

## **An Analysis of the Relationship between Public Spending Components and Private investments in Nigeria**

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**Abstract:** This paper examined the relationship between components of public spending and private investments in Nigeria for the period 1981 to 2010. Utilizing an error correction modeling procedure, the study revealed that components of public spending have different impact on private investment both in the long run and the short run. Specifically, recurrent and government final consumption expenditure had positive (crowd-in) effect on private investment while capital expenditure had negative (crowd-out) effect on private investment. Thus, the study recommended that greater emphasis should be placed on capital expenditure.

**JEL Classifications:** H50, H54

**Keywords:** capital expenditure; credit to private sector; foreign direct investment; government final consumption expenditure; recurrent expenditure

### **1. Introduction**

The role of the government in accelerating economic growth has come under intense controversy since the emergence of Keynes in the 1930s. On the one hand, opponents of fiscal policy argued that government spending may hinder economic growth, due to the impact of raising tax on individual and firm. Such increase in individual and firm tax reduces aggregate demand and reduces profitability as well as investment of firms. This therefore impact negatively on potential investment and long run growth (Blejer & Khan, 1984). Opponents of fiscal policy also argued that government spending may impact negatively on private investment, if government finances it spending through borrowings from banks. Such borrowings culminates in a raise in interest rates which consequently affects the cost of capital for the private sector from banks and thereby crowd out (compete away) private investment with adverse affect on economic growth. In contrast, proponents of fiscal policy advocated that government spending crowd-in private investment. For instance, given the low rate of national savings and gross shortage of essential facilities (such as education, electricity, roads, among other) especially in developing countries and which are prerequisite for investment climate and growth, there is the need for government to provide such investment-enhancing essentials that can spur economic growth. Relatedly, the role of government in the remarkable sustained growth achieved by the newly advanced countries (especially Japan and China) has also been cited as the importance of government in spurring economic growth. Furthermore, the rapid response of various governments especially in the form of bailout to the (2007/2008) financial crisis, have also portrayed the importance of government spending as a stimulus to enhancing private investment.

Apart from the above controversy on the impact of aggregate government spending on private investment, there also exists an unresolved issue on the relationship between components of

government spending and private investment. It is also argued in the literature that components of government spending may have differential impact on private investment. Some component may compliment (crowd in) private investment and so enhance economic growth while others may substitute (crowd out) private investment and thus adversely affect economic growth (Majeed & Khan, 2008). In this regard, Mamatzakis (2001) noted that public investment had a positive effect on private investment while government consumption had negative effect on private investment. In addition to Mamatzakis (2001), studies such as Laopodis (2001), Karagöl (2004), Ahmed and Miller (1999), and Levine and Renelt (1992) among others also examined the relationship between components of government spending and private investment. These studies have however produced divergent results. Although plethora of endogenous studies (see Paiko, 2012; Amassoma *et al.*, 2011; Nurudeen & Usman, 2010; Ekpo, 1995 among others) exist on the relationship between government spending and private investment, these studies failed to take into account the relationship between government final consumption expenditure and private investment (domestic credit and foreign direct investment) in their analyses. It is against this backdrop that this study seeks to examine to what extent has the component of government spending (taken into account government final consumption expenditure) crowd-in or crowd out private investment in Nigeria from 1981 to 2010.

In addition to the introduction, section two presented a review of related studies while section three discussed the methodology on which this study is based. Section four presented the analysis of empirical results while section five discussed summary and policy recommendations.

## 2. Literature Review

The emergence of Keynes in the 1930s, consequent to the great depression, ushered vast theoretical and empirical discussion on the relationship between government spending and macroeconomic variables. Some of the studies that have examined this relationship are reviewed herein. Inuwu (2012) examined the relationship between government expenditure and economic growth in Nigeria over the period 1961 to 2010. This study employed the bounds test co-integration based on unrestricted error correction model and pairwise causality test. The study observed that there exist no long run relationship between government expenditure and economic growth in Nigeria only when real gross domestic product is taken as dependent variable. Thus, the study therefore recommended that any reduction in capital expenditure would have a negative repercussion on economic growth in Nigeria.

Amassoma *et al.* (2011) examined the link between the components of government spending and economic growth in Nigeria using data from 1970 to 2010. The result of the study showed that expenditure on agriculture had a significant influence on economic growth while expenditure on education, health and transport and communication had insignificant influence on economic growth. Consequent to the findings, the study suggested the need for a reversal in declining budgetary allocation to the educational and health sector in order to provide the sectors with the needed revenue necessary in influencing aggregate output of the economy. In addition, the study recommended the need to redirect the excessive expenditures of government on its officials in both the house of senate and house of representative to these pivotal sectors that are capable of stimulating the growth of the Nigerian economy.

Udoh (2011) examined the relationship between public expenditure, private investment and agricultural output in Nigeria over the period 1970 -2008. The bounds test and autoregressive distributed lag (ARDL) modeling approach was used to analyze both short and long run impacts of public expenditure, private investment (both domestic investment and foreign direct investment) on agricultural output growth in Nigeria. The study observed that foreign investment has insignificant impact in the short run. The study recommended that policymakers should combine both private

and public investment in a complementary manner to ensure that both short and long run productivity of the agricultural sector is not undermined.

Nurudeen and Usman (2010) examined the relationship between government expenditure and economic growth in Nigeria for the period of 1970-2008. Using co-integration and error correction method, the study observed that government spending may slow down private investment. Okpara and Nwaoha (2010) examined the relationship between government expenditure, money supply, prices and output in Nigeria for the period 1960 to 2006. Using the two-stage least square methods, the study observed that money supply is a positive and significant function of prices and also granger causes price with no reverse or feedback effect. The study therefore recommended that government should step up its expenditures with strong supervision and control to ensure that budgeted fund is actually committed to its proper use.

Oladoyin (2010) examined the relationship between investment in education and economic growth in Nigeria from 1977 to 2007. The study used a Johansen co-integration technique and error correction methodology. The findings have strong implication on educational policy in Nigeria. The study recommended that concerted effort should be made by policymakers to enhance educational investment in Nigeria in order to accelerate growth which would engender economic development.

Ahmad and Qayyum (2008) examined the effect of government spending and macro-economic uncertainty on private investment in service sector for the period 1972 to 2005. The private investment model for services sector is estimated using the three steps methodology. These steps include univariate statistical analysis of a time series, multivariate co-integration analysis and the estimation of the long-run private investment function by using the Johansen maximum likelihood method. The study revealed that government recurrent expenditures mostly appeared as substitutes to private investment and affect private investment in services negatively in the long run. The study recommended the need for appropriate interest rate policy, taken into cognizance the investment climate and the targeted sector of the economy, in order to courage private investment. The study also recommended that expansion in the size of the market and the enhancement of purchasing power of the people are also needed to encourage private investment in the services sector.

Busari and Amaghionyeodiwe (2007) examined the relationship between the private investment and political instability in Nigeria for the period of 1990 to 2000. Utilizing an ordinary least square method, the study observed that political instability does not have any significant direct impact on private investment. Thus, the study recommended that political framework that doesn't negatively affect aggregate spending will be favorable to private investment. Ekpo (1995) examined the relationship between public investment and private investment. In particular, the study attempted to determine the influence of different categories of public expenditure on private investment. The study isolated infrastructure expenditure (which is social services expenditure that does not compete with private investment. Social services crowd in private investment while expenditure in real activities like manufacturing and construction crowd out private investment. This strongly suggests that the private sector is better placed to invest in construction and manufacturing. The study also revealed that capital expenditure on agriculture positively influence investment, while capital expenditure on education and health exerts positive impact on private investment.

From above review, it was observed that literature exist on the relationship between aggregate government spending and private investment and also between components of government spending and private. However, these studies failed to examine whether or not government final consumption expenditure crowd-in or crowd-out private investment in Nigeria. Thus, this study fills this gap among endogenous literature by examining the relationship between components of government spending (taken into cognizance government final consumption expenditure) and private investment in Nigeria.

### 3. Research Methodology

#### 3.1 Data Measurement and Sources

This study examined the relationship between components of government spending and private investment in Nigeria. Data on components of government expenditures (capital expenditure (CAP), recurrent expenditure (REC) and government consumption expenditure (GCE)), interest rate (INR) and gross domestic product (GDP) are obtained from the Central Bank of Nigeria (CBN) statistical bulletin 2010 edition. Private investment is measured by credit to the private sector (CPS) and foreign direct investment (FDI). Data on CPS are obtained from the CBN statistical bulletin 2010 edition while data on FDI are obtained from the World Bank database. All variables with exception to interest rate are transformed into logarithms form.

#### 3.2 Method of Analysis

To examine the short run and the long run relationship between components of government spending and private investment, this study utilized the co-integration and Error-Correction Methodology (ECM) methods. The co-integration approach provides information about the long run relationship between the variables while the error-correction method provides information about the short-run relationship between the variables. The error correction term provides information on the speed of adjustment from the short run disequilibrium to the long run equilibrium in the event of any deviations from the long run equilibrium.

#### 3.3 Model Specification

In examining the relationship between components of government spending and private investment, this study expressed a simple model as:

$$PRV_{it} = f(CAP_t, REC_t, GCE_t, ITR_t, GDP_t) \quad (1)$$

Where  $i$  in equation (1) refer to credit to private sector and foreign direct investment; and subscript “ $t$ ” refers to current time. Linearizing equation (1), we obtain:

$$\ln PRV_{it} = \alpha_0 + \alpha_1 \ln CAP_t + \alpha_2 \ln REC_t + \alpha_3 \ln GCE_t + \alpha_4 \ln GDP_t + \alpha_5 ITR_t + \varepsilon_t \quad (2)$$

$\alpha_0$ , is intercept,  $\alpha_1$  to  $\alpha_5$  are the slope of the coefficients of the independent variables to be determined while  $\varepsilon_t$  is the error term at time  $t$ . Equation (2) is the long run regression equation to obtain the long run relationship between the variables. In order to estimate the short-run relationship among variables in equation (2), the corresponding error correction equation is estimated as follows:

$$\begin{aligned} \Delta \ln PRV_t = & \alpha_0 + \sum_{i=1}^n \alpha_1 \Delta \ln PRV_{t-i} + \sum_{i=1}^n \alpha_2 \Delta \ln CAP_{t-i} + \sum_{i=1}^n \alpha_3 \Delta \ln REC_{t-i} + \sum_{i=1}^n \alpha_4 \Delta \ln GCE_{t-i} \\ & + \sum_{i=1}^n \alpha_5 \Delta \ln GDP_{t-i} + \sum_{i=1}^n \alpha_6 \Delta ITR_{t-i} + \psi ECT_{t-1} + \varepsilon_t \end{aligned} \quad (3)$$

The  $ECT_{t-1}$  is the error correction term of the short run equation.

## 4. Empirical Result

#### 4.1 Unit Root Test

To examine the time series properties of  $\ln cap$ ,  $\ln rec$ ,  $\ln gce$ ,  $\ln gdp$ ,  $\ln fdi$ ,  $\ln cps$  and  $\ln itr$ , the Augmented Dickey Fuller (ADF) and Phillip-perron (PP) tests were applied and the results are presented in

table 1 below. The table revealed that all the variables were not stationary at levels but became stationary after first differencing, indicating that the variables are of order one. The findings of the ADF test was confirmed by the PP test on the second half of table 1.

**Table 1.** Unit root test

Augmented Dickey-Fuller (ADF) Test				Phillip-Perron (PP) Test		
Variables	Level	1 <sup>st</sup> / 2 <sup>nd</sup> Diff	Status	Level	1 <sup>st</sup> / 2 <sup>nd</sup> Diff	Status
lcap	-0.5590	-5.4905*	I(1)	-0.5418	-5.4904*	I(1)
lrec	-0.3972	-7.7877*	I(1)	-0.1791	-8.0971*	I(1)
lgce	0.2998	-4.7777*	I(1)	0.1456	-4.8397*	I(1)
lgdp	0.9375	-3.2165**	I(1)	1.9065	-3.0756**	I(1)
lfdi	-0.0887	-10.6272*	I(1)	-0.9946	-10.8671*	I(1)
lcps	1.4075	-3.9397*	I(1)	2.6384	-3.7562*	I(1)
itr	-2.5731	-5.5525*	I(1)	-2.5002	-7.0578*	I(1)

Note: \*=1% and \*\*=5% significance level.

#### 4.2 Co-Integration Estimate

With respect to models I and II (that is, credit to the private sector and foreign direct investment models) respectively, it was revealed from table 2 below that the null hypothesis of no co-integration, for  $r=0$  was rejected by the trace statistic and the maximum-eigen statistic. The statistic values of both the trace and maximum-eigen statistics in both models were greater than their critical values at  $r=0$ . However, the null hypothesis of no co-integration at  $r \leq 1$  could not be rejected by both the trace and the maximum eigen-value statistics because their statistic values were less than their critical values. This result therefore indicates that there is one co-integrating equation by the maximum eigen-value statistics and the trace statistics. The implication of this is that there is the possibility of a long run relationship between credit to private sector and component of government spending in model I and between foreign direct investment and component of government spending in model II.

**Table 2.** Summary of the co-integration estimate

	Trace Test				Maximum Eigen value Test			
	Null	alternative	Statistics	95% critical values	Null	alternative	Statistics	95% critical values
Model I	$r=0$	$r \geq 1$	80.866	69.818	$r=0$	$r=1$	46.527	33.877
	$r \leq 1$	$r \geq 2$	34.339	47.856	$r \leq 1$	$r=2$	17.521	27.584
	$r \leq 2$	$r \geq 3$	16.818	28.797	$r \leq 2$	$r=3$	11.811	71.132
	$r \leq 3$	$r \geq 4$	5.008	15.495	$r \leq 3$	$r=4$	4.910	14.265
Model II	$r=0$	$r \geq 1$	77.380	69.818	$r=0$	$r=1$	40.383	33.877
	$r \leq 1$	$r \geq 2$	36.996	47.856	$r \leq 1$	$r=2$	21.117	27.584
	$r \leq 2$	$r \geq 3$	15.879	28.797	$r \leq 2$	$r=3$	8.342	71.132
	$r \leq 3$	$r \geq 4$	7.537	15.495	$r \leq 3$	$r=4$	6.267	14.265

Source: Author's Computation, 2012

### 4.3 Long-Run Estimate between Component of Government Spending and Private Investment

The co-integration estimate for the two models (that is credit to the private sector and foreign direct investment) reported above, showed the existence of long run co-integration relationships among the variables. The long-run co-integrating equation in each model is presented below.

*Model I: Long Run Co-integration Equation on Credit to Private Consumption:*

$$LCPS_t = -9.054 - 0.055LCAP_t + 0.546LREC_t + 0.362LGCE_t - 0.020ITR_t + 0.907LGDP_t + \varepsilon_t$$

SE:	(0.103)	(0.127)	(0.102)	(0.014)	(0.340)
t:	[-0.535]	[4.289]***	[3.547]***	[-1.433]	[2.668]**

The long run equation on credit to private sector as a measure for private investment showed that there is a negative and insignificant relationship between government capital expenditure and private investment in the long run while a positive and significant relationship exists between government recurrent expenditure and private investment and also between government final consumption expenditure and private investment in the long run. The implication of the above result is that government capital expenditure crowd out private investment (a one percent increase in government capital expenditure would reduce private investment by 5.5 percent) while government recurrent expenditure and government consumption expenditure crowd in private investment (a one percent increase in government recurrent expenditure and government consumption expenditure would enhance private investment by 54.6 percent and 36.2 percent respectively) in the long run.

*Model II: Long Run Co-integration Equation on Foreign Direct Investment:*

$$LFDI_t = -11.479 - 0.025LCAP_t - 0.425LREC_t + 0.358LGCE_t + 0.057ITR_t + 2.581LGDP_t + \varepsilon_t$$

SE:	(0.256)	(0.316)	(0.254)	(0.034)	(0.845)
t:	[-0.096]	[-1.345]	[1.411]	[1.673]	[3.055]**

The long run equation on foreign direct investment as a measure of private investment showed that government capital (LCAP) and recurrent expenditures (LREC) had negative relationship with foreign direct investment while government consumption expenditure had positive relationship with foreign direct investment. This simply implies that government capital and recurrent expenditures crowd out foreign direct investment while government consumption expenditure crowd in foreign direct investment. However, t-values of government capital, recurrent and final consumption expenditures showed that the coefficients of these variables were insignificant.

In addition to the long run estimate, this study also examined the short run relationship between components of government expenditures and private investment in Nigeria by utilizing the short run error correction model of equation (3). Before, analyzing the short run regression estimate, the stationarity property of the residuals from the long run estimates were examined and the result is presented on table 3.

A key criterion for the estimation of the short run estimate (or error correction model) is that the residual from the long run estimate must be stationary at levels and at five percent. Thus, using the Augmented Dickey Fuller and the Phillip-Perron tests, it was revealed that the residuals from both model were stationary at levels (that is integrated of order zero) and at one percent significant level. Consequently, this study proceeded to estimating the short run relationship between components of government expenditure and private investment in Nigeria.

**Table 3.** Residual stationarity test

Augmented Dickey-Fuller (ADF) Test			Phillip-Perron (PP) Test	
Variables	Level	Status	Level	Status
Resid-cps	-6.5967*	I(0)	-6.5967*	I(0)
Resid-fdi	-3.8824*	I(0)	-3.8532*	I(0)

Note: \*=1% significance level.

#### 4.4 Short Run Estimate

Following the residual stationarity tests, we over parameterized the first differenced form of the variables in equation (3) and used Schwarz Information Criteria to guide parsimonious reduction of the model. This helps to identify the main dynamic pattern in the model and to ensure that the dynamics of the model have not been constrained by inappropriate lag length specification. The lag length on all variables in each model is set at two to ensure sufficient degrees of freedom.

With respect to the parsimonious regression estimate capturing the short run analysis, it was observed from tables 4 and 5 that there was a significant improvement in the parsimonious models over the over-parameterized models (see appendix). From the table, it was observed that the various models were fit and appropriate for the analysis. The adjusted R-squared of the models ranged from about 0.77 percent (credit to private sector) to 0.73 percent (Foreign Direct Investment); suggesting that a relatively high proportion of variations in private investment was explained by the explanatory variables in the models. The high and significant value of the F-Stat further confirmed the fitness of the model. The Durbin Watson Statistics in both models were close to 2.0 (ranging from 1.75 (credit to the private sector) to 1.97 (Foreign Direct Investment)). The robustness of the models estimates were further ascertained by carrying out various diagnostic tests on the residual of the ECM model; namely the histogram and normality test, the serial correlation LM test and the ARCH LM Test. The Jarque-Bera statistic from the histogram and normality test on both models were insignificant (see appendix), implying that the residual from the error correction model is normally distributed. More so, both the Serial Correlation and ARCH LM tests confirmed that there is no serial correlation in the residuals of the ECM regression (see appendix). This is because the F-statistics of both tests on all the five models were insignificant. This showed that there are no lagged forecast variances in the conditional variance equation. In other words, the errors are conditionally normally distributed, and can be used for inference (Nwachukwu & Odigie, 2009).

The coefficients of error correction term in both models were both statistically significant at one percent and negative. The negative sign of the error correction term indicates a backward movement toward long run equilibrium from short run disequilibrium. The speed of adjustment ranged from about 69% to 132%. With respect to the credit to private sector model (see table 4), it was observed that the first lagged value of credit to private sector, current and second lagged values of government recurrent expenditures had significant influence on current credit to private sector while the current and second lagged values of government consumption expenditure had insignificant influence on current credit to the private sector at five percent significant level. Thus, with respect to the significant variables, a one percent increase in the first lagged values of credit to the private sector and the current government recurrent expenditure would crowd in private investment (that is, current credit to private sector) by 69.7 percent and 42.4 percent respectively while a one percent increase in the second lagged value of government recurrent expenditure would crowd-out current credit to private investment by 17.2 percent.

**Table 4.** Parsimonious short run regression estimate on credit to private sector

Variables	Coefficient	Std. Error	t-Statistics	Probability
C	0.0314	0.0427	0.7350	0.4718
ECM(-1)	-0.6994	0.1204	-5.8090	0.0000
$\Delta$ LCPS(-1)	0.6975	0.1276	5.4680	0.0000
$\Delta$ LREC	0.4240	0.0667	6.3591	0.0000
$\Delta$ LREC(-2)	-0.1721	0.0764	-2.2528	0.0370
$\Delta$ LGCE	0.1211	0.0595	2.0358	0.0568
$\Delta$ LGCE(-2)	-0.1299	0.0619	-2.0982	0.0503
$\Delta$ ITR	-0.0067	0.0055	-1.2327	0.2335
$\Delta$ LGDP(-1)	-0.2528	0.3070	-0.8236	0.4209
Adjusted R <sup>2</sup>	0.7749	S.D dependent Var:		0.1658
S.E of Regression	0.0787	F-Statistic		12.1898
D.W Stat	1.75	Prob. (F-Statistic)		0.0000

**Table 5.** Parsimonious short run regression estimate on foreign direct investment

Variables	Coefficient	Std. Error	t-Statistics	Probability
C	-05613	0.1989	-2.8216	0.0129
ECM(-1)	-1.3184	0.2280	-5.7822	0.0000
$\Delta$ LFDI(-2)	0.2456	0.1232	1.9932	0.0648
$\Delta$ LCAP(-1)	0.3324	0.2417	1.3754	0.1892
$\Delta$ LCAP(-2)	0.2397	0.2836	0.8453	0.4112
$\Delta$ LREC(-1)	0.4877	0.2884	1.6912	0.1115
$\Delta$ LREC(-2)	1.0346	0.3507	2.9498	0.0099
$\Delta$ LGCE	0.5013	0.2525	1.9855	0.0657
$\Delta$ ITR	0.0370	0.0235	1.5733	0.1365
$\Delta$ ITR(-2)	-0.0562	0.0264	-2.1291	0.0502
$\Delta$ LGDP	3.8955	2.3310	1.6711	0.1154
$\Delta$ LGDP(-1)	-2.7404	1.7646	-1.5530	0.1413
Adjusted R <sup>2</sup>	0.7288	S.D dependent Var:		0.6159
S.E of Regression	0.3208	F-Statistic		7.3514
D.W Stat	1.97	Prob. (F-Statistic)		0.0003

In addition to the foregoing, the foreign direct investment model (see table 5) revealed that, only the second lagged value of government recurrent expenditure had significant effect on current foreign direct investment while the effect of other variables on foreign direct investment in the model were observed not to be significant at five percent level. Specifically, table 5 showed that, one percent increase in the second lagged value of government recurrent expenditure would crowd in current foreign direct investment by about 103 percent.

The import from the above findings is that in the short run, the components of government expenditure in Nigeria impact differently on private investment, with the impact on credit to private sector greater than that of foreign direct investment. This therefore corroborates the argument raised at the introductory section that components of government spending impact private investment differently. The finding of this study is also in line with the study by Karagol (2004).



## 5. Conclusion and Policy Recommendation

This paper examined the relationship between components of public spending and private investments in Nigeria for the period 1981 to 2010. The components of government spending include capital expenditure, recurrent expenditure and government final consumption expenditure while private investments were measured by credit to the private sector and foreign direct investment. The long run regression estimate showed that credit to private sector as a measure for private investment had a positive and significant relationship with government recurrent expenditure and government final consumption expenditure while a negative and insignificant relationship existed between credit to private sector and government capital expenditure in the long run. With respect to foreign direct investment as a measure of private investment, the long run estimate showed that the components of government expenditure (capital, recurrent and final consumption expenditures) had insignificant effect on foreign direct investment in Nigeria.

In addition, the short run estimate showed that the first lagged value of credit to private sector, current and second lagged values of government recurrent expenditures had significant influence on current credit to private sector while current and second lagged values of government final consumption expenditure had insignificant influence on current credit to the private sector at five percent significant level. With respect to foreign direct investment, the short run estimate showed that only the second lagged value of government recurrent expenditure had significant effect on current foreign direct investment while other variables in the model had insignificant effect on foreign direct investment.

The implication of the above findings is that in Nigeria, the components of government spending especially recurrent and government final consumption expenditures had greater impact on domestic investment (that is credit to private sector) than on foreign investment. Base on these findings, the study recommended that greater emphasis should be placed on capital expenditure. This is because one of the reasons for the insignificant response of foreign direct investment might be due to the insignificant impact of capital expenditure. Thus, increase capital expenditure (such as expenditures on provision of adequate electricity and water supply, good motorable roads, etc) would act as incentive and motivation for investment especially on foreign investment. More so, utmost caution should be taken by the Nigerian government, such that future expenditures of the government do not crowd out private investment especially domestic investment.

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**Appendix A:****Table A1.** Over-parameterized model of credit to the private sector

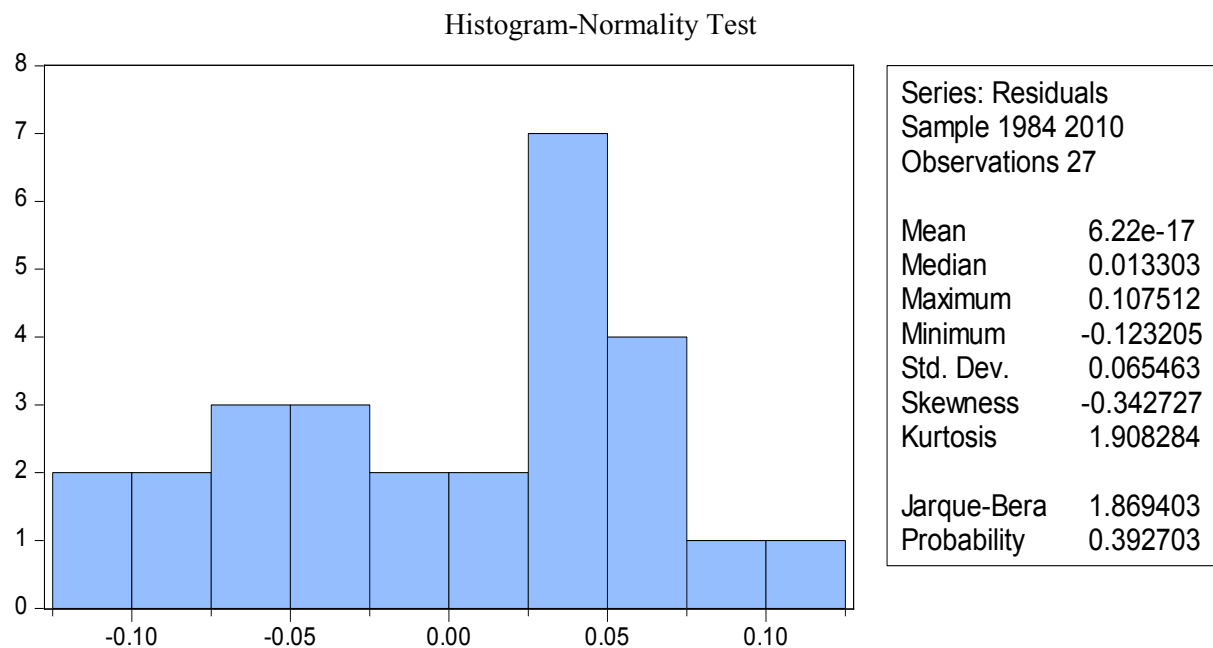
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.017338	0.079447	0.218232	0.8327
ECM(-1)	-0.640431	0.385061	-1.663195	0.1348
DLCPS(-1)	0.751084	0.289663	2.592960	0.0320
DLCPS(-2)	-0.177161	0.326186	-0.543128	0.6018
DLCAP	-0.034136	0.089874	-0.379824	0.7140
DLCAP(-1)	-0.019253	0.091923	-0.209448	0.8393
DLCAP(-2)	0.057457	0.081491	0.705073	0.5008
DLREC	0.471093	0.148663	3.168868	0.0132
DLREC(-1)	0.014667	0.160969	0.091117	0.9296
DLREC(-2)	-0.100620	0.148107	-0.679374	0.5161
DLGCE	0.170929	0.101857	1.678124	0.1318
DLGCE(-1)	-0.074477	0.192287	-0.387319	0.7086
DLGCE(-2)	-0.059316	0.141348	-0.419643	0.6858
DITR	0.001345	0.011894	0.113066	0.9128
DITR(-1)	-0.016567	0.012547	-1.320399	0.2232
DITR(-2)	-0.002071	0.011382	-0.181985	0.8601
DLGDP	-0.086810	0.743002	-0.116836	0.9099
DLGDP(-1)	0.640912	0.758726	0.844721	0.4228
DLGDP(-2)	-0.780913	0.669080	-1.167144	0.2768
R-squared	0.880471	Mean dependent var		0.250706
Adjusted R-squared	0.611530	S.D. dependent var		0.165840
S.E. of regression	0.103363	Akaike info criterion		-1.510119
Sum squared resid	0.085472	Schwarz criterion		-0.598234
Log likelihood	39.38661	Hannan-Quinn criter.		-1.238968
F-statistic	3.273848	Durbin-Watson stat		1.992121
Prob(F-statistic)	0.045836			

**Table A2.** Over-parameterized model of foreign direct investment

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.645189	0.335475	-1.923211	0.0907
ECM(-1)	-1.659566	0.580067	-2.860991	0.0211
DLFDI(-1)	0.102773	0.411384	0.249823	0.8090
DLFDI(-2)	0.247190	0.262589	0.941356	0.3741
DLCAP	0.184708	0.319488	0.578139	0.5791
DLCAP(-1)	0.480917	0.368914	1.303601	0.2286
DLCAP(-2)	0.505595	0.435768	1.160237	0.2794
DLREC	-0.305013	0.543931	-0.560756	0.5903
DLREC(-1)	0.487771	0.501000	0.973594	0.3588
DLREC(-2)	0.887946	0.513525	1.729119	0.1220
DLGCE	0.481301	0.390657	1.232029	0.2529
DLGCE(-1)	0.123954	0.476575	0.260095	0.8014
DLGCE(-2)	0.070500	0.462682	0.152372	0.8827
DITR	0.055723	0.047459	1.174141	0.2741
DITR(-1)	0.004390	0.044767	0.098059	0.9243
DITR(-2)	-0.032872	0.041887	-0.784784	0.4552
DLGDP	5.650530	3.377622	1.672931	0.1329
DLGDP(-1)	-3.423541	3.184379	-1.075105	0.3137
DLGDP(-2)	-0.877325	2.479359	-0.353851	0.7326
R-squared	0.868412	Mean dependent var		0.104045
Adjusted R-squared	0.572338	S.D. dependent var		0.615931
S.E. of regression	0.402794	Akaike info criterion		1.210227
Sum squared resid	1.297941	Schwarz criterion		2.122112
Log likelihood	2.661934	Hannan-Quinn criter.		1.481378
F-statistic	2.933092	Durbin-Watson stat		1.626667
Prob(F-statistic)	0.061994			

## Appendix B: Diagnostic Tests

### B1: Credit to the Private Sector Model



#### Breusch-Godfrey Serial Correlation LM Test

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F-statistic	2.067698	Prob. F(2,16)	0.1590
Obs*R-squared	5.545244	Prob. Chi-Square(2)	0.0625

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#### Heteroskedasticity Test: ARCH

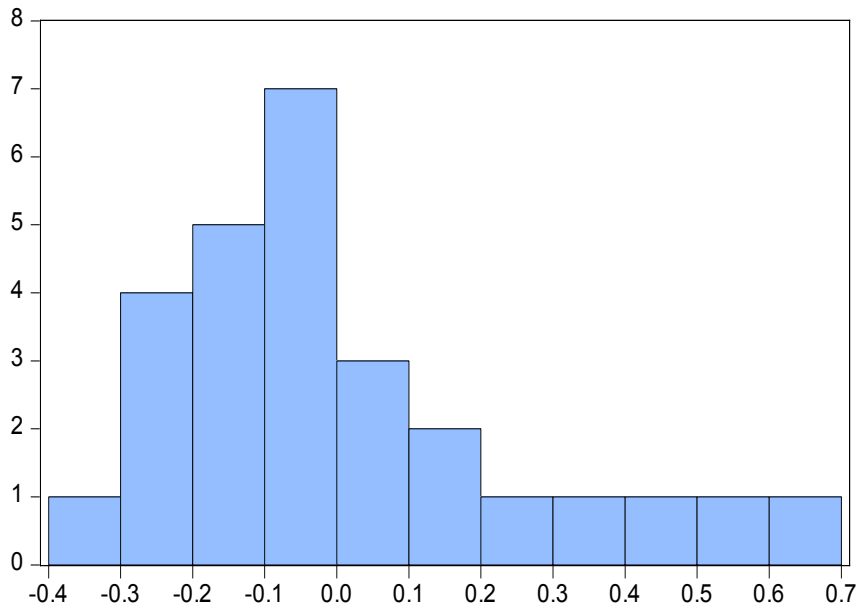
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F-statistic	0.002058	Prob. F(1,24)	0.9642
Obs*R-squared	0.002230	Prob. Chi-Square(1)	0.9623

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**B2: Foreign Direct Investment Model**

Histogram-Normality Test



Series: Residuals	
Sample 1984 2010	
Observations 27	
Mean	5.09e-17
Median	-0.063407
Maximum	0.604921
Minimum	-0.355428
Std. Dev.	0.243639
Skewness	1.013330
Kurtosis	3.351864
Jarque-Bera	4.760050
Probability	0.092548

Breusch-Godfrey Serial Correlation LM Test

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F-statistic	0.130884	Prob. F(2,13)	0.8785
Obs*R-squared	0.532941	Prob. Chi-Square(2)	0.7661

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Heteroskedasticity Test: ARCH

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F-statistic	0.619979	Prob. F(1,24)	0.4388
Obs*R-squared	0.654730	Prob. Chi-Square(1)	0.4184

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