruption cost the continent roughly \$150 billion a year (African Union, 2002).

Masoud *et al.*, (2015) confirm that foreign aid increases corruption and funds are not allocated efficiently to aid economic growth.

## 1. THEORETICAL FRAMEWORK

The association that exists between economic growth and foreign aid was first modeled by Harrod (1939) which was further updated by Domar (1946), called the Harrod-Domar growth model. This model was brought into literature by the work of Chenery and Strout (1996). The model proposed that the components of economic growth ( $\Delta y$ ) is domestic savings (S) and the fixed capital output ratio (r) given by the following equation:

$$\Delta y = \frac{s}{r} \quad \text{Eq1}$$

In this model three assumptions were established, where savings (S)= investment, investment = capital accumulation, and lastly there is a constant capital-output ratio ( $r = \frac{\Delta I}{\Delta Y}$ ). Re-arranging this identity will lead to the equation above. This equation indicates that a rise in savings will lead to economic growth.

Considering a small open economy like that of the poor countries, investment (I) in the identity above is determined by the level of savings (S) and the ability to export goods. The level of savings (S) attained is based on fiscal policies like reducing taxes, increasing government expenditure and the trade surplus. Countries with low national savings do not attain their required economic growth. They are prone to the accumulation of a twin deficit where there is a trade deficit and government deficit. This creates a shortage of capital for investment purpose to aid economic growth.

Foreign aid fills the difference between national savings and investment to attain the required growth rate.

National savings are comprised of domestic savings and foreign exchange savings, terming this the “Two gap” model by Chenery and Strout (1966) which was later modified to a “three gap” model, stressing the importance of government savings (budget surplus) to improve economic growth.

Different growth theories have emerged and proven to be more effective compared to the Harrod-Domar model. For instance, the Solow growth model shows that growth occurs through the increment of capital and labor with efficiency in the production function. Furthermore, the output is determined by the incremental capital accumulation in the long run, which in-turn is determined by the rates of savings in the nation. Output only ceases to increase when the country reaches the “steady state point”.

Another growth model that ties ODA and economic growth is the endogenous growth theory. Romer (1994) believes that growth should come from endogenous variables i.e. improvement in human capital through education, which will lead to an increase in skilled labor. As stated previously, the reason for the Millennium Development Goals is to improve human capital which can be achieved through foreign aid. Hence, all the growth models are compatible with foreign aid.

## 2. EMPIRICAL LITERATURE REVIEW

There seems to be a continuous argument over the benefits of foreign aid serving as a catalyst for an increase in growth in the economy. Being aware of numerous literature reviews carried out by many researchers on the influence aid has on economic growth, this research lays emphasis on the characteristic of aid in the economies of underdeveloped countries. Credible researchers have carried out various studies and their analysis results portray a positive association between economic growth. In addition, some researchers also found an inverse correlation between aid and economic growth. The empirical literature is divided into four parts that analyzed below.

Firstly, some researchers found a positive association between aid and growth in the economy. Thus, it serves as a positive contributor to the economic growth by those nation that can effectively put it into use. South Korea was seen as a vivid example of a country that effectively put foreign assistance into good use to boost its economy after the war. Hee (2014) examined how ODA and economic growth of South Korea influence each for the periods between 1965 and 1990. The OLS technique was employed in his analysis. The author found foreign assistance to be a significant contributor to the economic growth of South Korea. This view was also supported by previous research by Mosley, (1980); Dalgaard *et al.*, (2004) and Lof *et al.*, (2013).

Nwaogu and Ryan (2015) investigate the aid-growth relationship of 53 African countries and 34 Latin American countries. They use panel data covering the years from 1990 to 2014. They employ a dynamic spatial framework in their analysis. The authors found foreign assistance to be significant and a positive contributor to the economic growth of both regions. Recently, Geetilaximi *et al.*, (2016) studied the effect of ODA and macroeconomic policies on the economic growth of India from 1970 – 2014. The authors found that there was co-integration among the variables used (ODA, trade, GCF, GOVEX, and RGDP). Additionally, aid-growth nexus exhibits a significant relationship. The VECM revealed a unidirectional causality moving from a trade, government expenditure and gross capital formation to economic growth in both the long and short-run.

Secondly, some researchers opine that some conditions need to be met before foreign assistance is effective in the economy. Such conditions include effective democracy, political environment, geographical characters, government, financial liberation and macroeconomic policies on the ground. For example, the aids-growth relationship among developing countries was examined by Mosley *et al.*, (1987). The panel regression employed in their analysis revealed an insignificant association between ODA and the growth of their respective economies. However, the authors also find that aid to these countries is not efficiently used. Thus, assistance to such countries should be discouraged. Burnside and Dollar (2000) supported this view. Subsequently, Collier and Dollar (2001); Eskander *et al.*, (2008); Javid, and Qayyum, (2011) investigated aid-growth relationship and the authors concur with the conclusion of Burnside and Dollar (2000). They agree that the effectiveness of for ODA depends on conditions such as political stability, stable exchange rate and proper policies by the must be put in place.

While they enjoyed the attention, Burnside and Dollar (2000) also received a substantial amount of criticism for the methodology and approach used in their study. The study of Hansen and Tarp (2000) examine the aid-growth relationship in 45 countries. The authors employ panel data and GMM for estimation. Authors established a growing consensus between ODA and economic growth, irrespective of bad political environment. Moreover, Easterly *et al.*, (2004), followed the model of Burnside and Dollar (2000) with the same variables and a more recent data covering a large time frame conclude that effective policies are not a major determinant of economic growth.

The third insight on the association between economic growth and ODA literature looks at the possibility of a long-run relationship between the two variables via non-growth intermediate determinants through which aid might influence such as health, education level, environment, political institutions, or various local political influences. Dietrich and Wright (2015), examine aid allocation tactics and democratic change in West Africa. The authors use panel data covering the years between 1989 and 2008. They use instrumental variables approach such as GDP per capita, population, and civil war indicator in their analysis. They conclude that aid increases the likelihood of transition to multi-party politics. However, they find little evidence that foreign aid influences opposition support in the multiparty. Lynda and Léonce (2013) show that foreign aid influence mortality reduction as well as the difference in gender in youth literacy irrespective of previous situations of the recipients. Arndt *et al.* (2013) investigate aids-growth relationship. The author found a long-run relationship between foreign aids and economic growth. Also, foreign assistance improves structural change, improvement in social indicators and leads to poverty reduction.

Finally, there is also evidence of a negative relationship between aid and economic growth. Ali and Isse (2005) examined the aid-growth relationship for 151 countries over the period between 1975 and 1998. The authors employed panel data regression in their analysis. They concluded that the relationship between aid and growth is nonlinear and the relationship between aid per GDP and growth is sequential. Additionally, they show that an increase in aid will reduce economic growth. This view is also accepted by Rajan and Subramanian (2008). Girma (2015) examined whether foreign assistance contributes positively to a stable economy by using the ARDL approach to co-integration by using time series data covering the period between 1974 to 2011. Haile found co-integration among the variables. The study also revealed that foreign assistance has a negative impact on the economy of Ethiopia. This was due to the ineffective use of foreign assistance and corruption paramount in Ethiopia.

The above reviews show that the relationship between foreign assistance and economic growth is inconclusive. Notwithstanding, this review has formed the base for this research methodology. This will be presented in this next chapter below.

Methodology

### 3. METHODOLOGY

#### 3.1. Background and Description of the Model

Chenery and Strout (1996) developed the earliest model that attempted to test the association that exists between Aids and Growth. In which they were of the opinion that labor supply is of excess. Hence, growth lies on the level of productivity and availability of capital.

In this study, Growth is said to be constraint by three main gaps, which foreign aids tend to fill in other to enable investment. These gaps include; (1) Trade balance gap, (2) savings gap, (3) and fiscal gap.

These undeveloped countries are seen to have inadequate domestic savings and not enough export revenue to import capital goods and equipment for investment, therefore acquiring these foreign aids would help solve this trade and savings deficit problem. Furthermore, Bacha and Taylor (1990) in their study of aids-growth relationship stressed the fact that these developing countries lack the capital raising ability to cover their public investments hence stressing the need for foreign aid in supporting this fiscal deficit.

Earlier studies in this field which uses cross-country analysis tend to face estimation bias since countries of heterogeneous attributes and size are been pulled together in a panel, resulting to multiple causalities across countries at different time periods, leading to a high correlation between foreign aids flow and growth (Chenery and Strout, 1996).

In other to prevent this estimation from the bias of heteroscedasticity, simultaneity, and normality of distribution related to using cross-country analysis, we would be using a singular fixed country estimation of co-integration which allows for specific country long-run and short-run association testing.

#### 3.2. Data Description and Model Specification

Annual time series data from 1986 to 2015 for the five poorest countries in the world, were collected based on per capita GDP. These variables includes; GDP/capita, Trade openness, Official Development Aid and Investment and were gotten from the World Bank database.

The main focus of this research is to evaluate both the long run and short run relationship between economic growth and foreign aids of the 5 poorest countries of the world; Malawi, Burundi, Congo, Niger, and the Central African Republic. This study also incorporates trade openness and investment in other to improve the relationship. Hence, we can write the model as;

$$Y = f(M,N)$$

**M** = Vector of capital sources

**N** = other determining variable of growth.

$$\text{Hence, } \mathbf{RGDP}_t = \alpha + \beta \mathbf{M}_t + \beta \mathbf{N}_t + \varepsilon_t$$

Vector (M) = (Official Development Aids & Private Investment)

$$\mathbf{M} = f(\mathbf{FAID}, \mathbf{INV}, \mathbf{Trade}) \quad \mathbf{N} = f(\mathbf{Trade Policy})$$

**FAID** = Net official Development Aids as a % of GDP

**INV** = Capital formation as a % of GDP

**Trade Policy** = proxy as trade openness which is the sum of both import and export as a % of GDP

Hence our full model can be rewritten as;

$$\text{GDP}_t = \beta_1 + \beta_2 \text{FAID}_t + \beta_3 \text{INVT}_t + \beta_4 \text{TRADE}_t + \varepsilon_t$$

Taking the logarithm form of all variables would then become;

$$\text{LGDP}_t = \beta_1 + \beta_2 \text{LFAID}_t + \beta_3 \text{LINVT}_t + \beta_4 \text{LTRADE}_t$$

**Table 1: The Variables' Descriptions**

VARIABLES	MEASUREMENTS	DESCRIPTION	SOURCES
Foreign Aids	Log [(ODA/GDP)*100]	Logarithm Official Development Aids as a percentage of GDP (Current \$ value)	Center for Global Development Database
Trade Openness	Log [{"(Export+Import)/GDP"}*100]	The logarithm of Trade Openness as a percentage of GDP in Nominal Values	World Bank Database
Investment	Log [(GFCF/GDP)*100]	Logarithm values of Gross Fixed Capital Formation expressed as a percentage of GDP	World Bank Database
GDP per Capita	Log [Real GDP/Capita]	GDP per Capita (constant \$ 2010)	World Bank Database

### 3.2.1. Unit Root Test

Before we carry out econometric analysis, stationarity test is conducted on time series variables as a prerequisite step in order to eliminate the chance of spurious analysis that might result in spurious outcomes, (Granger and Newbold, 1974). Unit root test is also known as a random walk with drift is a stochastic trend found mostly in time series data when a systematic trend that is unpredictable is seen in a time series data, then there exists a unit root in the series.

In this study, we would be using both Augmented Dickey-Fuller (ADF) and Philip & Perron (PP) tests for a unit root. Unit root test was conducted on the raw data and later first differenced. From table (2), the outcomes from the ADF and PP test shows non-stationarity and a mixture of integrations, where some are stationary at the raw data and others at first difference.

### 3.2.2. Co-integration Test

After evaluating our stationarity results, next, we would be testing for co-integration among the variables. For the sake of this analysis, we would employ the Auto-Regressive Distribution Lag Model (Pesaran *et al.*, 2001). ARDL model is used against other co-integration models like Johansen Co-integration Model, Johansen and Juselius (1990), the Engle-Granger Co-integration, Engle and Granger (1987) and the

FMOLS model by Philips and Hansen (1990). ARDL model works perfectly irrespective of whether our variables are integrated at the level, first difference or both Pesaran (1997), while other co-integration approaches listed above only works well when our variables are integrated at the same order. Furthermore, the ARDL model produces results for both long and short run association simultaneously among our variables in a single form. Hence, the ARDL model for a long-run relationship is constructed as;

$$\begin{aligned} \Delta LRGDPT = & \sum_{i=1}^l \lambda \Delta LRGDPT - 1 + \sum_{i=1}^l \Phi \Delta LFAIDT - 1 + \sum_{i=1}^l \Omega \Delta LTRADEt - 1 \\ & + \sum_{i=1}^l \psi \Delta LINVt - 1 + \beta 1 LRGDPT - 1 + \beta 2 LFAIDt - 1 + \beta 3 LTRADEt - 1 \\ & + \beta 4 LINVt - 1 + \varepsilon t - 1 \end{aligned} \quad \text{Eq2}$$

**Where;**

$\Delta$  = Operator of the first difference.

$\Psi, \Omega, \Phi, \lambda$  = Variables short run coefficients

$\varepsilon$  = Error term.

The long run variables where estimated and test using the F statistics (Pesaran, 1997). Hence, the long run hypothesis of co-integration would be estimated as;

$$H_0: \beta 1 = \beta 2 = \beta 3 = \beta 4 = 0$$

$$H_1: \beta 1 \neq \beta 2 \neq \beta 3 \neq \beta 4 \neq 0$$

Pesaran *et al.*, (1997) estimated 2 categories of critical values; lower bound and upper bound critical values (cv) which assume variables are integrated at I(0) and I(1) respectively. Upper bound critical values are (3.77, 4.35, and 5.61 at 1%, 5% and 10% significant levels respectively), while lower bound cv are (2.72, 3.23, and 4.29 at 1%, 5% and 10% significant levels respectively).

However, the decision of existence of co-integration between RGDP per capita and ODA holds if our computed F-statistics > Upper bound Pesaran (cv). Hence rejecting the  $H_0$  while no co-integration is considered when F-stat < lower bound critical value (Pesaran, 1997).

After the long-run relationship is determined, the Error Correction Model (ECM) is incorporated to determine the existence of a short-run relationship among the variables using the short run coefficients and the ECT.

Hence, incorporating the ECM model into our ARDL model would result to;

$$\begin{aligned} \Delta LRGDPT = & \sum_{i=1}^l c1 \Delta LRGDPT - 1 + \sum_{i=1}^l c2 \Delta LFAIDt - 1 + \sum_{i=1}^l c3 \Delta LTRADEt - 1 \\ & + \sum_{i=1}^l c4 \Delta LINVt - 1 + \omega ECTt - 1 + \varepsilon t - 1 \end{aligned}$$

Eq3

**Where:**

$\Delta$  = Operator of the first difference



**c1, c2, c3, c4** = represents the variables short run coefficients

**ECT<sub>t-1</sub>** = denotes the speed at which our model adjusts to long-run equilibrium following the short run shock.

In other to verify whether the ARDL models are well specified, we conduct the diagnostic tests of serial correlation (LM test), stability test of CUSUM and CUSUM of square, Brown *et al.*, (1975). Finally, we would estimate the speed at which our model adjusts to long-run equilibrium following a short run shock for each individual country.

#### 4. RESULTS AND DISCUSSION

Based on the results from our descriptive statistics in Table 2, we could conclude that our variables are normally distributed with zero mean and constant variance.

**Table 2: Descriptive Statistics of Variables obtained from Niger**

NIGER				
	LTRADE	LRGDP	LODA	LINV
Mean	1.664536	2.547216	1.143935	1.192798
Median	1.641428	2.53256	1.142213	1.119789
Maximum	1.85303	2.610594	1.377634	1.589899
Minimum	1.515626	2.508058	0.940517	0.830407
Std. Dev.	0.092113	0.03221	0.099229	0.26046
Skewness	0.565211	0.685772	0.081263	0.364369
Kurtosis	2.444558	1.983734	2.966018	1.682422
Jarque-Bera	1.982964	3.642415	0.034462	2.833837
Probability	0.371026	0.16183	0.982917	0.24246
Sum	49.93607	76.41649	34.31806	35.78394
Sum Sq. Dev.	0.246061	0.030087	0.285546	1.967348
Observations	30	30	30	30

On the other hand, the test of stationarity in our variables, (displayed in Table 2 for Niger), shows that only foreign aids were stationary at I(0). The other variables were stationary at first difference, I(1). This implies that the variables are of mixed integration.

**Table 3: Show the unit root test of variables for Niger**

NIGER					
VARIABLES	LEVELS/1 <sup>ST</sup> DIFF.	ADF		PP Test	
		C	C & T	C	C & T
Foreign Aid	Level	-2.87035***	-3.68834**	-2.80560***	-3.71522**
	1st Diff	-5.324963*	-4.847750*	-7.16019*	-6.999513*
Trade Openness	Level	-0.981733	-5.381772	-1.028977	-2.058008
	1st Diff	-2.273469*	-5.409186*	-5.377609*	-5.429825*
Investment	Level	-0.183375	-1.731953	-0.269575	-1.728594
	1st Diff	-4.834355*	-4.842079*	-4.829354*	-4.832972*
GDP per Capita	Level	-1.416377	-0.417063	-1.783996	-0.604081
	1st Diff	-6.126858*	-7.339344*	-6.061272*	-11.56271*

Note: \* and \*\* denote significant levels at 1% and 5%, respectively. Results for other countries can be found in the methodology section.

As a prerequisite step, our optimal lag length selection criteria was carried out through our estimated Akaike and Schwarz Information Criteria, and results were determined from both criteria while prioritizing the Akaike Information Criterion in situations where both results are not identical. Based on 5 lag length that was selected and tested, the optimal level of lags selected for each country was Niger(2), Congo(2), Malawi(2), Burundi(1), Central Africa Republic (3). Results from these tests can be found in the appendix section.

Having selected our optimal lag lengths, the ARDL model was run for each country and the F-statistics was computed as follow; Niger (4.96\*), Congo (1.37\*), Malawi (5.84\*), Central Africa Republic (2.03). Table 4, shows the ADRL long run test result computed for Niger, while results for other countries could be found in the appendix section. The F-stat of Niger and Malawi is > Pesaran upper bound critical value, hence, long run association exists between the dependent variable (RGDP) and its regressors (LTRADE, LFAID, LINV) at 1% significant all other countries F-statistics proves otherwise.

The empirical findings obtained from estimating equation 2 implies that the series are co-integrated in Malawi, Niger, Central Africa Republic and Congo (DRC). These findings comply with the works of Dietrich and Wright (2015). However long-run co-integration was found only in the Niger and Malawi. This finding also concurred with the finding of Boone (1996) who was of the opinion that growth and investment are not affected by foreign aid in emerging economies where there is poor resource allocation.

A special case applied to Burundi, where the two Stationarity test revealed all series are co-integrated at first difference, this prompted the study to use a Johansen co-integration test for a better measure of a long-run relationship, and the test indicated one co-integrating equation in the long-run.

**Table 4: Showing results from ARDL Co-integration test for a long-run relationship**

Wald Test:			
NIGER			
Test Stat	Value	df	Prob
F-stat	4.962259	(4, 14)	0.0106
R-squared	0.702741	Mean dependent var.	-0.000852
Adjusted R <sup>2</sup>	0.447948	S.D. dependent var.	0.016585
S.E. of regression	0.012323	AIC	-5.648537
Sum squared resid	0.002126	SIC	-5.024615
Log likelihood	89.25525	Hannan-Quinn criter.	-5.463012
F-stat	2.758083	Durbin-Watson stat	2.256665
Prob(F-statistic)	0.036771		

Note: The critical values are obtained from Pesaran *et al.*, (2001). The optimal lag length is 2.

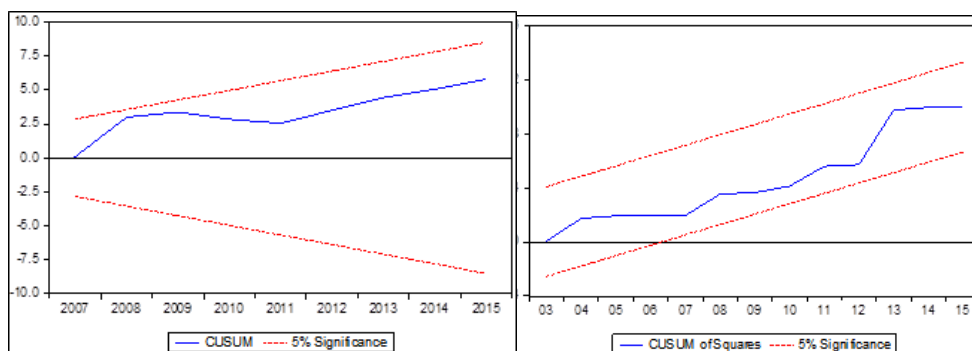
Furthermore, diagnostic test, CUSUM and CUSUM of squares and the functional form of the model was conducted for our model for each country to determine whether our model was well structured and defined. The results from this diagnostic test carried out by serial correlation LM test shows that the model is well defined.

**Table 5: Serial correction test results**

Serial Correlation: Breusch-Godfrey LM Test			
NIGER (Lag 2)			
F-stats	0.709127	Prob. F(2,12)	0.5116
Observed R <sup>2</sup>	2.85379	Prob. Chi-Square(2)	0.2401

Decision: Do not Reject H<sub>0</sub>. No serial correlation among variables.

In order to strengthen the assumption that our model is well defined, stability test results from CUSUM and CUSUM of squares constructed by Durbin and Evans (1975) (see Figure 1 for Niger), shows that there exist no structural instability since our line stays within the 5% significant level. It can be concluded that ARDL model is well defined and can be recommended for policy analysis.



**Figure 1: Showing the graphical representation of our stability test from CUSUM and CUSUM of squares**

As part of the objective of this research, the short run relationship between LR GDP and its regressors was tested by incorporating the error correction model into our standard ARDL model for each individual country (see Table 6 for Niger), the resulting F-statistics from this estimation suggests that, while there is a long run association in our model, there exist short-run relationship among variables of Congo only, all other countries proved otherwise.

**Table 6: The short-run causality test (Wald Test for Niger)**

Niger		
Variable	F-statistics	Prob.
LODA	1.137354	0.3733
LINV	0.858513	0.4889
LTRADE	0.927854	0.4571

Finally, the estimated coefficient ( $\omega$ ) of the ECT is displayed below for each country. This coefficient shows a relatively fast pace of diverging back to equilibrium after a short run disturbance. The results for Niger in Table 7 revealed that as a result of a short run shock, the variables deviating from the equilibrium will be corrected by 19% after each year.

**Table 7: Results from speed of adjustment from the ECM**

Country	Niger	Congo	CAR	Malawi	Burundi
ECT	0.1889	0.0494	0.2142	0.2539	0.00446

## 5. POLICY RECOMMENDATIONS

For the case of the underdeveloped countries, the concession that foreign aid can improve economic growth for a long period of time might lead to a decrease in investment. This is as a result of countries over-dependent on foreign aid; the focus of improving domestic investment becomes obscured and subsequently leads to poor growth and development in the long-run.

Accordingly, for economic growth to be stimulated through industrialization in Burundi, Malawi, Niger, Central Africa Republic, and Congo in the long run, investment and trade openness must be improved. Trade liberalization policies should be adopted. Africa is indeed blessed with high population and natural resources, therefore, it should create an investor-friendly environment that can attract another source of capital inflow such as foreign direct investment to prevail. This is because foreign assistance is not the only contributor to the economic growth of a nation in the long-run.

Long-run and sustainable growth can be also achieved when policy-makers develop a sound macroeconomic environment which may include; considerable foreign taxation policies, higher rates of return, cool political environment and a sound legal system to ignite both domestic and foreign investments.

Additionally, political stability is a key problem affecting virtually all African countries and political intimidations should be discouraged because it can affect investment environments in the country negatively, which can cripple growth and development in the economy.

Henceforth, governments at all levels should consider building anti-corruption institutions to reduce the magnitude of corruption in their respective regions. The government should further diverge from depending on aids in creating policies that promote investments and exports. In other to accelerate the growth rate and level of investment in the country, policies that attract investors should be put in place, especially countries like South Korea and Japan. These two countries are examples of countries that have put official assistance development into proper usage. Other developing countries like Botswana and Honduras are an example of developing countries that have benefited from foreign aid.

## **CONCLUSION**

This research set hypothesis that foreign assistance can influence economic growth of Burundi, Malawi, Niger, Central Africa Republic and Congo (DRC). This is a result of these countries being over-dependent on aid for its economic development for the past 20 years. Time series data from 1986 – 2015 were employed. real GDP per capita was estimated as the regressor while the independent variables are gross capital formation (INV), official development assistance (ODA) and trade. The study analyses the long and short run association that exists between RGDP per capita and its regressors in all five countries.

In the short run, the only gross capital formation has a significant relationship with GDP in Congo (DRC), all other countries did not display any short-run relationship between GDP and its explanatory variables. Congo (DRC) is home to some of the world largest cobalt mines which are an opportunity to export such minerals and increase economic growth. The government can use the export proceeds to continue developing capital goods. Policies that restrict government officials from absconding national resources should be put in place too.

In the long-run, only two of the five countries, Niger and Malawi, exhibited a long-run relationship between the dependent variable and its regressors. This is as a

result of the high inflow of foreign aid to these countries since the 1970s. Though these foreign aid received by these countries have shown slow impact in the short-run as seen in the annual growth rates of these countries, there has been a significant improvement in long-run over the years.

Some of the major reasons why Congo, Burundi, and the Central African Republic exhibits no long-run relationship would be due to inefficient allocation of resources, poorly structured government bureaucracy, and political instability in their respective countries.

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