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THE IMPACT OF DOMESTIC DEBT ON PRIVATE INVESTMENT IN THE GAMBIA: AN ARDL APPROACH*

Gambiya'da İç Borçların Özel Sektör Yatırımları Üzerindeki Etkileri: ARDL Yaklaşımı

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Keywords:
Private Investment, Domestic Debt, Real Interest Rate, Bounds Test, Cointegration

JEL Codes:
C22, E22, F43

Abstract

This study aims to analyse the impact of domestic debt on private investment in the Gambia by developing an investment model based on the neoclassical investment function and considered an annual time series data set from 1980 to 2013. To examine the nexus between our dependent variable, private investment and the explanatory variables, we used an Autoregressive Distributed Lag (ARDL) model. Based on the bounds test result, a long run relationship exists between our variables. Furthermore, domestic debt was found to have a negative effect on private investment in the short run but not in the long run. On the other hand, the real interest rates had a crowding-out effect on private investment in the long run but a positive effect in the short run. This study will be a guide for policymakers on formulating fiscal and monetary policies to curb the level of domestic borrowing to optimal or sustainable levels.

Anahtar Kelimeler:
Özel Yatırım, İç Borç, Reel Faiz Oranı, Sınır Testi, Eşbütünleşme

JEL Kodları:
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Özet

Bu çalışma, neoklasik yatırım fonksiyonuna dayalı bir yatırım modeli geliştirerek ve 1980-2013 yılları arasında yıllık zaman dizisi verilerini dikkate alarak iç borçların Gambiya'daki özel yatırımlar üzerindeki etkisini analiz etmeyi amaçlamaktadır. Bağımlı değişkenimiz olan özel sektör yatırımları ile bağımsız değişkenlerimiz arasındaki bağlantının incelenmesi amacıyla Gecikmesi Dağıtılmış Otoregresif Modeli (ARDL) kullanılmıştır. Sınır testi sonucuna göre değişkenlerimiz arasında uzun dönemli bir ilişki bulunmaktadır. Ayrıca, iç borcun kısa vadede özel yatırım üzerinde olumsuz bir etkisi olduğu, uzun vadede ise olumusuz bir etkiye sahip olmadığı bulunmuştur. Öte yandan, reel faiz oranlarının uzun vadede özel sektör yatırımları üzerinde dışlama etkisi olmasına karşı kısa vadede olumlu bir etkiye sahip olduğu görülmektedir. Bu çalışma, politika yapıcılar için iç borçlanma seviyesini en uygun veya sürdürülebilir seviyelere çekmek amacıyla geliştirilen maliye ve para politikaları oluşturulması konusunda bir rehber olacaktır.

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1. Introduction

After the recent financial crises in 2007-08, many Low Income Countries (LICs) including the Gambia switched from external to domestic borrowing to finance budget deficits (Bua, Pradelli and Presbitero, 2014). This move sparked the interest from academician and policy makers to study the impacts that the accumulating domestic debt might have. In a report made by the Governor of the Central Bank of The Gambia, the current domestic debt as at the end of 2015 equals a 54.2 percent of Gross Domestic Product (GDP). The governor ascribed this to the widening of the budget deficit from the US $81.8 million dollars in 2014 to USD $115.2 million dollars in 2015 (Central Bank of the Gambia [CBG], 2016). The domestic debt of the Gambia maintained an increasing trend from the mid-2000s to date. Domestic debt stood at 31 percent of GDP in 2008, 28.3 percent of GDP in 2009, 27.4 percent of GDP in 2010, 29.2 percent of GDP in 2011, 30 percent of GDP in 2012 and 54.2 percent of GDP in 2015 (CBG, 2015).

One of the reasons for the recent increase in domestic debt of the Gambia is the budget deficit. From 1997 to 2003, the Gambia's current account deficit averaged 2.5 as a percent of GDP. However, from 2004 to 2007, the current account deficit increased to an average of 11 percent of GDP (Tsikata et al., 2008). The deficit on trade of goods and nonfactor service is another factor leading to the increase of the domestic debt to GDP ratio in the Gambia. The Gambia is an import oriented country. The hefty importation and small amount of exports have led to the goods account deficit widening from USD $89.38 million in 2012 to USD $131.3 million 2015 (CBG, 2016).

The recent large fiscal disparities as a result of policy slippages and financial difficulties in public enterprises is another cause of the increase domestic borrowing. The fiscal deficit increased from 4.4 percent of GDP in 2012 to 11 percent of GDP in 2014 and fell slightly to 9.6 percent of GDP in 2015 (United Nations Development Program [UNDP], 2016). The UNDP report (2016) stated that one of the reasons why the Gambia government rely heavily on the domestic financial commercial banks to finance its budget deficit is a result of the difficulties it faces in mobilizing external funds. This inability to access external funds has piled pressure on the Central Bank to continuously issue T-bills to cater for the deficit.

The 2011 Central Bank of the Gambia annual report highlighted that private sector credit has been falling over the years and this can be explained by the increasing size of the government which may crowd out private investment (CBG, 2011). In 2007, T-bills accounted for 85.75 percent of the domestic debt and 54.5 of these T-bills were held by commercial banks (CBG, 2007). The private sector in developing countries especially the Gambia rely mainly on commercial banks' credit for a source of capital so an increasing government borrowing can limit the growth and development of private investment significantly.

The continuous increase in domestic debt may hamper the level of private investment growth in the Gambia. As Emran and Farazi (2008) stated, government borrowing from local banks reduces the amount of credit available to the private sector. The shortage of funds might lead to an increase in the cost of borrowing thereby discouraging investment. In addition to issues of high domestic debt, the Gambia suffers from the accessibility of funds and government intervention in the foreign exchange market. Given the Gambia's struggle to reduce the youth unemployment rates which currently stands at 38 percent and curb the poverty rate down from the current 48 percent according to Torchongambia (2017), it is important to have a well-

functioning private sector. That being the case, it calls for an empirical analysis of the possible impact the current domestic debt might have on private investment.

The aim of our paper is to analyze the impact of domestic debt on private investment in the Gambia. Researchers have studied private investment in developing countries in recent years but they mostly concentrate on the determinants of private investment (see Acosta and Lazo, 2004). In some cases, the nexus between private investment and economic growth was investigated (Bal and Rath, 2014; Forgha, Sama and Aquilas, 2016). Studies by Erenburg and Wohar (1995), Akomolafe, Bosede, Emmanuel and Mark (2015) and Kamundia (2015) looked at the link between public and private investment. Only a few, like Kamundia (2015) and King'wara (2014) studied the impact of domestic debt on private investment. To our knowledge, there has been no prior study on this topic on the Gambian economy. There is therefore a need to conduct an empirical analysis of the impact of domestic debt on private investment in the Gambia.

We will consider the variable private investment as our dependent variable and domestic debt, real interest rate, GDP, real effective exchange rate and bank credit to the private sector as independent variables. The study couldn't include most recent years as data on most of them are not available. A key limitation was unavailability of data on public investment. The data was not available online and neither the Ministry of Finance nor the Bureau of Statistics of the Gambia could provide it.

The rest of the paper is organized as follows. Section 2 covers the empirical literature review, Section 3 describes the methodology and data, and Section 4 analyse the findings from the dynamic model. In the final section, conclusion and policy recommendations, we summarize of our findings and lay down key policy recommendations.

2. A Brief Review of Empirical Literature

The literature on government expansionary fiscal policy financed by domestic borrowing and its impact on private investment is a new one but it has seen great attention in recent years. This is as a result of the increase in government debt as a percent of GDP. The conclusions on the impact of domestic public debt on private investment by researchers are not unanimous.

Akomolafe et al. (2015) investigated the effect of public borrowing on private investment in Nigeria using Johansen Co-integration test and a Vector Error Correction model. They found out that domestic debt crowds out private investment in the short run and in the long run. However, external debt was found to have a crowding-in effect on private investment in the long run. In another study, Kamundia (2015) examined the effect public debt on the level of private investment and economic growth in Kenya from 1980 to 2013. He employed Granger Causality and Ordinary Least Squares estimation method. The study stated that causality runs from public debt to private investment. Also, debt was detected to have a negative impact on private investment but a positive effect on economic growth.

Olweny and Chiluwe (2012) analyzed the effects of monetary policies on private investment in Keyna from 1996 to 2009 using a Vector Error Correction Model. They stated that government borrowing from the domestic banks may lead to financial crises in the credit market if there is limited liquidity in the financial market. The study found that government domestic borrowing crowds out private investment.

King'wara (2014) investigated the impact of domestic public debt on private investment for the case of Kenya from 1967 to 2007 using co-integration test. He found out that domestic debt affects private investment negatively. An increase in domestic debt crowds out private investment. He also found that interest rates affect private investment negatively. Output was found to have a positive effect on private investment. Based on this study, the author found out that public investment has not played a key role in complementing private investment in Kenya.

Asogwa and Okeke (2013) studied the effects of government deficits on private investment in Nigeria using Ordinary Least Squares and Granger Causality test. They found out that government deficits and private investment granger cause each other. They concluded that budget deficits crowd out private investments. The study recommended that budget deficits be financed by printing money.

Nabende and Slater (2003) in their study concluded that the monetary policies employed does have a significant impact on private investment. Their paper found that output growth to have to crowd in private investment only in the short-run. In another study, Abdullatif (2006) investigated the link between public sector investment and private domestic investment in a situation where the government finances its expenditures by selling bonds in a case of Japan. He found that financing deficits by issuing bonds do not crowd out private investment. He added that it might even have a crowd in effect. Therefore, he supported government increase issuance of bonds to both domestic and international market. The results also found that interest rates are not affected by increased government use of bonds to finance deficits. He stated that interest rates are not affected by government expenditure but only responds to interest rates changes in the international financial markets as a result of globalization and financial markets integration.

Majumder (2007) studied the crowding out effects of private domestic investment in Bangladesh using co-integration and the Error Correction Model to analyze an investment function comprising public borrowing, GDP and interest rate. The results show that public borrowing had a crowding-in effect on private domestic investment. The author therefore suggests that as a way for better fiscal management and avoiding inflation, the government should rely on the domestic market for borrowing instead of accumulating external debt since domestic borrowing can finance deficits without affecting private investment.

Maana, Owino and Mutai (2008) examined the impacts of domestic debt on economic growth in Kenya from 1996 to 2007. They found that high domestic debt leads to high-interest payment and eventually becoming a burden on the national budget. However, in the sequel of the financial development in Kenya during the period under study, the increase domestic borrowing did not have any negative effects on the private investment.

Coban and Tugcu (2015) looked at whether government deficits crowd out or crowd-in private domestic investment using a dynamic heterogeneous panel ARDL model for 28 countries for the period 2000-2012. They found that an expansionary fiscal policy positively affects private investment. Also, Snyder (2011) investigated if federal budget deficits cause crowding out in the United States of America (USA) using Vector Error Correction Model. He found out that government spending has crowding in effects on private investment. He lamented these results meant national borrowing has negative impacts on investment but government spending crowds in investment as stated by the Keynesian multiplier effect.

Kuştepeli (2005) investigated the effectualness of fiscal policy in terms of crowding out or crowding in effects in Turkey using Johansen cointegration test. The results show that government spending crowds in private investment whilst government deficits had a crowding out effect. Majeed and Khan (2008) studied the relationship between private and public in Pakistan using a panel data for the period 1970-2006. They found that public investment crowds out private investment. They explained that government borrowing squeezes the private sector for credit and therefore affects it long term productivity.

Xu and Yan (2014) investigated if government investment crowd out private investment in China using structured Vector Autoregressive (sVAR) analysis. They divided government investment into placement in public goods and infrastructure and placement in private industry and commerce. They concluded that placement in public goods crowds in private investment whilst placement in private goods crowds out private investment. These means government investment in private goods does not complement private investment in China.

Mahmoudzadeh, Sadeghi and Sadeghi (2013) looked at the effect of fiscal spending on private investment both in developing and developed countries using a panel data for the time period 2000-2009. They found that government capital formation expenditure crowd in private investment in both developing and developed countries. However, the complementary effect was greater in developed countries. They also concluded that fiscal deficits had crowded in effect on private investment in developed countries but crowding out effect on private investment in developing countries. Though, the effects were minimal in both set of countries.

In another study, Nazmi and Ramirez (1997) studied public and private investment and their effects on the economic growth in Mexico. They concluded that whereas public investment has a affirmative impact on economic growth, there was a significant crowding out effect on private investment.

Afonso and Jalles (2011) looked at the linkages between investment and fiscal policies in 95 countries during the time period 1970-2008. They found that total government expenditure and public investment crowds in private investment. However, government consumption spending had a negative effect on private investment. Interest payment had a negative effect on both public and private investment whilst government spending on health play a complementary role in enhancing private investment in emerging economies.

Şen and Kaya (2014) in their study examined the effect of government spending on private investment in Turkey from 1975 to 2011 to see if there exist any crowding out or crowding in effects. They found that government current transfer spending, government current spending and government interest spending had a crowd out effect on private investment. However, government capital spending was found to crowd in private investment within the time under study.

3. Estimation Methodology and the Data

An ARDL model is a dynamic model which uses lags of the explained and explanatory variables to estimate the short-run effects and also the long-run equilibrium relationship between the variables using one single equation.

For our empirical study, we developed an ARDL model based on a modified neoclassical investment function to examine the dynamic relationship between the explained variable private investment and explanatory variables:

$$PIV = f(GDP, DD, RINT, BCPS, REER) \quad (1)$$

From the investment function above, *PIV* presents private investment, *DD* represents Domestic debt, *GDP* represents the Gross Domestic Product, *RINT* represents real interest rate, *BCPS* represents bank credit to private sector and *REER* represents real effective exchange rate.

The choice of the model and variables was motivated by previous studies on the topic by Adofu and Abula (2010) who studied domestic debt in the Nigerian Economy and King'wara (2014) who studied the effect of domestic public debt on private investment for the case of Kenya. In their papers, they constructed an investment model with GDP growth, interest rates and domestic debt as the explanatory variables.

The model, equation (2) is simply constructed to capture the nexus between private investment and variables that impact on it.

$$lnPIV_t = \beta_0 + \beta_1 lnDD_t + \beta_2 lnGDP_t + \beta_3 RINT_t + \beta_4 BCPS_t + \beta_5 REER_t + \epsilon_t \quad (2)$$

To study the short run and long run relationship between our variables, the equation (2) is transformed into an Error Correction Model form of the ARDL model. This is represented by equation (3) below.

$$\begin{aligned} \Delta lnPIV_t = \beta_0 &+ \sum_{i=1}^{n1} \beta_{1i}\, \Delta lnPIV_{t-i} + \sum_{i=0}^{n2} \beta_{2i}\, \Delta lnDD_{t-i} + \sum_{i=0}^{n3} \beta_{3i}\, \Delta lnGDP_{t-i} \\ &+ \sum_{i=0}^{n4} \beta_{4i}\, \Delta RINT_{t-i} + \sum_{i=0}^{n5} \beta_{5i}\, \Delta BCPS_{t-i} + \sum_{i=0}^{n6} \beta_{6i}\, \Delta REER_{t-1} \\ &+ \delta_7 piv_{t-1} + \delta_8 dd_{t-1} + \delta_9 gdp_{t-1} + \delta_{10} rint_{t-1} + \delta_{11} bcps_{t-1} \\ &+ \delta_{12} reer_{t-1} + u_t \end{aligned} \quad (3)$$

One of the main reason for using the ARDL model estimation technique is to employ the bounds test. It helps in examining the long run relationship between our variables. The bound test by Pesaran and Shin (1999) is employed to test for co-integration in an ARDL model.

From the equation (3), the coefficients $\delta_7, \delta_8, \delta_9, \delta_{10}, \delta_{11}, \delta_{12}$ represents the long run relationship in the model. To perform the bounds test on the equation (3) given the long-run coefficients, the F-statistics will be used to test the following hypothesis:

$H_0: \delta_7 = \delta_8 = \delta_9 = \delta_{10} = \delta_{11} = \delta_{12} = 0$ Null hypothesis of no co-integration against the alternative

$H_1: \delta_7 \neq \delta_8 \neq \delta_9 \neq \delta_{10} \neq \delta_{11} \neq \delta_{12} \neq 0$ existence of a co-integration.

The result of bounds test provides a joint F-statistic, lower bound critical values and upper bound critical values. To test the hypotheses above, we examine the calculated F-statistics against the critical values. If the estimated F-statistics is greater that the upper bound critical value, we reject the null hypothesis H_0 and finalize that our variables are co-integrated.

However, if the F-statistic falls below the lower bound critical values we cannot reject the null hypothesis H_0. That will mean there is no long run relationship between our variables.

After confirming the existence of a long-run relationship between our variables from the bounds test, we can then move on to estimating the long and short-run coefficients. To this end, equation (1) is transformed to capture the short-run dynamics as can be seen in the equation (4).

From the equation (1), we derive an Error Correction Model to help us measure the short run impacts of the private investment model.

$$\Delta lnPIV_t = \alpha_0 + \sum_{i=1}^{m1} \partial i\, \Delta lnPIV_{t-i} + \sum_{i=0}^{m2} \delta_i\, \Delta lnDD_{t-i} + \sum_{i=0}^{m3} \theta_i\, \Delta lnGDP_{t-i} + \sum_{i=0}^{m4} \tau_i\, \Delta RINT_{t-i} + \sum_{i=0}^{m5} \gamma_i\, \Delta BCPS_{t-i} + \sum_{i=0}^{m6} \emptyset_i\, \Delta REER_{t-1} + \lambda EC_{t-1} + \mu_t \quad (4)$$

The equation above represents the short run dynamics of ARDL error correction form. The lags of our explained and explanatory variables are captured.

The study relied on secondary sources for data collection. Data was collected from the World Bank online database and the International Monetary Fund database. The series are in annual frequency starting from 1980 to 2013. The name of the variables and how they are represented in the estimated model are as follows; ln PIV is Private Investment (Constant LCU), ln GDP is GDP (constant LCU), ln DD is Domestic Debt (current LCU), RINT is Real interest rate (%),BCPS is Bank Credit to Private Sector (% of GDP), REER is Real effective exchange rate index (2010 = 100)

After establishing the long-run relationship between our variables, we move on to test for the short-run dynamics as in equation (4). The short run dynamic is adjusted to capture a one period lag of the error correction term. The Error Correction term EC_{t-1} is the speed of adjustment parameter which explains the rate at which our variables return to their long run equilibrium after an exogenous shock. A negative Error Correction term signifies effective feedback. That is there is a quick convergence to the long run equilibrium after a disequilibrium or shock. A positive Error Correction term means a slower feedback or divergence from the long run equilibrium after a shock. If the Error Correction terms is zero, then there is no adjustment.

4. Empirical Results and Analysis

Prior to the estimation of our econometric model it is vital for us to examine the series for a unit root, structural breaks and other issues that can be found in time series data. This will help us in deciding which econometric estimation technique is most suitable.

Numerous unit roots test techniques are available for stationarity testing. However, for our paper we will employ the Augmented Dickey-Fuller (ADF) test. This method is considered superior to many other unit root tests methods as it has the attribute of taking care of possible autocorrelation problems by adding lagged difference of the explained variables. The Philip-

Perron (PP) is also another popularly used unit root testing technique. It also solves autocorrelation issues in the error term. However, the ADF is the most popular and widely used technique. The results of the ADF test to examine the stationarity and other properties of our variables are summarized in Table 1.

Table 1. Unit Root Test Results

ADF Unit Root on the Level Series

Variables	Model (1) No Constant and No Trend	Model (2) Constant and No Trend	Model (3) Constant and Trend	Oder of Integration
LPIV	0.752744	-1.070271	0.1198	
LDD	0.495441	-2.415559	-3.902751**[b]	I(0)
LGDP	1.0000	-0.088326	-3.912043**[b]	I(0)
RINT		-9.744529***[c]	-9.197323***	I(0)
REER	1.308894	-0.038031	-2.552908	
BCPS	-1.405060	-4.295368***	-1.184550	

ADF Unit Root on the First Differenced Series

Variables	Model (1) No Constant and No Trend	Model (2) Constant and No Trend	Model (3) Constant and Trend	Oder of Integration
LPINV	-6.630396***	-6.728205***	-6.598101	I(1)
LDD	-8.766796***	-8.702585***	-8.606676***	
LGDP	-3.393086***	-6.717572***[c]	-6.609967***	
RINT		-8.923430***	-9.197323***	
REER	-2.926482***	-3.454875***	-3.522346**	I(1)
BCPS	-4.578018***	-1.251813	-5.044812***	I(1)

Source: Authors's computation

Note: From authors's estimation with data sample 1980-2013. *** represents significance at 1% while ** is significance at 5%.*is significance at 10% the letter c represents the intercept or drift and b signifies the presence of a trend.

The results from the ADF test found that the series are integrated of different orders. The variables LDD, LGDP and RINT are integrated of order *I(0*). That is, they are stationary at their levels. On the other hand, LPIV, REER and BCPS are integrated of the *I(1)*-that is-first difference had to be taken for them to be stationary.

After observing the graphs of all the variables, the presence of a break in 1986 was detected for the variable real interest rate (RINT). Therefore, the Unit Root Breakpoint test method was used to test for its stationarity. The break dummy was found to be significant proving the presence of the break. The variable was found to be stationary at the level.

After confirming the order of integration of our variables, we confirmed that no variable is integrated of the order *I(2).* Also, we have a mix of *I(0)* and *I(1).* Therefore, since we want to estimate the short run and long run relationship between our variables an ARDL model will be the appropriate model for our study. We therefore move on to estimate an ARDL model.

6250 models were evaluated and the ARDL (2, 3, 4, 3, 4, 4) was chosen from the estimated ARDL model. It is imperative that we examine how well other models performs in terms of minimizing the AIC. This procedure is important as it will help us use a model with Gaussian error terms. That is, error terms without non-normality, autocorrelation or

heteroscedasticity problems. The main selection criterions used are Akaike Information Criterion (AIC), Schwarz Bayesian Criterion (SBC) or Hannan-Quinn Criterion (HQC). The results can be found in Graph 1.

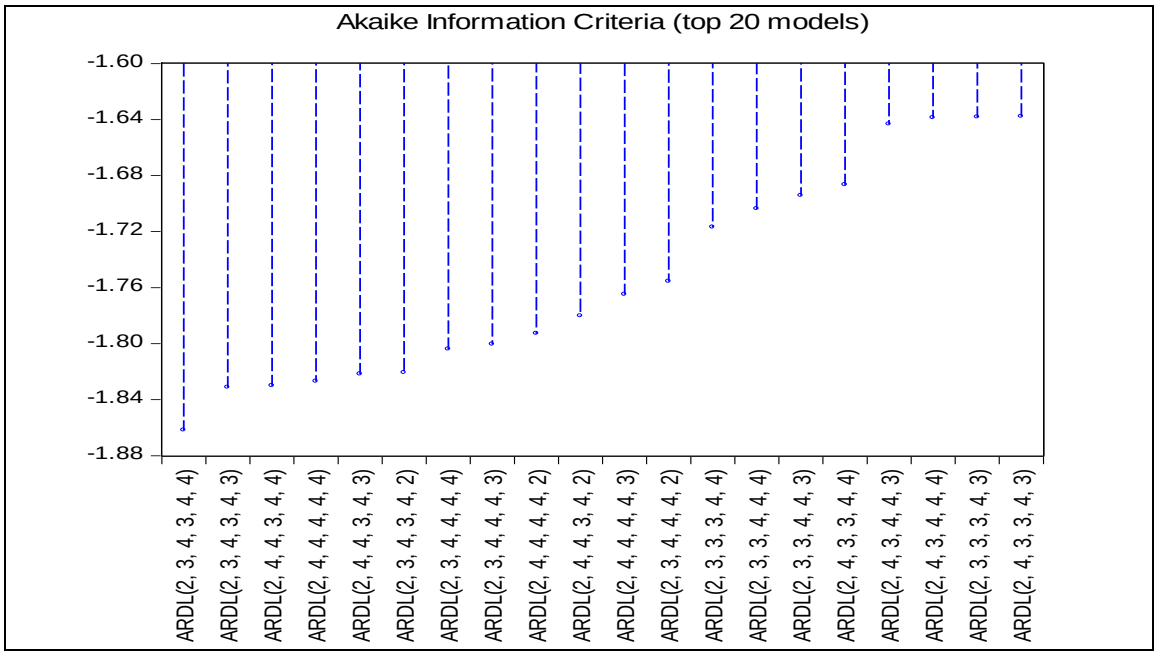

Figure 1. Criteria Graph
Source: Authors's computation from the estimated ARDL (2, 3, 4, 3, 4, 4)

One of the main aims of an ARDL model estimation technique is to test for a long run relationship between variables using the bounds test. The bounds test approach to cointegration examines the existence of a long-run relationship between our series. From our ARDL (2, 3, 4, 3, 4, 4) model, we run the bound test based on the equation (3). The bounds test structure contains comparison of the generated F-statistics and the critical values.

Table 2. ARDL Bounds Test

Test Statistic	**Value**	**k**
F-statistic	3.937982	5
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	2.08	3
5%	2.39	3.38
2.5%	2.7	3.73
1%	3.06	4.15

Source: Authors's estimations.
Note: The results are from the ARDL (2, 3, 4, 3, 4, 4) model

The null hypothesis of our bounds test as stated previously is that there exist no long run relationship between our variables and it is tested against the existence of a long-run

relationship. From the bound test results below, we have an F-statistics of 3.937982. Comparing that to the critical values, we can reject the null hypothesis of no long-run relationship as the F-statistics value exceeds the 2.5% critical value for the upper bound. We reach that there exist a long run relationship between our variables.

After confirming the long run relationship between our variables, we proceed on to estimate the long run coefficients. Based on the equation (3) we estimated this relationship. The results are summarized in Table 3.

Table 3. Long Run Coefficient Estimation of ARDL (2, 3, 4, 3, 4, 4)

Dependent Variable: LPIV

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LDD	0.195611	0.123217	1.587528	0.1876
LGDP	0.619762	0.640101	0.968224	0.3878
RINT	-0.045849	0.027329	-1.677676	0.0687*
BCPS	-0.044910	0.019862	-2.261087	0.0866*
REER	-0.011200	0.029405	-0.380890	0.7226
C	5.058559	15.637073	0.323498	0.7625

Source: Authors's computation

Note: * means significance at 10 percent level. The results are from the ARDL (2, 3, 4, 3, 4, 4) model.

The results from Table 3 show that domestic debt has a positive relationship with private investment in the long run. However, the probability of its coefficient is not significant at 10 percent level of significance. Therefore, we fail to reject the null hypothesis of no long run relationship.

Gross Domestic product was also found to have a positive long-run relationship with private investment. However, the probability is not significant at the 5 percent level. So, we fail to reject the null hypothesis of no long-run relationship.

Real interest rate was found to have a negative long run relationship with private investment. The results show that a 1 percent increase in real interest rates will lead to a 4 percent decrease in private investment. The coefficient of the real interest rates was found to be significant at the 10 percent level of significance. Most importance, the negative effect of interest rate signifies the crowding out effects on private investment as a result of increase interest rates.

Bank credit to private sector (BCPS) has a negative and significant impact on private investment in the long run. The coefficient is (-0.044910). This explains the reduction of private investment as a result of the fall in bank credit to the sector as a result of the increased commercial bank lending to the government in the form of T-bills and other government securities.

Real effective exchange rate (REER) had a negative effect on private investment in the long run. A 1 percent increase in the real effective exchange rate will lead to an 11 percent decrease in private investment. However, the P-value of real exchange rate is not significant at the 5 percent level. Therefore, we don't reject the null hypothesis and conclude that real effective exchange rate does not affect private investment in the long run.

Based on equation (4), we estimated the short run impact of our explanatory variables using the ARDL Vector Error Correction Model (VECM) Approach. The results are summarized in Table 4.

Table 4. ARDL Short Run Relationship Estimation

Dependent Variable: LPIV				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
D(LPIV(-1))	0.650447	0.152699	4.259674	0.0131
D(LDD)	-0.102375	0.023280	-4.397596	0.0117
D(LDD(-1))	-0.370758	0.046762	-7.928657	0.0014
D(LDD(-2))	-0.212226	0.032233	-6.584085	0.0028
D(LGDP)	-2.099826	0.555388	-3.780828	0.0194
D(LGDP(-1))	0.711924	0.468131	1.520778	0.2030
D(LGDP(-2))	-2.825261	0.548577	-5.150159	0.0067
D(LGDP(-3))	2.771388	0.575836	4.812808	0.0086
D(RINT)	0.007319	0.002944	2.485896	0.0678
D(RINT(-1))	0.061339	0.007660	8.007340	0.0013
D(RINT(-2))	0.027691	0.004329	6.397203	0.0031
D(BCPS)	0.058305	0.014292	4.079501	0.0151
D(BCPS(-1))	0.176908	0.024017	7.365987	0.0018
D(BCPS(-2))	0.182047	0.022181	8.207241	0.0012
D(BCPS(-3))	0.064351	0.013475	4.775564	0.0088
D(REER)	-0.008757	0.009628	-0.909499	0.4145
D(REER(-1))	-0.061634	0.010452	-5.896552	0.0041
D(REER(-2))	-0.016888	0.010899	-1.549503	0.1962
D(REER(-3))	0.014859	0.009198	1.615530	0.1815
CointEq(-1)	-0.357012	0.182461	-7.868588	0.0014
Cointeq = LPIV - (0.1956*LDD + 0.6198*LGDP -0.0458*RINT -0.0449 *BCPS -0.0112*REER + 5.0586)				

Source: Authors's Computation
Note: Based on author's estimation. The results are from the estimated ARDL (2, 3, 4, 3, 4, 4) model.

The results from Table 4 show that previous period private investment has a positive effect on current private investment. The effect is positive (0.650447) and is statistically significant at the 5 percent level. A 1 % increase in private investment in the previous period will lead to a 65 percent increase in private investment in the current period or short run.

It can also be seen that domestic debt (DD) had a negative effect on private investment in the short run not only in the current period but in the past three periods. The effect is strong and statistically significant for all the three periods. A 1 % increase in domestic debt, will lead to a 10%, 37% and 21% decrease in private investment in the current, first lag and second lag respectively in the short run.

Gross Domestic Product (GDP) has a negative and statistically significant effect on private investment in the current and two periods back. The first lag was found to be statistically insignificant. However, in the effect in the third lag was positive (2.771388) and statistically significant. The effect of GDP on private investment is relatively weak.

Real interest rates (RINT) was found to have a positive effect on private investment. The effect is not strong in the current period as the current lag is not significant at the 5 percent level

but significant only at the 10 percent. However, the preceding two legs were found to have positive coefficients and statistically significant p-values.

Bank credit to the private sector (BCPS) had a positive effect on private investment in the short run. The short run relationship is strong as all the p-values of the three-period lags were statistically significant even at 1 percent level. When commercial banks increase credit to the private investment by 1% private investment increases by 6%, 18%, 18% and 6% in the first lag, second lag, third lag and first lags respectively.

The real effective exchange rate (REER) had a negative effect on private investment in the short run. The current period had no statistically effect however the second lag was negative and statistically significant. The short run relationship between real exchange rate and private investment exist but it is weak with the effect fluctuating with different lags.

We have seen from the bound test results that there exist a long run relationship between our variables. The error correction term will be used to examine the speed of recovery of variables back to their long-run equilibrium after there is a shock. The error correction term (EC_{t-1}) is generated from the ARDL model by considering the cointegration and long-run coefficients. A negative error correction term coefficient means there is a quick return to long-run equilibrium after there is a shock. However, when we have a positive error correction term it means our variables do not return to their long-run state or it takes a long time before convergence to their long-run equilibrium.

From the Table 4, we have an EC term coefficient of (-0.357012). The ECT is negative and its P-value is significant. This proves the existence of a cointegrating relationship between our variables. There is a quick recovery to the long run equilibrium after a shock. From the ECT, we can say after exogenous shock disturbs the equilibrium condition, 35 percent of the correction is completed in the first period.

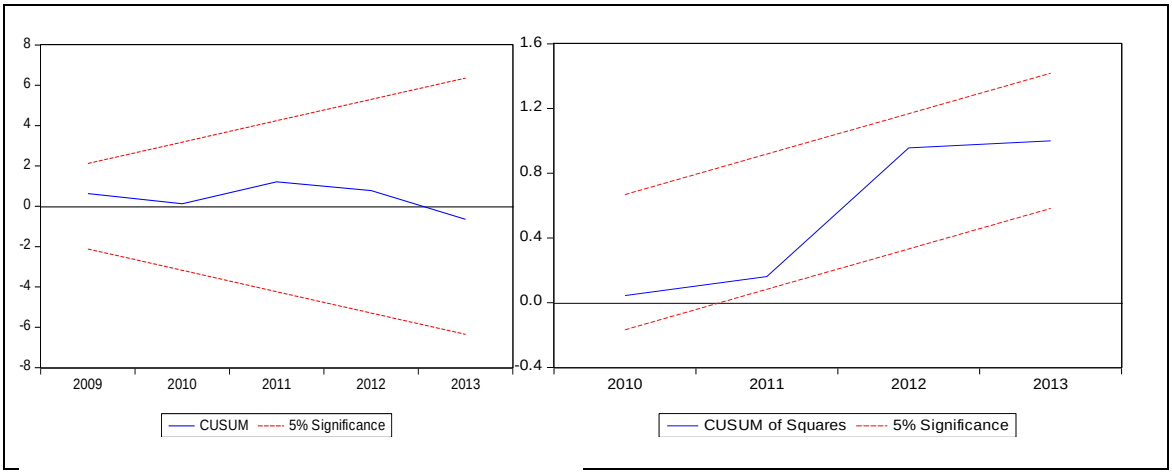

Figure 2. CUSUM TEST and CUSUM of Squares
Note: *Plot CUSUM and CUSUM of Squares tests result from author's estimation results of the ARDL (2, 3, 4, 3, 4, 4) model*

For our ARDL equation (3) and (4), we use the CUSUM and CUSUMQ to examine their stability both in the short run and in the long run. The results can be seen in Figure 2. From

Figure 2, we found no evidence of a structural break in our model and at 5 % level of significance, we can strongly state that our model is stable and the estimated results are reliable and valid.

5. Conclusion and Policy Recommendations

The findings showed that domestic debt affects private domestic investment negatively in the short run but not in the long run. The negative effect of domestic debt on private investment is in line with the classical economists view. This crowding out effect can be evaluated as a result of the fact that commercial banks are motivated to investment in government securities which have lower risks and higher returns compared to extending loans to the private sector. The Central Bank monetary committee highlighted the shortage of funds to the private sector due to the heavy domestic borrowing. However, the trend keeps increasing due to huge government expenditures leading to huge deficits.

The results showed that Gross Domestic Product affects private investment negatively in the short run but the impact in the long run is not statistically significant. It is not surprising that we have a negative short-run effect because the GDP of the Gambia over the years has been highly volatile with internal shocks from agriculture and tourism as a result of poor rains and ebola virus in the region affecting economic growth adversely. Low output signals low economic performance to prospective investors.

Empirical evidence showed that real interest rates affect private investment positively in the short run and negatively in the long run. The continuous government borrowing from banks coupled with the huge outstanding debt on the T-bills plus the shortage of funds have pushed interest rate at business killing rates. The local banks are willing to lend to the government but at very high-interest rates. This increase in interest rates affects the private sector negatively as the high-interest rates imply a high cost of capital. This is what is referred to as crowding out of private investment.

The bank credit to the private sector is found to have a positive and negative effect on private investment in the short run and long run respectively. This is another evidence of crowding out of private investment. Even though over the years the number of banks in the Gambia has increased, the credit to the private sector has been moderate.

The real effective exchange rate has a negative effect on private investment in the short run. On the other hand the impact in the long run was statistically insignificant. The exchange rate of the Dalasi is highly volatile. Also, compared to all major currencies the value of the Dalasi is low. The negative effect the real exchange rate has on private investment is not surprising as the value of a country's currency can be used to measure its economy's strength and the Gambia's Dalasi has not been doing quite well.

Based on the empirical findings, the study made the following recommendations. First and foremost, the prime task of the government is to settle the currently outstanding stock of domestic debt. After doing this, there will be room for conducting favorable monetary policy. One way that the government can cut on its stock of domestic debt is using external debt to pay for the outstanding domestic stock of domestic debt. Another way is by setting up donor funds which will be used to pay for the domestic debt.

Second, the government of the Gambia should revive its lost revenue base and also try to create new avenues for raising funds to finance deficits instead of relying heavily on domestic borrowing. With the new government in place, funds from donors and external debt will go a long way in helping the economy regain its strength. The privatization of Agricultural sector will also be a good move in helping the economy reduce its trade deficit through increased exports. The government can create avenues to motivate investors to come and invest in agriculture given the fertile lands. This will not only create jobs and output in the agricultural sector but it will allow for the export of agricultural products.

Finally, to be able to formulate proper debt sustainability policies there ought to be ready and update data on the debt structure. The stock of domestic debt, maturity, currency and type of holders should be known. However, until now, the data on domestic debt is one of the most challenging things to access. The Gambia Bureau of Statistics and the Central Bank of Gambia should work together towards providing data on debt and other related variables.

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Appendices

Table A.1. Breusch-Godfrey Serial Correlation LM Test

F-statistic	1.414461	Prob.	0.4142
Obs*R-squared	17.57486	Prob.	0.0905

Note*: authors's estimation from the results of the ARDL (2, 3, 4, 3, 4, 4) model*

Table A.2. Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.393651	Prob.	0.9351
Obs*R-squared	21.33028	Prob.	0.6741

Note*: authors's estimation from the results of the ARDL (2, 3, 4, 3, 4, 4) model*

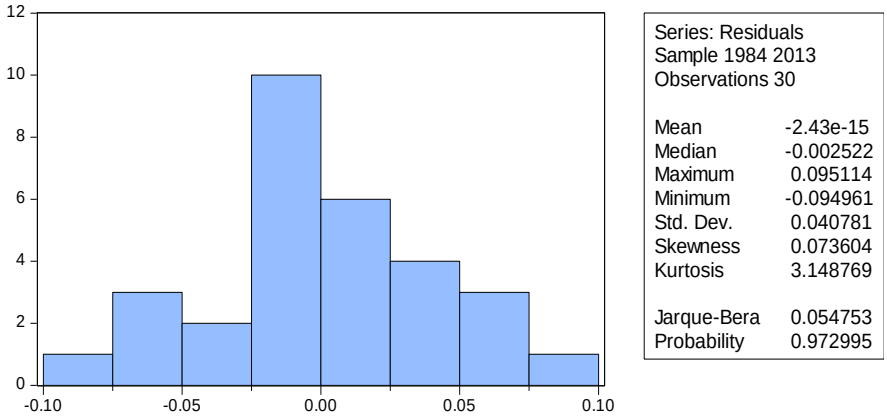

Figure A1. Normality Test Result
Source: Authors's computation
Note: Authors's estimation from the results of the ARDL (2, 3, 4, 3, 4, 4) model