THE RESPONSE OF OUTPUT OF MANUFACTURING SECTORTO ECONOMIC GROWTHIN NIGERIA: AN ARDL BOUND TEST APPROACH

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ABSTRACT

This study empirically investigated the long-run response of output of manufacturing sector to economic growth of Nigeria. The study used annual time series secondary data extracted from Central bank of Nigeria (CBN) statistical bulletin from 1986-2013. Ex-post facto *research design was adopted and Autoregressive distributed lag (ARDL) bound test employed. Findings indicate that there is no long run relationship between output of manufacturing sector and economic growth in Nigeria. Based on these findings, it was recommended among others that operating environment of the manufacturing sector should be made conducive so that cost of doing business in Nigeria will be reduced. The government should ensure adequate power supply so as to reduce the use of generators, and good roads to reduce accidents which lead to loss of the goods on transit.*

***KEY WORDS**: Output of Manufacturing; Gross Domestic Product; Interest rate; ARDL Model*

1.0 INTRODUCTION

The manufacturing sector is believed to offer a lot to solving the problems of unemployment in the country.A boost in manufacturing production offers prospects of a growing availability of manufactured products, increased employment, greater efficiency and improved balance of payments. Hence, the need to promote a virile manufacturing sector has continued to be a major concern of most governments worldwide.

The manufacturing sector, being a capital intensive sector, with longer gestation period and return on investment (ROI) needs special attention and treatment to maintain favourable business environments and promote economic growth of the country. The low share of the manufacturing sector in GDP reflects long- standing problems of competiveness. The loss of competitiveness of Nigerian industry appeared during the oil boom period of the early 1970’s with resulting real appreciation of the exchange rate which led to surge in imports. The inability to compete with imports can also be traced to high cost of production caused by poor infrastructure and a deficient business environment. The problems include power shortages, poor transport infrastructure, widespread insecurity and crime, lack of access to finance, corruption and inefficient trade facilitation institutions.

Empirical evidence showed that the share of manufacturing value added in the gross domestic product (GDP) was only 3.2 percent in 1960. Manufacturing production rose to annual average rate of 25.6 percent between 1974 and 1977, while its share of GDP increased from 5.4 percent in 1977 to 13 percent in 1982. After this time manufacturing activities dropped sharply as a result of a fall in foreign exchange inflows which weakened the ability of manufacturers to import needed inputs. As a result of this development, manufacturing output fell by an average of 3 percent between 1981 and 1986 and the share in GDP fell to 5.9, 5.5, 6.9, and 6.2 percent in 1989, 1991, 1993, and 1998 respectively while overall manufacturing capacity utilization rate fluctuated downwards to 32.4 percent in 1998. In spite of the spirited efforts made to boost manufactured exports under SAP, the sub sector did not make any significant contribution to the growth of the economy (Chizea, 2002.).In view of these,the researcher resolved toascertain the long run relationship between manufacturing output growth and economic growth of Nigeria using data for the periods of 1986-2013.The remaining part of this paper is divided into review of empirical literature for part two, methodology for part three, Data presentation, analysis and interpretation of results for part four, and Conclusion and recommendations for part five.

2.0 REVIEW OF EMPIRICAL LITERATURE

Economic Growth and the Manufacturing sector, has been studied In Latin America, for example, Libanio (2006) discussed the importance of manufacturing industry for the growth trajectories of developing countries from a Kaldorian perspective. The author focused on the relationship between manufacturing output growth and economic performance from Kaldorian perspective using simple regression analysis. Result indicated a close relationship between the growth of the manufacturing output and the growth of gross domestic product (GDP) in Latin America.

Obute (2012) assessed the impact of interest rate deregulation on economic growth in Nigeria. The objective of the research were to establish the relationship that exists between deregulated interest rates and economic growth through savings and investment in Nigeria, and also to make a comparative analysis between the impact of regulated and deregulated interest rates on economic growth in Nigeria. It was hypothesized that interest rates deregulation do not have significant influence on economic growth in Nigeria. The research used Time series data, sourced mainly from Central Bank of Nigeria (CBN) bulletin and World Bank data base. Four separate models were estimated to capture the relationship between; Real Deposit Rate (RDR) and Total Savings (TS) (Model 1), Real Lending Rate (RLR) and investment (INV) (Model 2), INV and economic growth (Model 3), and, RLR and economic growth (RGDP) (Model 4) for both the deregulation era (1987-2009) and the regulation era (1964-1986). The study revealed that RDR does not have significant impact on total savings before and after the deregulation exercise, RLR also does not have significant impact on investment before and after the deregulation exercise, investment has a positive and significant impact on economic growth before and after the deregulation of interest rate, and, RLR does not have a significant impact on economic growth before and after the deregulation exercise.

Imoisi (2012) studied the impact of interest and exchange rates on the Nigerian economy from 1975-2008. Data for the variables were collected from the CBN statistical bulletin. The study employed the ordinary least square (OLS) technique in the analysis but due to the fact that data are not stationary, a unit root test was employed; it further resorted to co-integration analysis which establishes the existence of a long run relationship between the variables in the models. From their findings they discovered that an increase in interest rate retards investment and subsequently economic growth; and the lag one of exchange rate shows the expected positive sign, implying that depreciation in exchange rate retarded growth from 1975 to 2008. Thus, interest and exchange rates exerted negative impact on the Nigerian economy during the period under review.

Irungu and Muturi (2015) used descriptive statistics, correlation and multiple regression analysis to examine the relationship between macroeconomic variables and financial performance of firms quoted in the energy and allied sector in the Nairobi Securities Exchange. The authors considered macroeconomic variables such as inflation rate, Exchange rate, Gross Domestic

Product (GDP), Interest rate and stock index. They used annual time series data extracted from Central Bank of Kenya, Kenya National Bureau of Statistics and published annual financial statements from the NSE for the period of 2009 to 2014, and found out that macroeconomic factors have pronounced influence on the financial performance of firms quoted in the energy and allied sector in the Nairobi Securities Exchange.

Olweny and Omondi (2011) sought to find out the influence of macroeconomic factors on the performance of the stock market. The study employed ordinary least squares (OLS) multiple regression analysis and discovered that foreign exchange rate, interest rate and inflation rate have a significant effect on stock return volatility.

Ochieng and Oriwo (2012) empirically examined the relationship between macroeconomic variables and all share index on NSE. Macroeconomic indicators were operationalized as interest rate, inflation rate and 91 day Treasury bill rate. Multi linear regression analysis was applied and the study found that there is a negative significant relationship between 91 Treasury bill rate and stock return. Moreover, there was an inverse significant relationship between inflation rate and stock returns.

Tawose (2012) investigated the effect of bank loans andadvanceson industrialperformance in Nigeria between1975 and 2009. Co-integration and Error Correction technique was adopted for the analysis. The results showed that industrial performance co-integrated with all the identified explanatory variables. Industrial sector as dependent variable is proxied by real GDP, while Commercial Banks' Loan and Advances to Industrial Sector (BLM), Aggregate Saving (SAV), Interest rate(INT), Inflation Rate (INF) are the independent variables. This suggests that the behavior of real Gross Domestic Product contributed by industrial sector in Nigeria is significantly explained by the commercial banks' loan and advances to industrial sector, aggregate saving, interest rate and inflation rate. The findings implies that every action towards infrastructural development, strengthening of commercial banks, deregulation of interest rate, encouragement of saving among rural dwellers and reduction of inflation rate will boost the performance of industrial sector significantly. Prominent among the obstacles facing the performance of manufacturing sector in Nigeria is the lack of effectively bank credits to the manufacturing sector of the economy. The banks especially the commercial ones have not been contributing effectively to the output of manufacturing sector of the economy. This study takes into cognizance the problems of manufacturing the range of one understanding of something, or awareness of something) Sector in Nigeria. Besides, it looks into the various economics effects of inefficiency of bank credits to the manufacturing sector in Nigeria over the period of 1989-2009, using the Nigerian data set. The study employed the ordinary least square regression method.

Obamuyi, Eden, and Kayode (2011) investigated the effect of bank lending and economic growth on the manufacturing output in Nigeria using multiple regression model. They used times series data covering a period of 36 years (1973-2009). They employed co integration and vector error correction model (VECM) techniques. The findings of the study showed that manufacturing capacity utilization and bank lending rates significantly affect manufacturing output in Nigeria. However, the relationship between manufacturing output and economic growth could not be established in the country.

Osoro and Ogeto (2014) analyzed the effects of macroeconomic fluctuations on the financial performance of manufacturing firms in Kenya. They used secondary data extracted from the Nairobi Stock Exchange and the Kenya National Bureau of Statistics; 2003-2012. Using the multivariate regression model, theauthors among other findings provided enough evidence that foreign exchange, interest rate and inflation rate have significant effects on the performance of the firms in the construction and manufacturing sectors in Kenya.

Njoroge (2013) investigated the relationship between interest rate and firm performance among listed companies in NSE. The study employed judgmental sampling technique to select all companies which were actively trading in 2008 to 2013 and ordinary least squares(OLS) regression analysis. The findings revealed a positive but not significant relationship between interest rate and return on equity.

3.0 METHODOLOGY

The dynamic Autoregressive Distributed Lag (ARDL) bound test model for data series which are integrated was used. Relevant diagnostic tests such as unit root test, autocorrelation test, and other higher diagnostic tests were considered. Annual time series secondary data for the period of 1986-2013 was used. The data was extracted from the central bank of Nigeria (CBN) statistical bulletin Research design adopted was *ex-post facto* since the study is relied on historical data.

The basic unit ADF root model (Dickey and Fuller, 1979; 1981) is specified as follows:

$$Y_t = Py_{t-1} + e_t \quad - \quad - \quad - \quad - \quad - \quad - \quad - \quad - \quad - \qquad (3.1)$$

Where,

P = 1

However, the researcher regressed Y_t on its (one period) lagged value y_{t-1} and find out if estimated p is statistically equal to 1.Additional lag terms were also included to ensure that the errors are uncorrelated. The decision was based on 5% level of significance.

The ARDL is specified thus:

$$Ln(OMS)_t = \alpha_o + \alpha_1 Ln(GDP)_{t-1} + \alpha_2 Ln(INTR)_{t-1} + \sum \beta_1 Ln(OMS)_{t-i} + \sum \delta_1 Ln(GDP)_{t-i} + \sum \theta_2 Ln(INTR)_{t-i} + \varepsilon_t \quad - \quad - \quad - \quad - \quad - \quad - \quad - \quad - \qquad (3.2)$$

Where,

Ln(OMS) = *Output of Manufacturing sector, the dependent variable*

Ln(GDP) = *Gross Domestic Product, the independent variable*

Ln(INTR) = *Interest rate, control variable*

α_0 = *Constant term*

α_1 = *Partial slope or the coefficient GDP in the regression equation.*

α_2 = *Partial slope or the coefficient INTR in the regression equation.*

e_t = *Random error associated with the model*

Ln = *Log transformation operator*

t = *time*

4.0 PRESENTATION OF DATA AND ANALYSIS OF RESULTS

4.1 Presentation of Data

The annual time series data on output of manufacturing sector gross domestic product and interest rate for the periods (1986-2013) were presented in table 1 below

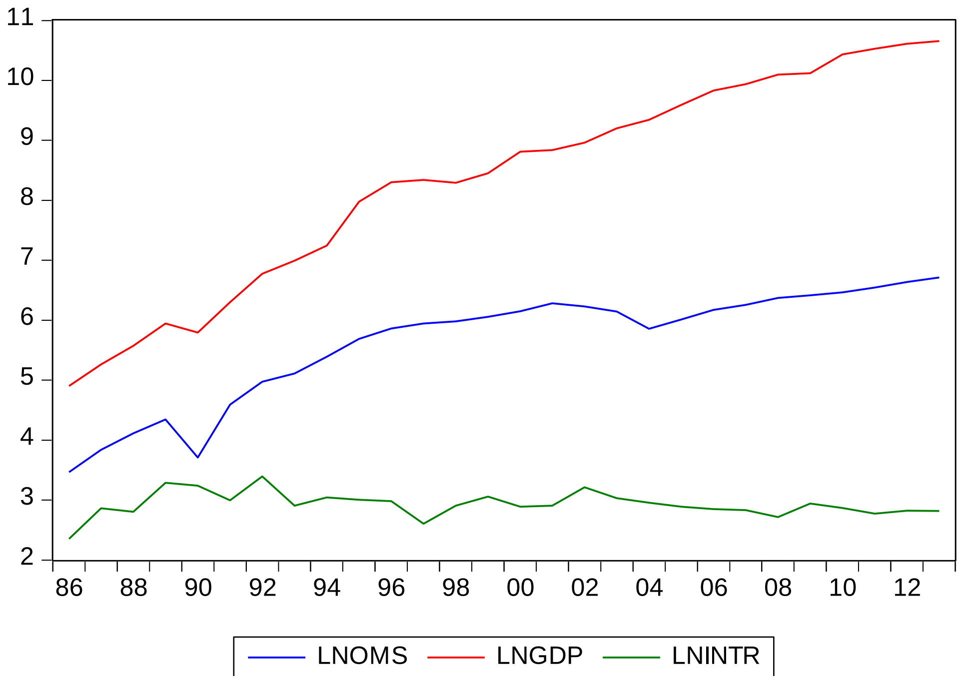
Table 1: Data of OMS GDP and INTR from 186-2013

YEAR	OMS (₦ BILLION)	GDP (₦ BILLION)	INTR (%)
1986	32.0	134.6	10.50
1987	46.4	193.1	17.50
1988	61.2	263.3	16.50
1989	77.2	382.3	26.80
1990	40.8	328.6	25.50
1991	98.6	545.7	20.01
1992	144.4	875.3	29.80
1993	165.9	1089.7	18.32
1994	219.9	1399.7	21.00
1995	295.8	2907.4	20.18
1996	350.6	4032.3	19.74
1997	382.6	4189.2	13.54
1998	395.8	3989.5	18.29
1999	426.2	4679.2	21.32
2000	468.0	6713.6	17.98
2001	535.8	6895.2	18.29
2002	507.8	7795.8	24.85
2003	465.8	9913.5	20.71
2004	349.3	11411.1	19.18
2005	408.4	14610.9	17.95
2006	478.5	18564.6	17.26
2007	520.9	20657.3	16.94
2008	585.6	24296.3	15.14
2009	612.3	24794.2	18.99
2010	643.1	33984.8	17.59
2011	694.8	37409.9	16.02
2012	761.5	40544.1	16.79
2013	823.9	42396.8	16.72

Source: CBN Statistical bulletin (2013)

4.2 Analysis of Results

Fig. 1: Graphical Representation of Study variables



The trend (line) graph of the variables under investigation indicates that OMS and GDP are on a steady rise within the period. The interest rate shows a fluctuating decline from 2004 to 2013. However, from the graph, growth in GDP is envisaged to cause growth in output of manufacturing sector and vice versa.

Table 1 Descriptionof variables under study

Variable	No of obs.	Mean	Std dev.	Skewness	Kurtosis	Prob. (JB)
Ln(OMS)	28	5.62	0.96	-0.99	2.67	0.0939
Ln(GDP)	28	8.63	1.78	-0.45	1.98	0.3400
Ln(INTR)	28	2.93	0.21	-0.14	4.32	0.3469

SOURCE: Researcher's extract from E-views output (See Appendix 1)

The descriptive statistics result indicates that the variables are not volatile (with low standard deviation). The skewness result shows that all the variables are negatively with interest rate having excess kurtosis (k>3). Jarque-Bera test of normality of the data series indicates that the dataset comes from a normal and smooth distribution.

Table 2 Summary of ADF Unit root test

Variable	ADF-Stat	C.V @5%	p-value	Order of integration	Inference
Ln(OMS)	-6.11	-3.60	0.0002	I(1)	Stationary
Ln(GDP)	-5.20	-3.60	0.0015	I(1)	Stationary
Ln(INTR)	-5.55	-3.59	0.0006	I(0)	Stationary

Source: Author's Extract from E-views 9.0 output (See Appendix II)

The ADF unit root test results in table 2 shows that the ADF statistics of the variables were more negative than the critical values at 5% hence, they are said to be integrated of order one (i.e., I(1)).In other words, they are stationary at first differencing.

Table 3 ARDL bound test result and interpretation

ARDL Bounds Test
Sample: 1990 2013
Included observations: 24
Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	2.781423	2

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	3.17	4.14
5%	3.79	4.85
2.5%	4.41	5.52
1%	5.15	6.36

Source: Researcher's Extract from E-views 9.0 output (See Appendix III)

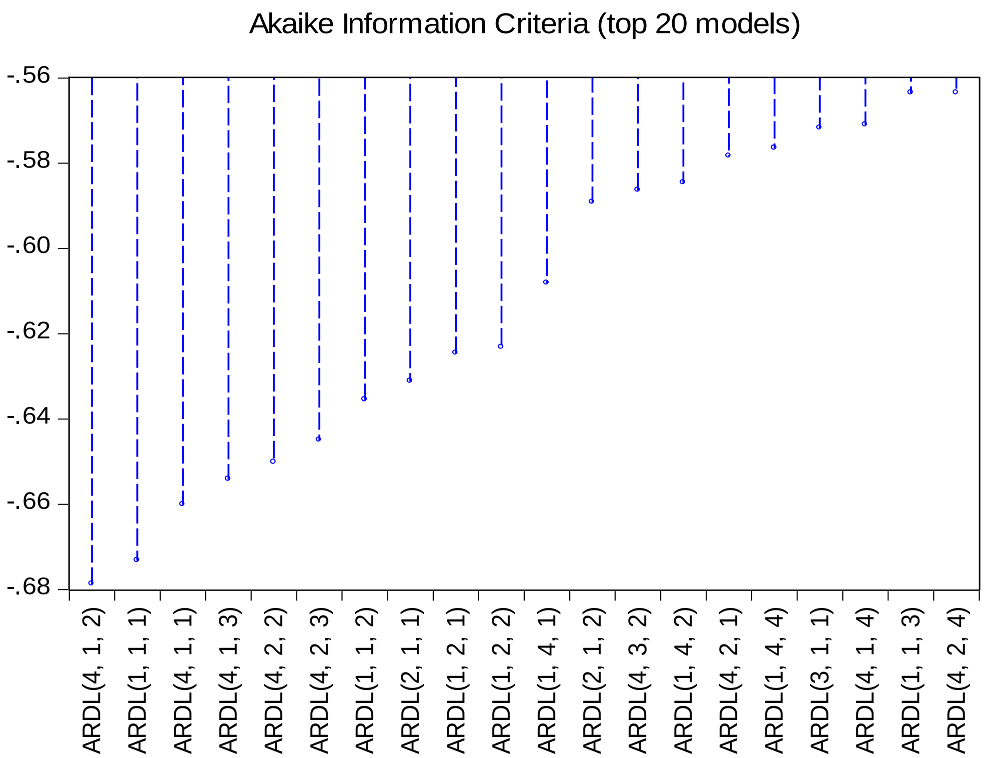
The ARDL bound test of long run relationship is guided by the decision rules as stated below:

F-statistic > Upper bound = Cointegration,

F-statistic < Lower bound = No cointegration,

F-statistic between Upper and Lower bound = Inconclusive, The ARDL bound test with F-statistic = 2.78< lower bounds at 10%, 5%, 2.5% and 1% levels of significance indicates that there is no long run relationship between output of manufacturing sector and economic growth in Nigeria.

Fig. 2 ARDL Model selectionGraph



From the model selection graph, it was ascertained that the best model for this relationship is ARDL (4, 1, 2). This is Ln(OMS) at lag 4, Ln(GDP) at lag 1, and Ln(INTR) at lag 2.

5.0 Conclusion and Recommendations

This study explored the responsiveness of output of manufacturing sector to economic growth in Nigeria. Using Autoregressive Distributed Lag (ARDL) bound test approach, the study provided evidence that Gross domestic Product (GDP) has no long run relationship with manufacturing sector output in Nigeria. Hence, the researcher recommended that operating environment of the manufacturing sector should be made conducive so that cost of doing business in Nigeria will be reduced. The government should ensure adequate power supply so as to reduce the use of generators, and good roads to reduce accidents which lead to loss of the goods on transit.

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APPENDIX 1

DESCRIPTIVE STATISTICS RESULT

	LNOMS	LNGDP	LNINTR
Mean	5.618650	8.325314	2.926596
Median	5.996578	8.631387	2.906354
Maximum	6.714049	10.65483	3.394508
Minimum	3.465736	4.902307	2.351375
Std. Dev.	0.960716	1.782436	0.206693
Skewness	-0.993597	-0.447503	-0.139688
Kurtosis	2.673269	1.976033	4.317897
Jarque-Bera	4.731641	2.157803	2.117387
Probability	0.093872	0.339969	0.346909
Sum	157.3222	233.1088	81.94469
Sum Sq. Dev.	24.92035	85.78115	1.153489
Observations	28	28	28

APPENDIX II

UNIT ROOT TEST RESULT

Null Hypothesis: D(LNOMS) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=6)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.108251	0.0002
Test critical values:	1% level	-4.356068	
	5% level	-3.595026	
	10% level	-3.233456	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNOMS,2)
Method: Least Squares
Sample (adjusted): 1988 2013
Included observations: 26 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNOMS(-1))	-1.232608	0.201794	-6.108251	0.0000
C	0.285008	0.118534	2.404433	0.0246
@TREND("1986")	-0.010069	0.006783	-1.484578	0.1512

R-squared	0.619203	Mean dependent var	-0.011262
Adjusted R-squared	0.586090	S.D. dependent var	0.385882
S.E. of regression	0.248261	Akaike info criterion	0.159492
Sum squared resid	1.417567	Schwarz criterion	0.304657
Log likelihood	0.926609	Hannan-Quinn criter.	0.201294
F-statistic	18.69983	Durbin-Watson stat	2.096810
Prob(F-statistic)	0.000015		

Null Hypothesis: D(LNGDP) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=6)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.196615	0.0015
Test critical values:	1% level	-4.356068	
	5% level	-3.595026	
	10% level	-3.233456	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNGDP,2)
Method: Least Squares
Sample (adjusted): 1988 2013
Included observations: 26 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNGDP(-1))	-1.081213	0.208061	-5.196615	0.0000
C	0.367687	0.106723	3.445254	0.0022
@TREND("1986")	-0.009827	0.005140	-1.911884	0.0684

R-squared	0.540059	Mean dependent var	-0.012162
Adjusted R-squared	0.500064	S.D. dependent var	0.259271
S.E. of regression	0.183320	Akaike info criterion	-0.446996
Sum squared resid	0.772946	Schwarz criterion	-0.301831
Log likelihood	8.810953	Hannan-Quinn criter.	-0.405194
F-statistic	13.50319	Durbin-Watson stat	2.050445
Prob(F-statistic)	0.000132		

Null Hypothesis: LNINTR has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=6)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.549997	0.0006
Test critical values:	1% level	-4.339330	
	5% level	-3.587527	
	10% level	-3.229230	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNINTR)
Method: Least Squares
Sample (adjusted): 1987 2013
Included observations: 27 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNINTR(-1)	-0.846223	0.152473	-5.549997	0.0000
C	2.627997	0.460064	5.712243	0.0000
@TREND("1986")	-0.009340	0.004024	-2.321120	0.0291

R-squared	0.578751	Mean dependent var	0.017231
Adjusted R-squared	0.543646	S.D. dependent var	0.238136
S.E. of regression	0.160870	Akaike info criterion	-0.712002
Sum squared resid	0.621099	Schwarz criterion	-0.568020
Log likelihood	12.61203	Hannan-Quinn criter.	-0.669189
F-statistic	16.48668	Durbin-Watson stat	2.313539
Prob(F-statistic)	0.000031		

APPENDIX III

ARDL BOUND TEST

ARDL Bounds Test
Sample: 1990 2013
Included observations: 24
Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	2.781423	2

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	3.17	4.14
5%	3.79	4.85
2.5%	4.41	5.52
1%	5.15	6.36

Test Equation:
Dependent Variable: D(LNOMS)
Method: Least Squares
Sample: 1990 2013
Included observations: 24

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNOMS(-1))	-0.183068	0.147831	-1.238367	0.2359
D(LNOMS(-2))	0.113123	0.175805	0.643461	0.5303
D(LNOMS(-3))	-0.285144	0.154501	-1.845589	0.0862
D(LNGDP)	0.963607	0.190560	5.056717	0.0002
D(LNINTR)	-0.282263	0.295804	-0.954226	0.3562
D(LNINTR(-1))	-0.264396	0.215726	-1.225607	0.2406
C	4.269844	1.781873	2.396267	0.0311
LNGDP(-1)	0.008060	0.084363	0.095544	0.9252
LNINTR(-1)	-1.044640	0.481850	-2.167979	0.0479
LNOMS(-1)	-0.223751	0.136535	-1.638781	0.1235

R-squared	0.799176	Mean dependent var	0.098652
Adjusted R-squared	0.670075	S.D. dependent var	0.258983
S.E. of regression	0.148758	Akaike info criterion	-0.678659
Sum squared resid	0.309804	Schwarz criterion	-0.187803
Log likelihood	18.14391	Hannan-Quinn criter.	-0.548435
F-statistic	6.190315	Durbin-Watson stat	1.931630
Prob(F-statistic)	0.001364		

APPENDIX IV

MODEL SELECTION TABLE

Model Selection Criteria Table
Dependent Variable: LNOMS
Sample: 1986 2013
Included observations: 24

Model	LogL	AIC*	BIC	HQ	Adj. R-sq	Specification
18	18.143908	-0.678659	-0.187803	-0.548435	0.955171	ARDL(4, 1, 2)
94	14.077652	-0.673138	-0.378624	-0.595003	0.951069	ARDL(1, 1, 1)
19	16.920880	-0.660073	-0.218303	-0.542872	0.953670	ARDL(4, 1, 1)
17	18.848809	-0.654067	-0.114126	-0.510821	0.954477	ARDL(4, 1, 3)
13	18.801359	-0.650113	-0.110172	-0.506867	0.954296	ARDL(4, 2, 2)
12	19.739390	-0.644949	-0.055922	-0.488680	0.954210	ARDL(4, 2, 3)
93	14.625372	-0.635448	-0.291849	-0.544291	0.950503	ARDL(1, 1, 2)
69	14.572786	-0.631065	-0.287466	-0.539909	0.950285	ARDL(2, 1, 1)
89	14.493919	-0.624493	-0.280894	-0.533336	0.949958	ARDL(1, 2, 1)
88	15.478303	-0.623192	-0.230507	-0.519013	0.951017	ARDL(1, 2, 2)
79	16.296815	-0.608068	-0.166298	-0.490866	0.951197	ARDL(1, 4, 1)
68	15.069329	-0.589111	-0.196426	-0.484931	0.949319	ARDL(2, 1, 2)
8	19.036006	-0.586334	0.002693	-0.430065	0.951446	ARDL(4, 3, 2)
78	17.014453	-0.584538	-0.093682	-0.454314	0.950746	ARDL(1, 4, 2)
14	16.939280	-0.578273	-0.087418	-0.448049	0.950437	ARDL(4, 2, 1)
76	18.916748	-0.576396	0.012631	-0.420127	0.950961	ARDL(1, 4, 4)
44	14.860218	-0.571685	-0.179000	-0.467506	0.948428	ARDL(3, 1, 1)
16	18.851181	-0.570932	0.018095	-0.414663	0.950693	ARDL(4, 1, 4)
92	14.761391	-0.563449	-0.170765	-0.459270	0.948002	ARDL(1, 1, 3)
11	19.760976	-0.563415	0.074698	-0.394123	0.950138	ARDL(4, 2, 4)
7	19.755890	-0.562991	0.075122	-0.393699	0.950116	ARDL(4, 3, 3)
64	14.612933	-0.551078	-0.158393	-0.446898	0.947355	ARDL(2, 2, 1)
43	15.530679	-0.544223	-0.102453	-0.427022	0.947980	ARDL(3, 1, 2)
84	14.507228	-0.542269	-0.149584	-0.438090	0.946889	ARDL(1, 3, 1)
87	15.502330	-0.541861	-0.100091	-0.424659	0.947856	ARDL(1, 2, 3)
63	15.484432	-0.540369	-0.098599	-0.423168	0.947779	ARDL(2, 2, 2)
83	15.480160	-0.540013	-0.098243	-0.422812	0.947760	ARDL(1, 3, 2)
54	16.387467	-0.532289	-0.041433	-0.402065	0.948105	ARDL(2, 4, 1)
91	15.325995	-0.527166	-0.085396	-0.409965	0.947085	ARDL(1, 1, 4)
86	16.306962	-0.525580	-0.034724	-0.395356	0.947755	ARDL(1, 2, 4)
3	19.300648	-0.525054	0.113058	-0.355763	0.948188	ARDL(4, 4, 2)
67	15.085297	-0.507108	-0.065338	-0.389906	0.946012	ARDL(2, 1, 3)
77	17.025611	-0.502134	0.037807	-0.358888	0.947007	ARDL(1, 4, 3)
53	17.018344	-0.501529	0.038413	-0.358282	0.946975	ARDL(2, 4, 2)
38	15.964203	-0.497017	-0.006161	-0.366793	0.946241	ARDL(3, 2, 2)
9	16.943497	-0.495291	0.044650	-0.352045	0.946643	ARDL(4, 3, 1)
51	18.931731	-0.494311	0.143802	-0.325020	0.946570	ARDL(2, 4, 4)
39	14.885692	-0.490474	-0.048704	-0.373273	0.945107	ARDL(3, 2, 1)
2	19.806437	-0.483870	0.203328	-0.301556	0.945359	ARDL(4, 4, 3)
28	17.803882	-0.483657	0.105370	-0.327388	0.946196	ARDL(3, 4, 2)
6	19.778908	-0.481576	0.205622	-0.299262	0.945233	ARDL(4, 3, 4)
29	16.760767	-0.480064	0.059877	-0.336817	0.945824	ARDL(3, 4, 1)
66	15.736040	-0.478003	0.012852	-0.347779	0.945209	ARDL(2, 1, 4)
59	14.625488	-0.468791	-0.027020	-0.351589	0.943904	ARDL(2, 3, 1)
4	17.578130	-0.464844	0.124183	-0.308575	0.945174	ARDL(4, 4, 1)

42	15.566982	-0.463915	0.026941	-0.333691	0.944432	ARDL(3, 1, 3)
62	15.520394	-0.460033	0.030823	-0.329809	0.944216	ARDL(2, 2, 3)
82	15.504111	-0.458676	0.032180	-0.328452	0.944140	ARDL(1, 3, 3)
58	15.486754	-0.457229	0.033626	-0.327005	0.944059	ARDL(2, 3, 2)
61	16.337083	-0.444757	0.095184	-0.301510	0.943877	ARDL(2, 2, 4)
81	16.321711	-0.443476	0.096465	-0.300229	0.943805	ARDL(1, 3, 4)
33	16.213291	-0.434441	0.105500	-0.291194	0.943295	ARDL(3, 3, 2)
52	17.036313	-0.419693	0.169334	-0.263424	0.942642	ARDL(2, 4, 3)
37	16.030347	-0.419196	0.120746	-0.275949	0.942424	ARDL(3, 2, 3)
26	19.026865	-0.418905	0.268293	-0.236592	0.941691	ARDL(3, 4, 4)
1	19.936910	-0.411409	0.324874	-0.216073	0.939944	ARDL(4, 4, 4)
34	14.913546	-0.409462	0.081394	-0.279238	0.941322	ARDL(3, 3, 1)
41	15.874386	-0.406199	0.133742	-0.262952	0.941671	ARDL(3, 1, 4)
27	17.813191	-0.401099	0.237013	-0.231808	0.941350	ARDL(3, 4, 3)
57	15.523865	-0.376989	0.162953	-0.233742	0.939942	ARDL(2, 3, 3)
36	16.456672	-0.371389	0.217638	-0.215120	0.939803	ARDL(3, 2, 4)
56	16.347513	-0.362293	0.226734	-0.206024	0.939253	ARDL(2, 3, 4)
95	9.286797	-0.357233	-0.111805	-0.292121	0.930899	ARDL(1, 1, 0)
32	16.213940	-0.351162	0.237865	-0.194893	0.938573	ARDL(3, 3, 3)
90	9.993543	-0.332795	-0.038282	-0.254661	0.931232	ARDL(1, 2, 0)
31	16.585351	-0.298779	0.339333	-0.129488	0.935031	ARDL(3, 3, 4)
70	9.371029	-0.280919	0.013594	-0.202785	0.927570	ARDL(2, 1, 0)
65	10.151085	-0.262590	0.081009	-0.171434	0.928136	ARDL(2, 2, 0)
85	10.036034	-0.253003	0.090596	-0.161846	0.927444	ARDL(1, 3, 0)
45	9.536228	-0.211352	0.132247	-0.120195	0.924358	ARDL(3, 1, 0)
40	10.281143	-0.190095	0.202589	-0.085916	0.924468	ARDL(3, 2, 0)
60	10.192666	-0.182722	0.209962	-0.078543	0.923909	ARDL(2, 3, 0)
80	10.142592	-0.178549	0.214135	-0.074370	0.923591	ARDL(1, 4, 0)
20	9.547638	-0.128970	0.263715	-0.024790	0.919707	ARDL(4, 1, 0)
35	10.441281	-0.120107	0.321663	-0.002905	0.920500	ARDL(3, 3, 0)
15	10.282004	-0.106834	0.334937	0.010368	0.919438	ARDL(4, 2, 0)
55	10.249237	-0.104103	0.337667	0.013099	0.919218	ARDL(2, 4, 0)
96	8.937230	-0.078102	0.314582	0.026077	0.915517	ARDL(1, 0, 4)
30	10.455441	-0.037953	0.452902	0.092271	0.914922	ARDL(3, 4, 0)
10	10.453739	-0.037812	0.453044	0.092413	0.914910	ARDL(4, 3, 0)
71	9.263790	-0.021982	0.419788	0.095219	0.912304	ARDL(2, 0, 4)
98	5.973207	0.002233	0.296746	0.080367	0.903863	ARDL(1, 0, 2)
99	4.927144	0.006071	0.251499	0.071183	0.900627	ARDL(1, 0, 1)
100	3.609109	0.032574	0.228917	0.084664	0.894636	ARDL(1, 0, 0)
46	9.608176	0.032652	0.523508	0.162876	0.908698	ARDL(3, 0, 4)
5	10.511780	0.040685	0.580626	0.183932	0.908807	ARDL(4, 4, 0)
97	6.418788	0.048434	0.392033	0.139591	0.901918	ARDL(1, 0, 3)
73	5.984426	0.084631	0.428230	0.175788	0.898303	ARDL(2, 0, 2)
74	4.948305	0.087641	0.382155	0.165776	0.895291	ARDL(2, 0, 1)
21	9.672939	0.110588	0.650530	0.253835	0.902204	ARDL(4, 0, 4)
75	3.609183	0.115901	0.361329	0.181013	0.889091	ARDL(2, 0, 0)
72	6.593481	0.117210	0.509895	0.221389	0.897294	ARDL(2, 0, 3)
48	5.986592	0.167784	0.560469	0.271963	0.891967	ARDL(3, 0, 2)
49	4.973112	0.168907	0.512506	0.260064	0.889361	ARDL(3, 0, 1)
50	3.904720	0.174607	0.469120	0.252741	0.885778	ARDL(3, 0, 0)
47	6.594142	0.200488	0.642258	0.317690	0.890453	ARDL(3, 0, 3)
23	6.282568	0.226453	0.668223	0.343654	0.887572	ARDL(4, 0, 2)
24	5.100242	0.241646	0.634331	0.345826	0.883685	ARDL(4, 0, 1)
25	3.938499	0.255125	0.598724	0.346282	0.879399	ARDL(4, 0, 0)
22	6.734897	0.272092	0.762948	0.402316	0.883997	ARDL(4, 0, 3)