Real Exchange Rate and Inflation: An Empirical Assessment of the Nigerian Experience

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Abstract The objective of the paper has been to assess the relationship between the real exchange rate and inflation in Nigeria. Using data covering the period between 1970 and 2010, the cointegration test result shows a long run relationship between inflation and the real exchange rate. The satisfactory speed of adjustment indicated by the error correction model further supports this long run relationship. The result showed that both domestic and imported inflation appreciated the real exchange rate. The ARCH result indicates the persistence of volatility between the rate of inflation and the real exchange rate. An indication that the real exchange rate in Nigeria has been susceptible to fluctuations in the rate of inflation. Policy makers should thus, not rely only on policies to stabilize real exchange rate by targeting inflation, but should employ domestic policies to increase export and production of previously imported inputs to reduce the problem of imported inflation.

Key words: Real exchange rate, inflation, error correction, granger causality and Nigerian economy

1. Introduction

The effects of high inflation on the economy are generally considered to be predominantly harmful. Since the 1970s policy makers have been saddled with the responsibility of reducing and stabilizing the inflation rate. Inflation can be decomposed into two, namely: demand side inflation and the supply side inflation. For an open economy like Nigeria, inflation comes from both domestic factors (internal pressures) and oversea's factors (external pressures). The external factors results from increase in the world prices of commodities or fluctuation in the real exchange rate. However, the influence of exchange rate on inflation is a function of the exchange rate regime in the country (Noer, Arie and Piter, 2010). The exchange rate regime plays a key role in reducing the risk of fluctuations in the Real Exchange Rate (RER) which will affect the rate of inflation and hence the entire economy. In a system of flexible exchange rate as practiced in Nigeria, fluctuations in the RER have a major impact on output and prices through the aggregate demand and supply channels. On the supply side, depreciation or devaluation of domestic currencies affects the price level and output directly through the importation of goods in which case the country is an international price taker. Indirect effect of depreciation or devaluation is transmitted through the price of capital goods imported by the manufacturers as inputs in the production process. The historical origin of the current inflation in Nigeria dates back to the early 1970s when oil revenue rose sharply resulting in an increase in government spending and aggregate demand without a corresponding increase in domestic output production. The monetization of oil earnings which expanded money supply also resulted to a rise in the general price level.

In July 1986, the deepening economic crisis made the government to introduce the International Monetary Fund (IMF) supported Structural Adjustment Programme (SAP) which was predicated on the principle of "getting prices right" and has exchange rate reform as a major focus (Festus, Chete and Gabriel, 1994). The Second Tier Foreign Exchange Market (SFEM) was introduced in late September 1986 and since then, the naira has depreciated against the American dollar and other major currencies. The Nigerian naira traded at about N4.62k to a U.S. dollar at the introduction of the SFEM and by the last part of 1989, has exceeded N7.65k to a U.S. dollar and inflation jumped from about 5% at the introduction of SFEM to about 41% (Festus, Chete and Gabriel, 1994). Although the exchange rate became relatively stable in the mid 1990s, it depreciated further to about N120.97, N129.36 and N133.50 in 2002, 2003 and 2004

respectively (Obadan, 2006). This is an indication that the depreciation of the naira is a contributory factor to the inflationary trend in Nigeria. Giiven the import dependent nature of the Nigerian industrial sector, the continued depreciation of the naira exchange rate vis-à-vis the currencies of other major trading partners, meant that more resources would be needed to increase domestic output. A depreciating exchange rate in the absence of domestic sources of input and inadequate infrastructure has raised the cost of production in Nigeria and hence a high rate of inflation. Locally produced goods are thus less competitive compared to imported goods, thus reversing the supposed benefits of cheaper exports expected from depreciation of the currency. Similarly, overdependence of the Nigerian economy on imported capital goods implies that a deprecating exchange rate would crowd-out marginal investment as a result of high investment cost (Nnanna, Englama and Odoko, 2004). This has increased the inflationary pressure in Nigeria, thus providing more justification for this study. The overall objective of the study is thus to assess the relationship between the RER and inflation in Nigeria using the cointegration and its implied error correction methodology. This will entail building an econometric model that will adequately explain the RER- inflation relationship in Nigeria. This will enable us to ascertain the authenticity or otherwise of the monetary policy direction of the Nigerian government. This study is important because unrealistic RER and high rate of inflation may hinder the achievement of other macroeconomic objectives like employment, rapid economic growth and tolerable balance of payments. The study of the relationship between RER and inflation in Nigeria will highlight the need for efficient resource allocation and this will increase the international competitiveness of the country.

2. Exchange rate and inflation in Nigeria

The general price level and exchange rate has been identified as two important key indicators of economic performance (Rutasitara, 2004). There has been a significant change in exchange rate management in Nigeria over the past years. The table below summarizes the exchange rate regimes in Nigeria:

Table A1: Schema of Events in Exchange Rate Management in Nigeria

S/N	YEAR	EVENT	REMARK
1.	1959-1967	Fixed parity solely with the British pound sterling	Suspended in 1972
2.	1968-1972	Included the US dollar in the parity exchange	Aftermath of the 1967 devaluation of the pound and the emergence of a strong US dollar.
3.	1973	Revert to fixed parity with the British pounds	Devaluation of the US dollar
4.	1974	Parity to both pounds and US dollar	To minimize the effect of devaluation of the individual currency.
5.	1978	Trade (import)-weighted basket of currency approach	Tied to 7 currencies- British pounds, US dollar, German mark, French franc, Japanese yen, Dutch guilder and Swiss franc
6.	1985	Referenced on the US dollar	To prevent arbitrage prevalent in the basket of currencies.
7.	1986	Adoption of the Second- Tier Foreign Exchange Market (SFEM)	Deregulation of the economy
8.	1987	Merger of the first and second-tier markets	Merger of rates
9.	1988	Introduction of the inter-bank foreign exchange market (IFEM)	Merger between the autonomous and the FEM rates
10.	1994	Fixed exchange rate	Regulate the economy
11.	1995	Introduction of the Autonomous foreign exchange market (AFEM)	Guided deregulation
12.	1999	Re-introduction of the inter-bank foreign exchange market (IFEM)	Merger of the dual exchange rate, following the abolition of the official exchange rate from January 1, 1999
13.	2002	Re-introduction of the Dutch Auction System (DAS)	Retail DAS was implemented at first instant with the CBN selling to end-users through the authorized users (banks)
14.	2006-date	Introduction of Wholesale DAS	Further liberalized the market

Source: Extracted from Mordi, C.O. (2006) "Challenges of Exchange Rate Volatility in Economic Management in Nigeria", *Central Bank of Nigeria 30 (3)* . Updated by the author

The Nigerian foreign exchange market is peculiar because foreign exchange earnings depends about 90% on the world price of crude oil. The consequence is that the volatility of the world oil prices has direct impact on the Nigerian foreign exchange earnings (Olusanya and Rasheed, 2008). Thus, the revenue shared between the three tiers of government depends on the international price of crude oil. However, in Nigeria, it has been difficult to bring down the expenditure when oil prices fall. This has been the main cause of high government deficit spending. Thus, despite the huge amount of foreign exchange supplied by the Central Bank of Nigeria (CBN) to the foreign exchange market, the impact has not been fully reflected in the performance of the real sector of the economy. Arising from Nigeria's high import propensity of finished consumer goods, the foreign exchange earnings from oil continued to generate output and employment growth in other countries from which Nigeria's imports originate. This lead the CBN to re-introduce the DAS in 2002. since then, the DAS has been largely successful in achieving the objectives of monetary authorities.

3. Literature Review

The theoretical framework draws from the framework proposed by Olusanya and Rasheed (2008). In the framework inflation is assumed to originate from both the demand side and supply side. The supply side is captured by the tradeable sector whereas the demand side is represented by the nontradeable sectors. The price of non-traded goods responds to disequilibria in the money market and the price of traded goods is governed by the movements in the exchange rates and foreign prices. The overall price level is a weighted average of the price of tradeable and non-tradeable goods .

Rana (1983) in his study of the impact of current exchange rate system on trade and inflation of selected developing member countries found that the changes in exchange rates do not affect the inflation rate. Oyejide (1989) in his study on the stability of the Nigerian exchange rate found that exchange rate depreciation often lead to increased local currency cost of imported inputs and final goods through the cost-push inflation channel. He further noted that since non-tradable goods cannot be imported, the excess demand for them is translated into high prices since in the short run, domestic supply is fixed. Elbadawi (1990) investigated the inflationary process, stabilization and the role of public expenditure in Uganda and found that rapid monetary expansion and the precipitous depreciation of the parallel exchange rate were the principal determinants of inflation. Ndugu (1997) investigated price and exchange rate dynamics in Kenya using data covering the priod between 1970 and 1993. Using the Granger casuality testing he found that the level of domestic inflation and exchange rate affect each other.

Kamin and Khan (2003) empirically investigated the multi-country comparison of the linkages between inflation and exchange rate competitiveness found that a relationship exists between inflation rate and the RER in most Asian and Latin American countries. Their study further revealed that the influence of exchange rate changes on inflation rate is higher in Latin American countries than those in Asia and industrialized countries.

Omotor, (2008) in his study of exchange rate reforms and its inflationary consequences, found, using annual time series data covering the period between 1970 to 2003, that exchange rate policy reforms is important in the determination of inflation in Nigeria.

Noer, Arie and Piter (2010) conducted a comparative investigation of the relationship between inflation rate and the RER. Using explorative statistics and granger causality test, they found a strong correlation between the movements of inflation rate and the RER in most countries investigated. Using data covering 1986-2008 and adopting the auto-regressive distributed lag model (ARDL) and cointegration techniques, Imimole and Imimole and Enoma (2011), in their study of exchange rate depreciation and inflation in Nigeria found that exchange rate depreciation can bring about inflation in Nigeria.

A close look at the literature reveals that most of the works that investigated the relationship between inflation and exchange rate are of foreign origin. Most of the works also used the nominal exchange rate. One of the points of departure of this paper is the use of real exchange rate which reflects the true international competitiveness of Nigeria. The study also used data covering the pre-SAP, SAP and post -SAP periods. The paper also adopts more recent econometric methods of estimation.

4. Econometric Procedure

The conventional approach to time-series econometrics is based on the implicit assumption of stationarity of time-series data. A recent development in time-series econometrics has cast serious doubt on the conventional time-series assumptions. There is substantial evidence in the recent literature to suggest that many macroeconomic time series may possess unit roots. That is, they are non-stationary processes. A time-series integrated of order zero I(0), is level stationary, while a time-series integrated of order one, I(1), is stationary in first difference. Most commonly, series are

found to be integrated of order one, or I(1). The implication of some systematic movements of integrated variables in the estimation process may yield spurious results. In the case of a small sample study, the risk of spurious regression is extremely high. In the presence of I(1) or higher order integrated variables, the conventional t-test of the regression coefficients generated by conventional OLS procedure is highly misleading (Granger and Newbold, 1977). Resolving these problems requires transforming an integrated series into a stationary series by successive differencing of the series depending on the order of integration (Box and Jenkins, 1970). However, Sargan (1964), Hendry and Mizon (1978) and Davidson, Hendry, Sbra and Yeo (1978) have argued that the differencing process loses valuable information in data, especially in the specification of dynamic models. If some, or all, of the variables of a model are of the same order of integration, following the Engle-Granger theorem, the series are cointegrated and the appropriate procedure to estimate the model will be an error correction specification. Hendry (1986) supported this view, arguing that error correction formulation minimizes the possibilities of spurious relationships being estimated as it retains level information in a non-integrated form (Hendry, 1986). Davidson, Hendry, Sbra and Yeo. (1978) proposed a general autoregressive distributed lag model with a lagged dependent variable, which is known as the 'error-correction' term. Davidson, Hendry, Sbra and Yeo (1978) also advocated the process of adding lagged dependent and independent variables up to the point where residual whiteness is ensured in a dynamic specification. Therefore, error correction models avoid the spurious regression relationships. To guard against the possibility of estimating spurious relationships in the presence of some nonstationary variables, estimation is performed using a general-to-specific Hendry-type error correction modelling (ECM) procedure. This procedure begins with an over-parameterised autoregressive distributed lag (ADL) specification of an appropriate lag. The consideration of the available degrees of freedom and type of data determine the decision on lag length. With annual data, one or two lags would be long enough, while with quarterly data a maximum lag of four can be taken. Under this ECM procedure, the long run relationship is embedded within the dynamic specification.

The model to be estimated is thus stated as:

$$REER = b_o + b_1CPI + b_2IMP + b_3MS + U_t$$
$$b_1<0,\ b_2<0\ b_3<0$$

Where:

REER	=	Real Effective Exchange Rate
CPI	=	Consumer Price Index
IMP	=	Import representing imported inflation
MS	=	Money supply
Ut	=	Random variable
L	=	Natural logarithm

The summary of the Augmented Dickey Fuller (ADF) and Philip Perron (PP) unit root tests are shown in table 2 below:

Table 2: Summary of ADF and PP Unit Root Tests Results

Variables	ADF			PP		
	Level	1st Difference	Order of Integration	Level	1st Difference	Order of integration
IMP	-1.328355	-4.498982*	I(1)	-2.587691	-7.382665*	I(1)
REER	-1.925375	-3.422332**	I(1)	-1.612792	-3.445278**	I(1)
CPI	-1.234678	-4.065456*	I(1)	-2.351024	-3.924131*	I(1)
MS	-2.126756	-3.745776*	I(1)	-2.406755	-6.456235*	I(1)

* significant at the 1% level

** significant at the 5% level

The result from both the ADF and PP unit root tests suggests that the variables are non-stationary. The variables however became stationary after taken the first difference. All the variables are integrated of order 1. This result thus permits us to proceed to the next stage which is the test of a long run relationship among the variables. The Johansen methodology was adopted for this purpose. The summary of the Johansen cointegration test result is shown in table 3 below:

Table 3: Summary of Johansen cointegration test result

Series: LREER LCPI LIMP LMS

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	5 Percent Critical Value	1 Percent Critical Value
None *	0.612425	53.38387	47.21	54.46
At most 1	0.328621	19.26139	29.68	35.65
At most 2	0.123320	4.918224	15.41	20.04
At most 3	0.004991	0.180129	3.76	6.65

*(**) denotes rejection of the hypothesis at the 5%(1%) level
Trace test indicates 1 cointegrating equation(s) at the 5% level
Trace test indicates no cointegration at the 1% level

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	5 Percent Critical Value	1 Percent Critical Value
None **	0.612425	34.12248	27.07	32.24
At most 1	0.328621	14.34316	20.97	25.52
At most 2	0.123320	4.738095	14.07	18.63
At most 3	0.004991	0.180129	3.76	6.65

*(**) denotes rejection of the hypothesis at the 5%(1%) level
Max-eigenvalue test indicates 1 cointegrating equation(s) at both 5% and 1% levels

The result of the Johansen cointegration test in table 3 indicates the existence of a long run relationship among CPI, REER, MS and IMP. This is suggested by both the trace statistics and max-eigen value statistics which indicated one cointegrating equation in each case. The result of the long run elasticities are reported in table4 below:

Table 4: Summary of long run elasticities: *Dependent variable: LREER*

Variables	Coefficients	Std. error	t-statistics	Probabilities
LCPI	-0.454316	0.167069	-2.719327	0.0105
LIMP	-0.241899	0.117810	-2.053292	0.0476
LMS	-0.210039	0.028066	-7.483633	0.0000
LMS	8.413220	1.006740	8.356891	0.0000
R^2=0.74; DW=2.234; Fstat= 32.95; Prob(Fstat) = 0.0000				

The estimated long run result in table 4 shows that in the long run, domestic inflation rate and the imported inflation have significant impact on the Real Effective Exchange Rate (REER). The result shows that an increase in the rate of inflation and imported inflation by 1 percent appreciated the REER by 0.45 and 0.24 percent respectively. The result of the error correction representation is shown in table 5 below:

Table 5: error Correction Representation: *Dependent variable: DLREER*

Variables	Coefficients	Std. Error	t-Statistic	Prob.
DLCPI	-0.576772	0.212428	-2.715139	0.0112
DLIMP	-0.102783	0.041629	-2.469048	0.0191
DLMS	-0.483866	0.105695	-4.577960	0.0001
ECM(-1)	-0.268213	0.089215	-3.006366	0.0061
C	0.065979	0.091336	0.722375	0.4753
R^2= 0.83; DW= 2.017921; F statistic= 42.90; Prob (Fstat)= 0.0000; SC=0.54;AIC=0.33;LL=-1.11				

The error correction result shows that the overall fit is satisfactory at an R^2 of 83 percent. The probability values of 0.0112 and 0.0191 is an indication that the rate of inflation and imported inflation are statistically significant. The result shows further that an increase in the rate of inflation by 1 percent appreciates the REER by 0.58 percent. The coefficient of the ECM is negative and is statistically significant, indicating a satisfactory speed of adjustment in the long and short run.

According to Afolabi and Olayemi (1995), a highly significant error correction is an indication of a stable long run relationship. This, thus, confirms the existence of a long run relationship between REER and inflation rate.

The result of the ARCH test shown in table 6 with a combined coefficient of approximately 1 is an indication of the persistence of volatility between the rate of inflation and the REER. This is an indication that the REER in Nigeria is susceptible to fluctuations in the general price level.

Table 6: summary of ARCH result: Dependent variable: LREER

Convergence achieved after 37 iterations

	Coefficient	Std. Error	z-Statistic	Prob.
LCPI	-0.358519	0.025745	-13.92599	0.0000
C	7.544876	0.152922	49.33815	0.0000
Variance Equation				
C	0.044098	0.052249	0.843983	0.3987
ARCH(1)	0.576232	0.813007	0.708766	0.4785
GARCH(1)	0.336379	0.452888	0.742741	0.4576
R-squared	0.694979	Mean dependent var		5.310853
Adjusted R-squared	0.660119	S.D. dependent var		1.018128
Log likelihood	-23.63283	F-statistic		19.93651
Durbin-Watson stat	2.153935	Prob(F-statistic)		0.000000

The result from the granger causality test presented in table 7 below with an F value of 4.1365 and probability of 0.000 indicate a causal relationship from inflation from inflation to the REER. There is also a bi-causal relationship between imported and domestic inflation.

Table 7: Summary of Pairwise Granger causality test result

Null Hypothesis:	F-Statistic	Probability
LCPI does not Granger Cause LREER	4.43651	0.00000
LREER does not Granger Cause LCPI	2.88409	0.07009
LIMP does not Granger Cause LREER	0.59784	0.55602
LREER does not Granger Cause LIMP	1.04237	0.36428
LMS does not Granger Cause LREER	1.90962	0.16415
LREER does not Granger Cause LMS	0.13505	0.87415
LIMP does not Granger Cause LCPI	4.09991	0.02599
LCPI does not Granger Cause LIMP	7.61614	0.00197
LMS does not Granger Cause LCPI	4.07681	0.02617
LCPI does not Granger Cause LMS	0.25363	0.77748

6. Conclusion

This study has been on inflation and the RER in Nigeria. The study covered the period between 1970 and 2010, which encompasses, the Pre-SAP, SAP and post-SAP periods. The cointegration technique and its implied error correction methodology were used as well as the ARCH and Granger causality methodology. The result showed that the RER in Nigeria is highly responsive to changes in the rate of inflation and import. A long run relationship was also found between RER and inflation in Nigeria. The satisfactory speed of adjustment shown by the error correction further confirms this result. It is therefore recommended that policy makers should not only rely on targeting inflation as a measure of stabilizing the RER, but should adopt complementary macroeconomic policies such as increasing domestic production of exports and previously imported inputs used in the production process.

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Appendix

Appendix 1: Summary of result of Variance Decomposition

Variance Decomposition of LREER:

Period	S.E.	LREER	LCPI	LMS	LIMP
1	0.273987	100.0000	1.0200000	0.000000	0.000000
2	0.434754	88.33610	11.30551	3.391510	7.971844
3	0.561349	76.38749	14.59971	8.403675	14.61886
4	0.689009	64.18306	19.79685	12.59112	22.42613
5	0.777962	61.29638	12.13690	15.32068	22.56926
6	0.855757	60.24940	15.81006	17.22914	21.63045
7	0.930438	59.47669	21.97297	18.40855	21.19746
8	1.007960	57.82875	16.96497	19.33834	21.91641
9	1.079484	56.47161	13.92895	20.17582	22.43968
10	1.143683	55.64698	21.31950	20.90398	22.51709

Variance Decomposition of LCPI:

Period	S.E.	LREER	LCPI	LMS	LIMP
1	0.234481	0.043170	99.95683	0.000000	0.000000
2	0.345548	0.028810	94.88365	3.007602	2.079941
3	0.403112	0.194000	89.75256	4.354781	5.698657

4	0.444432	0.595393	88.05764	4.549392	6.797579
5	0.483813	0.747871	88.71084	4.333233	6.208059
6	0.521627	0.731949	89.71626	4.083764	5.468028
7	0.556800	0.711543	90.06006	3.957270	5.271125
8	0.590898	0.725667	89.84016	3.904496	5.529674
9	0.622914	0.762656	89.72454	3.877097	5.635712
10	0.652334	0.789658	89.91512	3.826163	5.469061

Variance Decomposition of LMS:

Period	S.E.	LREER	LCPI	LMS	LIMP
1	0.144801	18.57282	2.785746	78.64143	0.000000
2	0.241769	12.41354	4.662730	79.26248	3.661252
3	0.316484	9.404279	4.653610	82.83394	3.108168
4	0.380746	8.026308	3.853982	85.24272	2.876989
5	0.437285	7.220428	3.428937	86.50557	2.845066
6	0.491062	6.608258	3.194759	87.00724	3.189745
7	0.540222	6.188136	3.053379	87.45631	3.302173
8	0.585399	5.898495	2.911391	87.86082	3.329294
9	0.627085	5.677697	2.808596	88.18239	3.331321
10	0.666572	5.495463	2.732491	88.39353	3.378515

Variance Decomposition of LIMP:

Period	S.E.	LREER	LCPI	LMS	LIMP
1	0.752325	0.838176	9.574159	2.575634	87.01203
2	0.856773	0.695885	24.96922	2.059877	72.27502
3	0.878597	0.721649	27.35694	2.104516	69.81690
4	0.909701	0.686112	31.49123	2.201951	65.62071
5	0.966434	0.625439	33.67896	2.087925	63.60768
6	1.002478	0.655016	37.56677	1.998938	59.77927
7	1.025802	0.722961	40.21752	1.940240	57.11928
8	1.050648	0.708966	42.92606	1.860045	54.50493
9	1.077248	0.684029	45.43319	1.770406	52.11237
10	1.105299	0.670629	47.72779	1.691515	49.91006

Cholesky Ordering: LREER LCPI LMS LIMP

Appendix 2: Summary of Vector Error Correction Result

Cointegrating Eq:	CointEq1
LREER(-1)	1.000000
LCPI(-1)	-139.6377 (27.4641) [-5.08437]
LIMP(-1)	110.8093 (17.6057) [6.29392]
LMS(-1)	18.16785 (19.6019) [0.92684]
C	-629.5866

Error Correction:	D(LREER)	D(LCPI)	D(LIMP)	D(LMS)
CointEq1	0.003833 (0.00137) [2.78945]	0.001365 (0.00118) [1.16064]	-0.017757 (0.00377) [-4.70663]	0.000245 (0.00073) [0.33797]

D(LREER(-1))	0.245369	0.135823	0.010430	0.096988
	(0.19071)	(0.16321)	(0.52366)	(0.10079)
	[1.28660]	[0.83218]	[0.01992]	[0.96228]
D(LREER(-2))	-0.071219	-0.141040	-0.276978	0.022567
	(0.19082)	(0.16331)	(0.52396)	(0.10085)
	[-0.37322]	[-0.86366]	[-0.52862]	[0.22377]
D(LCPI(-1))	0.212520	0.109119	-0.716547	0.033906
	(0.16394)	(0.14030)	(0.45015)	(0.08664)
	[1.29633]	[0.77775]	[-1.59179]	[0.39134]
D(LCPI(-2))	0.111977	-0.198263	-1.045638	-0.055968
	(0.15144)	(0.12960)	(0.41582)	(0.08003)
	[0.73943]	[-1.52980]	[-2.51464]	[-0.69931]
D(LIMP(-1))	-0.249792	-0.080220	0.689695	0.038726
	(0.12418)	(0.10627)	(0.34097)	(0.06563)
	[-2.01156]	[-0.75485]	[2.02273]	[0.59008]
D(LIMP(-2))	-0.176132	-0.058760	0.328723	-7.39E-05
	(0.07833)	(0.06704)	(0.21509)	(0.04140)
	[-2.24849]	[-0.87652]	[1.52830]	[-0.00179]
D(LMS(-1))	0.389408	0.375114	0.765445	0.278836
	(0.42527)	(0.36395)	(1.16773)	(0.22476)
	[0.91566]	[1.03067]	[0.65550]	[1.24062]
D(LMS(-2))	0.145850	-0.250389	0.002513	0.007131
	(0.39350)	(0.33676)	(1.08048)	(0.20796)
	[0.37065]	[-0.74353]	[0.00233]	[0.03429]
C	-0.131067	0.234053	0.055338	0.182182
	(0.11948)	(0.10225)	(0.32807)	(0.06314)
	[-1.09700]	[2.28902]	[0.16868]	[2.88521]
R-squared	0.377247	0.303054	0.653642	0.230614
Adj. R-squared	0.161679	0.061804	0.533749	-0.035712