Globalization and Nigeria's Economic Performance

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Abstract
This paper investigates the part that globalization has played in the performance of selected key sectors of the Nigerian economy by relying on a tripartite error correction representation of the effects of globalization on manufacturing sector, agricultural sector and international trade. We incorporate a pre- and Post- economic globalization dummy in an Engle Granger two-step Error Correction Model (ECM). Our findings reveal that except for the agricultural sector, economic globalization (compared to none) has not contributed to an improvement in manufacturing output and Nigeria's external balance position. Trade openness and net capital inflow have short term positive and insignificant effect on agricultural output (AGR); but the effect became negative and detrimental to agricultural production in the long term period. Contrastingly, foreign direct investment in agriculture has significantly contributed to an increase in agricultural production over the long term period. The error correction mechanism indicates dis-equilibrium in Nigeria's external balance position that is divergent, oscillatory and explosive, implying a damaging effect of unfettered globalization on Nigeria's external balance. It is, therefore, recommended that Nigeria should adopt selective globalization policies to improve its external balance position and raise production in its manufacturing and agricultural sectors.

Keywords: Globalization, error correction model, international trade, manufacturing sector, Nigeria.

1. Introduction

In recent times, globalization – the integration of national economies through trade and financial interactions – has assumed centre stage at domestic, regional and international fora. This arises from the fear expressed, especially by developing countries, about the negative impact of globalization on their economies. The fear is due mainly to the failure of the trickling down assumption which was promoted by Kuznet (1955) in his celebrated Kuznet hypothesis to hold true in the case of many developing economies[1]. In more specific terms, this is the failure of the benefit of globalization, where it exists, to trickle down and reduce extreme inequality and absolute poverty as predicted by trickle-down economics, a development that has caused disillusionment with unfettered globalization to grow throughout the developing world. The fear has further been heightened by recent empirical researches which show mixed and agnostic or inconclusive nexus between globalization and economic performance.

Globalization itself is a multidimensional concept covering all aspects of life – economic, political, cultural, environmental and social. Economic globalization, which is the concern of this paper, refers to the increasing integration of economies around the world through reduction in barriers to trade, migration, capital flows, technology transfer and direct investment. This type of globalization is characterized by intensification of cross-border trade and increased financial and foreign direct investment flows promoted by rapid liberalization and advances in information technology (Daouas 2001, Uwatt 2004). This presupposes that globalization will be beneficial to the extent to which it can lead to increased specialization and efficiency, improved managerial capacities, and increase capital formation and national income. As pointed out by Adawo (2003), other benefit accruable from globalization include; access to world inputs at competitive prices, improvement in technology and standard of living, and increase in employment mostly for the lowly trained. But as noted by Umaru, Hamidu and Musa (2013: 3), ever since Nigeria signed a treaty to become a global player and an entrepreneur of the World Trade Organization (WTO) in 1983 and subsequently adopted the IMF's and World Banks' designed Structural Adjustment Programme in 1986, its economic condition has worsened[2], indicating that Nigeria being an import-led country may further worsen her economic conditions but improve those of other economies through unfettered globalization. Till date, Nigeria has continued to implement neoliberal economic policies. The cost of unregulated globalization, these experts have said include:

[1] A fundamental assumption of Kuznet's (1955) hypothesis is that poverty, measured by inequality, will tend to reduce over time as an economy grows. The key aspects of economic globalization, including privatization, commercialization and liberalization of trade, and financial and capital markets, has it's root on neoliberal economic policy that is anchored on market fundamentalism – the view that markets solve most, if not all, economic problems by themselves – a view that have led to the early 1980s IMF's and World Bank's designed market-friendly economic reform policies which was adopted in Nigeria in 1986, the so called Structural Adjustment Programme (SAP). As Serra, Spiegel and Stiglitz (2008) cited in Serra and Stiglitz (2008) note, advances in economic theory in the 1970s showed that market failures are pervasive, especially in developing economies rife with imperfection in information, limitation in competition, and incomplete markets. These advances in economic theory had already removed the intellectual foundations of market fundamentalism before Williamson's (1990) Washington Consensus became fashionable. It is not surprising, therefore, that the Washington Consensus prescriptions (as broadly interpreted) failed to work as promised, and that disillusionment with the Washington Consensus and economic globalization it preaches grew throughout the developing world.

[2] According to UNCTAD (2009), increasing globalization has brought about rising inequality, especially in LDCs, that global institution are unable to contend with. There is also growing belief that the global economic crisis of 2007/2008 was largely a product of exploitative tendency of capitalism which has created structural imbalance between savings and investment and widened inequalities between LDCs and MDCs in the context of modern form of exploitative-globalization (Akpakpan, 2009; Benn, 2009).

erosion of a nation's sovereignty, increased dependency of a nation, making the developing economies vulnerable to the vagaries of foreign capital flows and above all, encouraging oppression, exploitation and injustice (Crook 2001; Adawo, 2004: 278). Thus, globalization is capable of thwarting social progress, increase inequality within and between nations, threaten employment and living standard, create risk of social, economic and environmental degradation with rise in poverty level, and increase the risk and volatility of capital and financial markets as recent evidence of 2008/2009 global financial turmoil clearly demonstrates.

Unarguably, globalization is not a recent phenomenon. According to O'Rourke and Williamson (1999), the late 19th century was a period of dramatic globalization with the world economy extremely well integrated in 1914, even by the standards of the late 20th century globalization. Commodity market integration in the late 19th century was both impressive in scale and global in scope (O'Rourke 2001). Capital market integration was also very impressive. In fact, as (O'Rourke 2001: 46) notes, international capital flows, by some measures, have never been as important as they were in the 19th century despite the rhetoric about unprecedented nature of today's globalization.

Given the perspective on the agnostic or inconclusive globalization and economic performance link and disillusionment throughout the developing world of unfettered globalization, two questions become pertinent. First, how has globalization impacted on Nigeria economic performance? Second, is there any empirical evidence to suggest that key sectors of the Nigerian economy such as the agricultural sector, manufacturing sector and even the external trade sector stand to benefit from recent globalization experience? It is these questions that this study sets out to investigate. The import of this study is, again, two fold. Because the agricultural and manufacturing sectors hold the key to job creation and poverty reduction in a developing economy like Nigeria, it becomes insightful to investigate how its globalization experience have impacted on these sectors. Finding from the study is expected to provide evidenced-based policy guide on globalization because, as Adawo (2004) notes, Nigeria cannot continue to operate Robinson Crusoe's type of economy in the 21st century. Second, the focus on pre-globalization (pre-SAP) and post-globalization (post-SAP) is of essence because, it was after the Structural Adjustment Programme[3] of 1986 that there were consistent implementation of mainstream or orthodox economic reform programmes which were in line with the globalization process occurring in the world during that period.

The rest of the paper is structured as follows. Section 2 deals with the theoretical[4] and empirical issues on globalization and economic performance, measured by economic growth and components of growth. Section 3 discusses the data and methodology. In section 4, we present and analyze the empirical results while the paper is concluded in section 5 with suggestions for policy.

2. Theoretical and Empirical Issues on Globalization and Economic Performance

As has been noted, Globalization is a multidimensional phenomenon covering all aspects of life – economic, political, cultural, environmental and social. In spite of its different forms, it is the economic dimension that constitutes the heart or hallmark of globalization. Economic globalization, according to Uwatt (2004), refers to the integration of the domestic economies with the world economy and the inevitable consequential increase in the economic interdependence of the countries through trade, financial and investment flows, freer factor movement and exchange of technology and information. As Obadan (2003) rightly notes, in the context of economic globalization, openness and market constitute the platform of globalization while trade, finance and investment, and the entrepreneur are the hallmark.

Economic performance, sometimes proxied by economic growth, components of growth and/or determinants of growth, refers to general improvement in macroeconomic conditions and indicators in an economy – including reduction in unemployment rate, economic stability (stable general prices), and sustained increase in output or income resulting from improvement performance of various sectors of the economy such as agriculture, manufacturing and external trade, among others. Thus, this study proxies the performance of the economy with economic growth, defined as the steady process by which the productive capacity of the economy is increased overtime to bring about rising levels of national income (gross national income or product). It is often measured by percentage change in gross (or real) per capita national product (GNP). Several factors have been identified as determinants of economic growth. This include advancement in technology, international trade or degree of openness of the economy or trade liberalization, foreign capital inflow and investment, transformational education and human capital development, sound macroeconomic (fiscal, monetary, exchange rate and income) policies and institutions, good governance and physical capital formation or accumulation.

From the above, it can be seen that globalization and economic growth are related at least theoretically. Globalization is associated with more openness of the economy with a concomitant increase in volume of trade. Theory suggests that greater openness (variously measured by ratio of import plus export to GDP, and net BOPs to GDP ratio, among others) portends better economic performance. There are, at least, two theories which provide the channels through which openness affect economic growth. First is the Allocative-Efficiency Gains Theory which postulates that openness yields unambiguously better economic performance in terms of a higher level of output or income even if not in terms of a higher long-run rate of growth. The reason being that removal of trade barriers expands the feasible set of consumption possibilities by providing a more efficient technology to transform domestic resources into goods and services (Martin 1992). This theory also suggests that greater openness reduces other costs of a less open trade regime such as deadweight losses arising from domestic monopolies, cost arising from scale inefficiency, technical inefficiency or x-inefficiency and cost of rent-seeking and directly unproductive activities.

[3] Since early 1980s, the world economies has been guided by neoliberal economic policies that promotes capitalism at a global scale through trade liberalization, foreign direct investment (FDI), financial capital flows as well as the relaxing of government regulations especially in financial, goods, and labour markets. Economic globalization in Nigeria can be traced back to the introduction of Structural Adjustment Programme (SAP) in 1986, during Gen. Ibrahim Babangida's military regime.

[4] In Adawo and Onye (forcoming), the section preceding theoretical and empirical review shall provide a historical overview of globalization policies implemented before and after the introduction of SAP in 1986.

The second is the New Growth (Endogenous Growth) Theory which suggests that openness can lead to long-run rate of growth of output. This can occur indirectly when openness results in technological progress and expansion of the size of the market facing domestic exporters thereby raising returns to innovation and, thus, enhancing the country's specialization. The endogenous growth model does not, however, predict any positive nexus between openness and increase in growth. It admits that growth may be retarded by increased foreign competition or can be enhanced by increased import protection. Thus, in the endogenous growth literature, the direction of openness-growth relationship is not theoretically given: it is an open question for empirical investigation. Reviewing the theoretical link between openness and growth Cooper (2002: 114) cited in Uwatt (2004) come to the conclusion that:

There is in theory, no systematic link between trade and sustained growth. Just as there is no single, simple connection between growth and trade, there is no single or simple connection between trade and growth. The impact of new trade on growth may well be powerful in some countries, but it can as well be negligible or even negative in others.

In spite of this agnostic theoretical relationship, an extensive review of the empirical literature on this by Uwatt (2004) provides some evidence that foreign trade, openness or trade liberalization may be growth enhancing. Indeed, while some studies have provided evidence-based findings on a positive link between trade and openness on economic growth, others have provided inconclusive results. Some of the studies that found positive growth-openness nexus include Martin (1992), Dollar (1992), Sachs and Wagner (1995), Ojo and Oshikoya (1995), Savvides (1995), Edwards (1998), Ben-David, Romer (1999), Nordstrom and Winters (2000), among others. However, despite the skepticism raised by Rodriguez and Rodrick (2001) among many other researchers, Berg and Krueger (2002), after surveying prominent empirical research on the subject, conclude that 'varied evidence support the view that trade openness contributes greatly to growth'.

In the case of developing countries, Prasad *et al*. (2003) find that the average income per capita for the group of more financially open (developing) economies does grow at a more favourable rate than that of the group of less financially open economies. Whether this actually reflects a causal relationship and whether this correlation is robust after controlling for other factors remain unresolved questions. While studies such as Klein and Olivei (2000) and Bekaert, Harvey and Lundblad (2001) find a positive effect of financial integration on growth, others (Grilli and Milesi-Ferretti 1995; Edwards 2001; Edison Klein, Ricci and Slock 2002) found no effect at all. Yet, others such as Eichengreen and Wyplosz (2001), and Reisen and Solo (2001) find mixed effects. Thus, there seem to be indeterminacy or agnosticism in financial globalization-growth linkage in developing countries

In terms of effect of foreign capital flow and investment on growth, studies by De Mello (1999), Borenzstein, De Gregorio and Lee (1998) and Reisen and Soto (2001) find that Foreign Direct Investment (FDI) appears to promote growth. De Mello (1999), for instance, used data for the 1980s to show that FDI appear to promote growth in both developing and OECD countries. Borenzstein, De Gregorio and Lee (1998) FDI promotes growth only in countries with sufficiently high level of human capital. Reisen and Soto (2001) examine six types of capital flows (FDI, portfolio equity flows, portfolio bond flows, long-term bank credit, short-term bank credit, and official flows) between 1986 to 1997 period using a dynamic panel regression framework. They found that of the six types of capital flows, only FDI and portfolio equity flow are positively associated with subsequent economic growth.

In sum, there is, therefore, different effect of trade openness and financial openness (integration) on growth and overall economic performance. The effect varies across countries and, perhaps, even on the measure of trade and financial openness, and sample period used. This study adopts a variety of recent measures of openness and financial integration to investigate how globalization – captured by total trade flow in percent of GDP (TRADEY), net capital flow in percent of national income (NCAPY), foreign direct investment (and agricultural and manufacturing components of FDI) – has impacted international trade, and Nigeria's manufacturing and agricultural sectors.

3. Methodology and Data Sources

In fellowship with Uwatt (2004) and Ekpo, Ndebbio, Akpakpan and Nyong (2004), we employ the Solow (1956) - type growth model as elaborated by Mankiw, Romer and Weil (1992). In other words, this study adapts the agricultural and industrial production functions of the Nigerian economy that has been promoted by Ekpo, Ndebbio, Akpakpan, and Nyong (2004: 81) to investigate how globalization – measured by total trade flow (in % of GDP), net capital flow (in % of National Income), foreign direct investment (and agricultural and manufacturing components of FDI) – has impacted international trade, and Nigeria's manufacturing and agricultural sectors. The study covers a 42-years period of 1970 to 2012. The *long run*[5] version of our estimated model is given as:

$$\log AGR = \alpha_0 + \alpha_1 \log AGRFDI + \alpha_2 \log TRADEY\ \alpha_3 \log NCAPY + \alpha_4 INF + \alpha_5 \log GSA + \alpha_6 \log INFRAS + \alpha_7 D1 \quad (1)$$

$$\log MAN = \beta_0 + \beta_1 \log MANFDI + \beta_2 \log INFRAS + \beta_3 \log TRADEY + \beta_4 \log NCAPY + \beta_5 EXR + \beta_6 CPI + \beta_7 \log GSC + \beta_8 D1 \quad (2)$$

$$EXBD = \varphi_0 + \varphi_1 EXR + \varphi_2 INF + \varphi_3 \log GDPC + \varphi_4 \log INFRAS + \varphi_5 \log NCAPY + \varphi_6 D1 \quad (3)[6]$$

Where α_0, β_0, φ_0 are the intercepts while α_i, β_i, and φ_i (i = 1 through 8) are the coefficients of the variables in equations 1, 2, and 3 respectively. The a priori expectations about the signs of the coefficients are as follows:

$\alpha_1, \alpha_2, \alpha_3, \alpha_5, \alpha_6, \alpha_7, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \varphi_1, \varphi_3, \varphi_4, \varphi_5 > 0$ and $\alpha_4, \beta_6, \varphi_2 < 0$

Some justifications for the theoretical a priori expectations are necessary. Inflation, which implies tax on real money balances, creates uncertainty about business expectations and may thus lead to fall in investment in agriculture and manufacturing,

[5] Estimation of long run model is simply an Ordinary Least Square regression of the equations 1, 2, and 3 with the variables examined in their log form where applicable. We recover the residuals from each equation and incorporate them into the overparametized model (see result of overparametized model in the Appendix) of the error correction model. The parsimonious error correction model (ECM) is got from the overparametized model through an iterative process of moving from general to specific as suggested by Hendry (1995)

[6] External Balance (EXBD) and Foreign Direct Invest (FDI) were not examined in their log form because they include several negative values. We did not also examine inflation and exchange rate in log form because they are rates.

resulting in a reduction in output from these sectors. This may eventually lead to unfavorable net Balance of Payments (BOPs), for an open economy as the amount of output available for export plummets. CPI is expected to have similar negative impact on manufacturing output (MAN) as consumption and production cost rises. Although economic theory provides no unambiguous and no systematic link between trade openness (or globalization in general) and economic performance, ab initio, we expect a positive link between FDI, trade output ratio and net capital inflow (to income ratio) on the one hand and agricultural and manufacturing output on the other hand. The nature of the relationship, as has earlier been noted from the literature, is an open question for empirical investigation. If we take corruption for granted in Nigeria, increased government spending in agriculture and manufacturing is expected to result in increased output from these sectors. This portends positive nexus between the expenditure in agriculture and manufacturing on agricultural and manufacturing output, respectively. Similarly, government expenditure in core infrastructure is expected to have a positive effect on manufacturing, agriculture and external balance.

In implementing the model, we shall first estimate the long run equations and thereafter proceed to implement the error correction model (ECM) where applicable. The sources of data and the definition of the variables used in the model are presented in Table 1.

Table 1: Data sources and Variable Definitions

Variable	Definition/Description	source
AGR	Agricultural Output (N'm)	CBN 2013
AGRFDI	Agric. Component of Private Foreign Direct Investment (N'm)	CBN 2008
TRADEY	Total Trade (% GDP)	WEO 2013
NCAPY	Net Capital Flow to GDP Ratio Measured by Net Official Development Assistance (ODA) Received (% of Gross National Income, GNI)	
INF	Inflation, Consumer Prices (Annual %)	WDI, 2014
GSA	Recurrent Expenditure on Agriculture (N'm)	CBN 2011
INFRAS	Infrastructure measured by Electric Power Consumption (Kwh Per Capita)	WEO
MAN	Manufacturing Output (N'm)	CBN 2011
MANFDI	Manufacturing Component of FDI (N'm)	CBN 2008
EXR	Average Monthly Official Exchange Rate (N/USD)	CBN 2013
CPI	Consumer Price Index (2005 = 100). CPI Is Used As An Indicator of Production Cost	WEO 2013
GSC	Recurrent Expenditure On Manufacturing Proxied by Recurrent Expenditure On Construction (N'm)	CBN 2013
EXBD	External Balance (X-M), i.e., Export Minus Import ($US)	WDI 2014
FDI	Foreign Direct Investment, Net Inflows (% Of GDP)	WDI 2014
GDPC	Gross Domestic Product (GDP) Per Capita (Constant 2005 US$)	WDI 2014
D1	Dummy variable with values of 1 in post-SAP (economic globalization era), i.e., 1986-2012 and 0 in pre-SAP or pre-globalization period (1970-1985)	Authors

Note: WEO-World Economic Outlook, CBN- Central Bank of Nigeria (CBN) Statistical Bulletin (2008, 2011, 2013), WDI- World Economic Indicators. Data on MANFDI and AGRFDI for the balance of 2009-2012 were estimated from those obtained from CBN 2008 using their average growth rate of 0.182358 and 0.127008 respectively. External balance on goods and services (EXBD), formerly called resource balance, equals exports of goods and services minus imports of goods and services.

3.1. Model Estimation Procedure

We employ the Engle and Granger[7] (1987) 2-step error correction model (ECM). The general specification of the ECM is as follows:

$$\Delta \log Y_t = \beta_0 + \sum_{t=-1}^{n} \beta_1 \Delta \log X_t - \beta_2 EC_{t-1} + \varepsilon_t \qquad (4)$$

Where:

Δ is the first difference operator; EC_{t-1} is one period lagged value of the error correction term; X_t is a vector of past value of regressors; β_1 captures the short term effects of X in the prior period on Y in the current period. β_2 captures the rate at which the system Y adjusts to equilibrium state after a shock. In other words, β_2 captures the speed of error correction. If the ECM approach is appropriate, then $-1<\beta_2<0$.

Thus, ab initio, β_2 is expected to be negative. If $\beta_2<0$, then Y is too high and will be adjusted downward in the next period; if $\beta_2=0$, the system is in equilibrium; and if $\beta_2>0$, Y is too low and will be adjusted upward in the next period – technically, we say that Y is explosive when $\beta_2>0$. In such case, when $\beta_2>0$, the system will apparently drift apart in the long run (Ekong and Onye 2012a)

In the Engle and Granger 2-step procedure, the error correction component (EC) is derived from the co-integrated time series. For the current study, the Engle and Granger 2-step ECM is preferred to the Vector-Autoregressive-based (VAR-based) approaches that allow all variables in the model to be endogenous because there is no reason to assume that our model (equations 1, 2, and 3) are simultaneously determined. In other words, there is no plausible rationale to assume that all the exogenous variables in the equations (1, 2, and 3) are also endogenous. Thus, the vector of regressors in equation 4 is assumed to be exogenous, an assumption that is central to the implementation of the Engle and Granger ECM.

The 2-step procedure actually involves the following four steps: i) determining that all the time series are integrated of the same order (ii) demonstrating that the time series are co-integrated (iii) obtaining an estimate of the co-integrating vector (EC) by regressing Y_t on X_t and taking the residuals and

[7] Error Correction Model (ECM) was first introduced by Sargan (1964) and later popularized by Engle and Granger (1987), the so-called Engle and Granger 2-step ECM. The Johansen's multivariate VAR-based ECM that allow all variables in the Vector Auto-Regressive model to be endogenous are becoming increasingly common.

(iv) entering the lagged residual into the regression of ΔY_t on ΔX_{t-1}. In implementing the ECM, therefore, an extensive systematic analysis of the data is carried out to conform to the basic properties of Ordinary Least Square (OLS) estimation.

First, to avoid what Granger and Newbold (1974) first described as spurious regression – the regression of two or more non-stationary variables at their levels, the result of which has no economic meaning – we check the integration properties of the variables by conducting a battery of unit root tests based on the Augmented Dickey Fuller (ADF), Phillip Persons (PP) and Kwaiatkowski-Phillips-Schmidt-Shin (KPSS) techniques. In fact, as Gujarati (2004:798) and Ekong and Onye (2012b:61notes), "if a time series is not stationary, its behaviour can only be studied for the time period under consideration. Thus, an integrated process may be of little practical value for the purpose of statistical inferences such as forecasting or hypotheses testing". The ADF unit root test involves estimating (5) for each series and, then, testing the null hypothesis of a unit root, H0: $\alpha=0$, versus the alternative of a stationary process, H1: $\alpha<0$. This test is based on the typical t-ratio for α (Fuller 1976; Dickey and Fuller 1979). But the t-statistic does not follow the t-distribution under the null; thus, critical values are simulated for each regression specification and sample size.

$$\Delta yt = \alpha y_{t-1} + x't\beta + \sum_{p=1}^{q} \Delta y_{t-p} + \varepsilon_t \qquad (5)$$

X'_t is exogenous regressor that may include a constant term only, a constant and a trend, or none while Δy_{t-p} are terms included to correct for higher order serial correlation. Notably, the PP unit root test involves estimating a non-augmented version of equation 5, i.e., without the lagged difference terms (augmentation terms). PP unit root test uses a non-parametric method to control for serial correlation under the null hypothesis, but the H_0 and H_1 are same as in the ADF test. However, the PP unit root test is based on its own statistic and the corresponding distribution (Phillips and Perron, 1988). The KPSS unlike the ADF and PP assume that the series is stationary under the null. KPSS tests the OLS residuals obtained from (5) based on the Langrage Multiplier (LM), where x_t is as defined in (5).

$$\Delta y_t = xt'\beta + e_t \qquad (6)$$

In the second stage, having determined the stationary state of the variables, we proceed to the test of co-integrating relationship in each of the three equations of the model using the Johansen Co-integration approach. Johansen's system based co-integration test procedure is preferred to the residual-based tests, such as Augmented Engle Granger and Philip Ouliaries tests, because it is able to indicate the number of co-integrating vector(s) in each equation of the model.

In the third stage, if an equation in the model passes the preliminary test of co-integration, which indicates the presence of long run equilibrium relationship among the variables in that particular equation, we proceed to check the short run adjustment in the equation using the error correction mechanism. In implementing ECM, the general- to–specific procedure suggested by Hendry (1995), is adopted to estimate a parsimonious model of the effect of globalization on international trade, agriculture and manufacturing in Nigeria. This procedure imposes lag structures of all the variables in the co-integrating equation. Moreover, this technique makes it possible to deal with irrelevant variables rather than omitting relevant ones – using the Akaike Information Criterion[8], the significance of the individual variables, and the adjusted R^2 as a guide.

4. Analysis of Results

In this section, we first present and analyze the results of model diagnostic tests, namely, test of integration and co-integration properties of the time series employed for the study, and thereafter proceed with the interpretation of estimates of our long run model. Presentation and interpretation of the result of parsimonious error correction model, the dynamic model, forms the last part of this section.

4.1. Analysis of Unit Root Test Results

As has been noted, in the Unit Root test, we test the null hypothesis (Ho) that there is a unit root against the alternative hypothesis (H1) that the process is stationary. The decision rule is as follows: taken in absolute terms, if the computed test statistic is greater than the critical value, we reject the Ho of a unit root, and, therefore, accept the H1 of no unit root. On the other hand, taken in absolute terms, if the computed test statistics is less than the critical value, we accept Ho and reject H1 which means that the series is non-stationary or that the series contains a unit root. As is obvious from Table 2, at their level, the ADF and PP returned result for which we are unable to reject the Ho of unit root, except the result for inflation. The KPSS returned results that are mixed. But when the first differences are taken, the entire variables became stationary. Overall, the battery of unit root tests indicate that all the variables became stationary only after taking their first differences except inflation (INF) which is stationary at level. The implication is that the dynamic model should be implemented at the level of differences that make the variable stationary. Implementing the models with the variables in their log form, difference form, or log-difference form are common methods of inducing stationarity in the variable so as to help in reducing the possibility of spurious regression results; but where these data transformations have been conducted, the results should be interpreted accordingly[9].

Having determined the integration state of the variables, we proceed to implement Johansen's test of co-integration.

[8] The Akaike Information Criterion (AIC) is used in model selection for non-nested alternatives. Smaller values of the AIC are preferred.

[9] If variable are regressed in log form, the estimates can be interpreted as elasticities; but where the log-difference of the variables have been taken, the regression coefficients are approximately equal to their growth rates and can be interpreted as such.

Table 2: Result of Unit Root Test

VAR	ADF Statistics			PP statistics			KPSS Statistics			Final conclusion
	Lev	1st Diff	Conclu	Lev	1st Diff	Conclu	Lev	1st Diff	Conclu	
AGR	0.37	-4.56*	I(1)	-0.28	-4.47*	I(1)	0.8*	0.22	I(0	I(1)
AGRFDI	-1.32	-8.56*	I(1)	-1.47	-8.58*	I(1)	0.7*	0.1	I(0)	I(1)
TRADEY	-2.88	-8.43*	I(1)	-2.9	-8.36*	I(1)	0.56*	0.17	I(0)	I(1)
NCAPY	-1.8	-5.4*	I(1)	-1.9	-5.4*	I(1)	0.33	0.11	Inc	I(1)
INF	-3.8*	-7*	I(0)	-3.53*	-15.7*	I(0)	0.14	0.5*	I(1)	I(0)
GSA	-0.56	-9.03*	I(1)	-0.77	-9.19	I(1)	0.78*	0.06	I(0	I(1)
INFRAS	-1.98	-6.1*	I(1)	-2.14	-8.8*	I(1)	0.69*	0.19	I(0)	I(1)
MAN	-1.42	-6.42*	I(1)	-1.23	-6.42	I(1)	0.80*	0.16	I(0	I(1)
MANFDI	0.05	-6.25*	I(1)	0.11	-6.24*	I(1)	0.76*	0.07	I(0)	I(1)
EXR	-0.05	-5.16*	I(1)	-0.2	-5.16*	I(1)	0.76*	0.17	I(0)	I(1)
CPI	-0.62	-3.24*	I(1)	-0.47	-3.07*	I(1)	0.81*	0.15	I(0	I(1)
GSC	1.11	-6.46*	I(1)	0.46	-14.5*	I(1)	0.80*	0.35	I(0	I(1)
EXBD	-1.21	-12.8*	I(1)	-0.92	-12.7*	I(0)	0.77*	0.26	I(0)	I(1)
FDI	1.29	-5.52*	I(1)	1.07	-5.6*	I(1)	0.66*	0.32	I(0)	I(1)
GDPC	-0.16	-5.51*	I(1)	-0.63	-5.6*	I(1)	0.19	0.32	Inc	I(1)

Source: Author's computation.

Note: 'Drift' or 'intercept' is assumed across the battery of Unit Root Tests; the respective critical values (CV) are ADF (2.93), PP (2.93) and KPSS (0.46). The variables were examined in their log form. The critical values changes when we assume 'Drift' 'Drift and Trend' or 'none'; see Table A2 (Preliminary Summary of Unit Root Result) for more exposition. 'inc' stands for inconclusive Unit Root result.

4.2. Analysis of Co-Integration Test Results

The Johansen's co-integration result presented in Table 3 indicates seven, two and one co-integrating vectors for equation 1, 2, and 3 respectively, based on the Eigenvalue and Trace statistics.

Table 3: Summary of Co-Integration Test Results

Equation1: Series: AGR AGRFDI TRADEY NCAPY INF GSA INFRAS
Exogenous series: LOG (AGRFDI) LOG (TRADEY) LOG (NCAPY) LOG (GSA)
Warning: Critical values assume no exogenous series
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Spectively Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.995837	565.7942	139.2753	0.0001
At most 1 *	0.987040	384.9021	107.3466	0.0001
At most 2 *	0.957302	241.4875	79.34145	0.0000
At most 3 *	0.838948	137.4186	55.24578	0.0000
At most 4 *	0.740493	77.15976	35.01090	0.0000
At most 5 *	0.569390	32.64372	18.39771	0.0003
At most 6 *	0.136405	4.839479	3.841466	0.0278

Trace test indicates 7 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

EQUATION 2: Series: MAN MANFDI
Exogenous series: LOG (MANFDI) LOG (INFRAS) LOG (TRADEY) LOG (NCAPY) (EXR) (CPI) LOG (GSC)
Warning: Critical values assume no exogenous series
Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.857846	76.49982	18.39771	0.0001
At most 1 *	0.209322	8.220269	3.841466	0.0041

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

EQUATION 3: Series: EXBD EXR
Exogenous series: EXR INF GDPC INFRAS NCAPY
Warning: Critical values assume no exogenous series
Lags interval (in first differences): 1 to 2

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	5 Percent Critical Value	1 Percent Critical Value
None **	1.000000	1355.006	18.17	23.46
At most 1	0.019665	0.754715	3.74	6.40

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

Overall, the co-integration test indicates that equation 1, 2, and 3 are long-run equations and that there are long run equilibrium relations among the variables in each of the equations. The result of the error correction model which accounts for the short dynamic relationship among the variable is presented in table 4.

4.3. Analysis of Estimated Equations

We begin with the explanation of the result of *long run* estimates from equation 1, 2, and 3 which is summarized in Table 4. This will be followed by analysis of the short run dynamic model, the ECM, presented in Table 5.

Table 4: Summary of Estimated Long Run Equations

Dep. Varia.	Explanatory Variables													test		
	AGRFDI	TRADEY	NCAPY	INF	GSA	INFRAS	MANFDI	EXR	CPI	D1	GSC	GDPC	FDI	R^2	DW	Pr(F)
AGR	0.23 (2.5)**	-0.61 (-2.1)**	-0.09 (-0.94)	-0.01 (-1)	0.71 (10) **	0.59 (1.86)*	na	na	na	0.36 (1.2)	na	na	na	0.98	1.77	0.0
MAN	na	0.23 (1.41)	-0.18 (-3.53)**	Na	na	-0.33 (-1.47)	1.22 (12.2)**	0.01 (2.33)**	-0.01 (-2.78)**	0.12 0.56)	0.03 (0.51)	na	na	0.99	1.51	0.0
EXBD	na	na	1.3b (1.1)	-35m (-0.5)	na	8.8b (2.1)**	na	36m (0.99)	na	na	na	15.2b (2.3**)	1.3b (1.1)	0.54	2.4	0.0

Source: Author

Note: ** indicates significance at 5% level of significance while * indicates significance at 10% level of significance. 'm' and 'b' stand for '000,000 and '000,000,000 respectively. *na* indicates not applicable. The values in bracket are the t-statistics. All variables except INF, EXBD, EXR are examined in log form. Inflation and exchange rate are in form the of rates and need not be logged while log of external balance returned error, namely, 'log of non-positive number' because it contains many negative figures.

As we can see from Table 4, the entire variable in equation 1, which captures the relationship between agricultural output (AGR) and some measures of economic globalization (net capital inflow, trade-GDP ratio, agricultural FDI) among other macroeconomic variables, met the theoretical a priori expectation except net capital inflow (NCAPY) and trade-GDP ratio (TRADEY) both of which turned out to be negatively signed. Equation 1 indicates that agricultural FDI, government expenditure on agriculture (GSA) and the level of core infrastructure (INFRAS) have exerted positive and significant long run impact on agricultural output in Nigeria. Among the entire variables, the size of the coefficient of government spending is largest at 0.71 units which indicate that a unit rise in government spending on agricultural production will have an elastic impact of about 0.71 units. This is not surprising given the large mass of fertile agricultural land in Nigeria, large population of the country which constitutes ready demand or market for the products and the primary export-oriented nature of Nigeria's export commodities. This shows that an improvement in government financing of agricultural programmes such as the current agricultural transformation initiative of President Goodluck Jonathan and other similar reforms, especially in the power sector, can transform the economy of Nigeria to become the food basket of Africa. It also indicates the need to encourage more foreign direct investment in the agricultural sector given that the effect of agricultural FDI on agricultural production is highly significant with an elastic impact of about 0.23. Expectedly, inflation exerted negative effect on agricultural production but the effect is insignificant indicating that the prevailing general price level in the economy may not have been too detrimental to agricultural production (against the general expectation) in the country over the period of analysis. This shows that Nigeria can still make economic progress under condition of inflation. The dummy variable, D1, capture the effect of economic globalization in the form of various economic reform programmes (financial and capital account liberalization, trade liberalization, commercialization and privatization of public enterprises and foreign exchange market deregulation) implemented through Structural Adjustment Programme (SAP) that started in 1986 in Nigeria. The globalization dummy (D1) with t-statistic of 1.2 (in equation 1) indicates that economic globalization (more than none) did not have any appreciable long run effect on agricultural production in Nigeria. It further indicates that Nigeria should be selective in her choice of globalization policies. Perhaps, it may have had some short-term effect; our dynamic model, the ECM, shall show if it does have. Overall the F-statistic with probability of 0.001 indicates that equation 1 is robust and jointly significant. The R^2 of 0.98 indicates that about 98% of the variation in agricultural production is explained by variation in the explanatory variables in equation 1. The Durbin Watson (DW) statistic indicate absence of serial correlation, hence, there is no reason to suspect that our regression result is spurious.

From equation 2, it can be seen that the joint effect of all the exogenous variables on manufacturing output is significant as shown by the F-statistics with a probability value of 0.001. The R^2 is 99% which means that an overwhelming 99% of the variation in manufacturing output (MAN) is explained by variations in the explanatory variables. The DW statistics of 1.51 indicates the absence of serial correlation. It can be seen that all the variables met the a priori expectation except net capital inflow (NCAPY) and level of infrastructure (INFRAS). Trade-GDP ratio (TRADEY) has a positive, but highly insignificant effect on manufacturing output indicating that trade openness has not contributed significantly to the growth in manufacturing output. This result is not surprising as the country can scarcely boost of appreciable level of export of manufactured goods, except semi-finished product, commonly found in the textile industries. Manufacturing FDI (MANFDI) and government spending on construction (GSC) exerted long-run positive and significant effect on manufacturing output. These suggest that Nigeria must look inward in order to develop its manufacturing sector. As the study clearly show, the way to do this ensure timely disbursement and conscientious utilization of fund meant for manufacturing sector. In order words, efforts at growing the manufacturing sector should not only entail mere appropriation and disbursement of fund to the sector but improved monitoring of resources utilization. Because our model takes the alarming rate of corruption in Nigeria for granted, this note of caution is important. Similarly, the positive and highly significant effect of manufacturing FDI on manufacturing output must be interpreted with a grain of salt, with serious caution. This is because if Nigeria is to develop local capacity and ensure that home-groomed cottage industries and other manufacturing firms survive and thrive, it must close its borders against unfettered globalization in form of FDI especially by multinational companies (in the manufacturing sector) as the ASEAN Tigers did. This was what helped them to build local capacity and develop technology. We must remind ourselves that the model being discussed here is a long run model, but as Keynes (1936) would say '*the long run is a misleading guide to current affairs; in the long run, we are all dead'*. By

implication, we must also be concerned with what happens to us (or the coefficients of our model) in the short run. This is where the short term dynamic model, the error correction model (Best 2008:5), presented in Table 5 becomes consoling as a more useful guide to current affairs.

On the long run effect of economic globalization on international trade (equation 3), all the variables (net capital inflow, inflation, exchange rate, net inflow of FDI, infrastructure, and real GDP per capita) met the a priori expectation in that they are correctly signed. Infrastructure and real GDP per capita have long run positive and significant effect on external balance with an overwhelming elastic impact of 8.8 billion and 15.2 billion units respectively. The indication here is that investment in core infrastructural facilities like road, railway and power are important ways of encouraging the growth of local firms and development of indigenous technology in cottage industries that may improve our external balance position in the future. The probability of F-statistic is 0.001; indicating that the model is robust and that all the variables are jointly significant. The DW statistics of 2.4 indicates that there is the absence of serial correlation and hence, no reason to suspect that our regression is spurious. Overall equation 3 points to the notion that economic globalization did not have long run significant and/or positive impact on Nigeria external balance position. In other words, globalization did not improve Nigeria's external trade position over the period of analysis. The ECM mimics the short run dynamic situation.

Table 5: Result of Parsimonious Error Correction Model (ECM)

Depend-ent Variable	Explanatory Variables																	
	ΔlogAGR $_{t-1}$	**ΔlogAGRIFDI$_{t-1}$**	**ΔlogTRADEY$_{t-1}$**	**ΔlogNCAPY$_{t-1}$**	**ΔINF $_{t-1}$**	**ΔlogGSA $_{t-1}$**	**EC $_{t-1}$**	**ΔlogMAN$_{t-1}$**	**ΔlogMANFDI $_{t-1}$**	**ΔlogINFRAS $_{t-1}$**	**ΔlogTRADEY $_{t-1}$**	**EXR $_{t-1}$**	**CPI $_{t-1}$**	**ΔlogGSC $_{t-1}$**	**EC2 $_{t-1}$**	**ΔEXBD(t-1)**	**ΔEXBD(t-2)**	**ΔlogGDPC $_{t-1}$**
ΔlogAGR	0.23 (1.4)	-0.7 (-1.9)	0.13 1.13)	0.01 (0.3)	0.004 (2.5)**	-0.13 (-2.3)**	-0.26 (-3.1)**	na	na	Na	na	na	na	na	na	na	na	na
ΔlogMAN	na	na	na	-0.1 (-0.9)	na	-0.00 (-0.04)	na	-0.2 (-0.9)	0.1 (0.4)	0.04 (0.14)	0.14 (0.8)	0.003 (1.3)	-0.01 (-1.7)	-0.1 (-1.1)	-0.17 (-0.71)	na	na	na
EXBD	na	na	na	-43b (-1.5)	92.7m (0.8)	na	na	na	na	14.6b (1.23)	na	na		na	na	0.9 (1.9)*	1.1 (3.8)**	15b (0.6)

Dependent. Vari	D1	EC3(-1)	R^2	DW	Pr(F)
ΔlogAGR	0.11 (2.16)**	na	0.46	1.96	0.019
ΔlogMAN	0.09 (0.9)	na	0.23	2.1	0.6
EXBD	3.1b (0.84)	-1.2 (-1.97)*	0.47	1.67	0.009

Source: Author.

Note: ** indicates significance at 5% level of significance while * indicates significance at 10% level of significance. 'm' and 'b' stand for '000,000 and '000,000,000 respectively. *na* indicates not applicable. The values in bracket are the t-statistics. All variables except INF, EXBD, EXR are examined in log form. Inflation and exchange rate are in form of rates and need not be logged while log of external balance returned error, namely, 'log of non-positive number' because it contain many negative figures. See the Appendix for output of the over-parametized and parsimonious models.

The results of parsimonious ECM presented in Table 5 shows that the *short run* dynamic effects of globalization on international trade and Nigeria's manufacturing and agricultural sectors differ markedly from the *long-run* effects.

On the effect of economic globalization (and other macroeconomics magnitudes) on agricultural production, it can be seen from Table 5 that only one-year lagged values of inflation (INF) and government spending on agriculture (GSA) has a significant effect on agricultural output (AGR). In the short term, globalization (measured here by agricultural FDI, trade-GDP ratio, and net capital inflow) did not have a significant effect on agricultural output. The effects of trade-GDP ratio (TARDEY) and net capital inflow (NCAPY) are positive but insignificant. Here, the globalization dummy (D1) with t-statistic of 2.16 indicates that economic globalization during SAP era (compared to pre-SAP era) actually had some ***short-run*** effect on agricultural production in Nigeria but as the coefficients of trade-GDP ratio (TRADEY) and net capital inflow (NCAPY) indicate, the short run effect of these individual explanatory variables were positive but not significant. Importantly, this positive but insignificant short run effect of TRADEY and NCAPY became negative in the long run; a pointer to the fact that the weak positive effect of economic globalization on agricultural output (resulting from various economic reform programmes that were implemented via SAP) are ephemeral**.** In fact, in the long run, the effect of globalization on agricultural output worsened as continued capital inflow (NCAPY) and more trade openness or liberalization (TRADEY) exerted negative and detrimental effect on agricultural production (see Table 4). Only exclusive foreign direct investment in agricultural sector (AGRFDI) had a positive and significant effect on agricultural output in the long term (equation 1), a result that is analogous to the long term effect of manufacturing-FDI (MANFDI) on manufacturing output (equation 2). The analyses so far provide overwhelming evidence which suggest that a viable approach to raise agricultural productivity is to look inwards through improved investment in core infrastructure (electricity, road and rail ways) and improve government funding and monitoring of funds disbursed to the agricultural sector. There is also the need to allow foreign direct investment in the agricultural sector given the positive and highly significant effect of AGRFDI on agricultural output. The error correction term is negative and significant with a coefficient of -0.26 and t-statistic of -3.11, suggesting that deviations from long-run equilibrium are corrected at about 26% per annum. In other

words, it will take 1/0.26 or 3.9 years for the deviations to return to equilibrium.

On the *short-term* effect of globalization on manufacturing sector, Table 5 indicates that the manufacturing FDI (MANFDI), net capital flow (NCAPY) and trade-GDP ratio have not significantly impacted the manufacturing sector; the effect of NCAPY is even negative. This finding is further supported by the fact that the period of economic globalization, 1986-date, when compared to pre-globalization era (1970-1985) have also not significantly impacted Nigeria's manufacturing sector as is obvious from the highly weak t-statistics (0.86) of the globalization dummy variable (D1). The error correction term ($EC2_{t-1}$) with t-statistic of -0.71 is negative but insignificant, suggesting that deviations from long run equilibrium are not corrected in the short-run.

The *short-run* impact of economic globalization on external trade provides even more abysmal results. Net capital flow exerted negative short-term effect on external balance position[10]. The globalization dummy (D1) indicates that globalization (compared to none) did not improve Nigeria's external balance position. The error correction term (EC3), with coefficient of -1.23 and t-statistics of -1.97 indicates dis-equilibrium in Nigeria's external balance position that is divergence, oscillatory and explosive. This implies that unfettered globalization will apparently result in an explosive dis-equilibrium situation – implying a damaging external balance position for Nigeria.

5. Recommendations and Conclusion

This paper has shown, with clear analysis, that while economic globalization has contributed to the growth of agricultural production, its effect on manufacturing and Nigeria's external balance position has been negative and detrimental. Relying on a dynamic short term model (Best 2008:5), namely the 2-step Engle and Granger (1987) error correction model in assessing the effect of globalization – captured by trade openness (TRADEY), net capital inflow (NCAPY), foreign direct investment in agriculture (AGRFDI) and foreign direct investment in manufacturing sector (MANFDI) – our findings clearly show that Nigeria should adopt selective globalization policies for sustained increase in manufacturing and agricultural production and improvement in its external balance position. Trade openness and net capital inflow have short term positive and insignificant effect on agricultural output (AGR); but the effect became negative and detrimental to agricultural production in the long term period. Contrastingly, the results further indicate that foreign direct investment in agriculture has significantly contributed to increase in agricultural production over the long term period. The effect of net capital inflow on Nigeria external balance position is insignificant in the short run; the situation became worsened over time as the effect turned negative. Overall, the findings reveal that except for agricultural sector, economic globalization (compared to none) has not contributed to improvement in manufacturing output and Nigeria's external balance position.

[10] The long run effect of net capital inflow of external balance is positive but insignificant

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Appendix

Table A1: Preliminary summary of Unit Root Results

		AGR	AGRFDI	TRADEY	NCAPY	INF	GSA	INFRAS	MAN	MANFDI	EXR	CPI	GSC	EXBD	FDI	GDPC
ADF: drift	level	0.37	-1.32	-2.88	-1.77	-3.7 *	-0.56	-1.98	-1.42	0.05	-0.1 *	-0.62	1.11	-1.2 *	1.29 *	-0.2 *
	1st diff.	-4.56	-8.56 *	-8.43	-5.4	-7.03 *	-9.03	-6.08 *	-6.42	-6.25 *	-5.16	-3.24	-6.46	-12.8 *	-5.52	-5.51
ADF: drift & trend	level	-2.46	-2.9 *	-2.9 *	-2.2 *	-3.7 *	-2.93	-3.13 *	-2.29	-3.3 *	-1.9 *	-2.11	-4.9	-4.1 *	-0.1 *	-0.1 *
	1st diff.	-4.51	-8.51	-8.55	-5.35	-6.99 *	-9.03	-6.17	-6.56	-6.28	-5.1	-3.22	-6.51	-12.8	-6.02	-6.03
pp: drift	level	0.28	-1.47	-2.88	-1.89	-3.5 *	-077	-2.14 *	-1.23	0.11 *	-0.2 *	-0.47	0.46	-0.9 *	1.07 *	-0.6 *
	1st diff.	-4.47	-8.58	-8.36	-5.36	-15.7	-9.19	-8.8	-6.42	-6.24	-5.2	-3.07	-14.5	-13 *	-5.6	-5.6
PP: drift & trend	level	-2.02	-2.92 *	-2.74 *	-2.24 *	-3.5 *	-2.91	-3.04 *	-1.69	-2.41 *	-2.2 *	-1.49	-4.84	-4.1 *	-0.3 *	-0.3 *
	1st diff.	-4.39	-8.6 *	-8.39 *	-5.32	-16	-9.06	-8.91 *	-6.56	-6.31 *	-5.1 *	-3.02	-16.6	-13 *	-6.0 *	-6.0
KPSS: drift	level	0.8	0.7	0.56	0.33	0.14	0.78	0.69	0.80	0.76	0.76	0.81	0.8	0.77	0.66	0.19
	1st diff.	0.22	0.1	0.17	0.11	0.5 *	0.06	0.19	0.16	0.07	0.17	0.15	0.35	0.26 *	0.32	0.32
KPSS: drift & trnd	level	0.14	0.09	0.09	0.09	0.14	0.11	0.13	0.08	0.1	0.11	0.10	0.13	0.15	0.19	0.19
	1st diff.	0.14	0.06	0.06	0.1	0.5 *	0.06	0.11	0.07	0.05	0.16	0.14	0.19	0.23	0.14	0.14
Summary	SIG @ Lev		2	1	0	3		2		2	1	1		4	1	0
	Sig @ 1st Diff		4	4	4	6		4		4	4	4		4	4	4

Type of Unit Root Test	Critical Value	
	Drift	Drift & Trend
ADF	2.9	3.52
PP	2.9	3.52
KPSS	0.46	0.146

Source: Author.

Note: The critical values for each type of test of a Unit Root test (ADF, KPSS, and ADF) remains the same when the assumption about 'Drift' or 'Trend and Drift' is maintained. But the critical values changes if we change from 'Drift', to 'Drift and Trend', or to 'None'. KPSS reports a special critical. The final summary-result of Unit Root test is presented in Table 2.

Table A2: Raw Data Used for the Analysis

years	MANFDI	AGRFDI	GDPC	TRADEY	FDI	NCAPY	INFRAS
1970	224.8	11.2	694.49997	19.620599	1.6340066	0.8901538	.
1971	378.8	15.4	775.12562	24.463635	3.1148679	1.2576299	28.492491
1972	356.6	9.4	782.46862	22.763646	2.4848433	0.73289	32.636787
1973	409	7.9	804.74633	31.267753	2.4599563	0.5420399	35.199204
1974	520.4	20.7	871.83378	39.74699	1.034345	0.3027655	32.752949
1975	506.2	19.2	804.04761	41.170344	1.6923615	0.2998652	45.637891
1976	550.7	21.9	851.80908	42.138099	0.9336558	0.1460846	51.416099
1977	703.8	75	876.35489	47.395266	1.2224483	0.1177898	58.983672
1978	1,263.40	117.6	801.04821	43.314842	0.5774586	0.1103624	60.478561
1979	1,402.50	120.8	830.03534	43.878402	0.6550983	0.054814	59.606905
1980	1,503.90	120.5	840.53873	48.571314	-1.1508558	0.0563206	67.803649
1981	1,705.70	120.5	710.60608	48.293322	0.8879477	0.0659545	50.706742
1982	1,922.50	120.5	685.02855	37.748502	0.8378065	0.0694472	81.577459
1983	2,128.10	127.8	634.11954	27.037172	1.0279788	0.1344357	81.412968
1984	2,109.30	128.5	605.75648	23.608882	0.6637171	0.1168614	61.815794
1985	2,278.10	126	639.54289	25.900064	1.6817265	0.113857	80.129607
1986	2,810.20	128.2	568.53682	23.716756	0.9324369	0.30118	90.515291
1987	3,122.30	11.73	494.23896	41.646662	2.5341258	0.3116363	88.934966
1988	3,637.00	128.9	517.69419	35.311978	1.6271247	0.5187651	86.776315
1989	5,406.40	134.8	536.94171	60.391761	7.7761405	1.5533876	96.662623
1990	6,339.00	334.7	590.05193	53.030221	1.9113747	0.9152645	86.710205
1991	8,692.40	382.8	571.65114	64.876599	2.6005779	1.0359027	89.218196
1992	9,746.30	386.4	559.82258	61.030973	3.0601129	0.9821852	89.668943
1993	12,885	1,214.90	557.38154	58.109849	8.5209213	2.1455562	100.45107
1994	14,059.90	1,208.50	548.58135	42.30887	10.832558	1.2054788	95.146421
1995	27,668.80	1,209.00	533.41691	59.767834	3.7806884	0.801326	91.086149
1996	29,814.30	1,209.00	546.24312	57.690994	4.5543084	0.5762109	85.520591
1997	31,297.20	1,209.00	547.68993	76.859991	4.2974457	0.5947386	81.628728
1998	34,503.90	1,209.00	548.66181	66.173245	3.2849208	0.6962402	76.608209
1999	36,282.10	1,209.00	537.62607	55.846391	2.8014901	..	75.405638
2000	37,333.60	1,209.00	552.18687	71.380531	2.4579351	0.4316824	74.131206
2001	37,779.60	1,209.00	562.23061	81.812849	2.6975206	0.4399542	75.20337
2002	39,953.60	1,209.00	568.97086	63.383637	3.1700633	0.5619264	104.15196
2003	45,719.40	1,209.00	612.13041	75.218903	2.9641048	0.5137332	101.42577
2004	102,995.80	1,209.00	797.87572	48.448131	2.1333308	0.7397852	123.01538
2005	133,894.50	1,209.00	804.15237	50.748359	4.4388493	6.4813264	128.65914
2006	212,729.40	1,209.00	847.53914	64.609314	3.3379794	8.1172385	111.14685
2007	219,512.00	1,329.90	881.59143	64.462909	3.62567	1.2653455	138.10969
2008	229,765.60	1,397.20	911.95753	64.972974	3.9394504	0.6687882	126.45488
2009	229,765.78	1397.33	949.00641	61.802854	5.0476615	1.0696404	119.81515
2010	229765.96	1397.45	995.6802	42.366246	1.6510272	0.5947789	135.39729
2011	229766.15	1397.58	1013.5486	52.560995	2.1381051	0.4528135	148.92846
2012	229766.3	1397.71	1052.1751	44.704608	1.5449925	0.4380916	na

Source: Compiled from WDI 2014, WEO 2013, and CBN 2008, 2011, 2113. The variables are as defined in Table1; their units of measurement are also as indicated.

Table A3: Raw Data Used for the Analysis (contd.)

years	EXR	INF	CPI	D1	GSA	GSC	AGR	MAN	EXBD
1970	0.7143	13.75708	0.1615648	0	1.92	14.28	2,576.40	378.40	-352092958.1
1971	0.6955	15.999115	0.1874137	0	3.86	15.60	3,033.70	415.80	-256637168.1
1972	0.6579	3.4576498	0.1938938	0	8.89	14.91	3,092.70	511.10	-101557285.9
1973	0.6579	5.4026645	0.2043693	0	10.75	17.65	3,261.20	622.40	86138613.86
1974	0.6299	12.674393	0.2302718	0	13.77	17.24	4,377.99	1,589.02	2636248416
1975	0.6159	33.964188	0.3084818	0	22.43	31.97	5,872.92	1,170.44	-1248062954
1976	0.6265	24.3	0.3834429	0	11.71	46.65	6,121.96	1,464.30	-2071954315
1977	0.6466	15.087834	0.4412961	0	29.38	51.07	7,401.64	1,695.58	846673819.7
1978	0.6060	21.709246	0.5370982	0	8.69	33.61	8,033.55	2,915.82	-1537689970
1979	0.5957	11.709731	0.5999909	0	9.15	1.89	9,213.14	3,815.57	2719273128

1980	0.5464	9.972262	0.6598236	0	17.14	46.03	10,011.46	5,162.21	6535122227
1981	0.6100	20.812823	0.7971515	0	13.03	96.66	13,580.32	4,699.95	-2393152302
1982	0.6729	7.6977472	0.8585142	0	14.80	109.81	15,905.50	5,047.61	-1069492337
1983	0.7241	23.212332	1.0577954	0	12.77	94.75	18,837.19	5,542.96	721492354.7
1984	0.7649	17.820533	1.2463001	0	15.66	116.23	23,799.43	4,847.51	2223628711
1985	0.8938	7.4353448	1.3389668	0	20.36	151.11	26,625.21	6,422.64	2561221044
1986	2.0206	5.7171515	1.4155176	1	20.69	153.51	27,887.45	6,591.12	604094052.6
1987	4.0179	11.290323	1.5753341	1	46.15	409.08	39,204.22	7,468.45	2948297094
1988	4.5367	54.511225	2.434068	1	83.00	693.60	57,924.38	11,017.78	2419669655
1989	7.3916	50.466688	3.6624615	1	151.80	491.00	69,713.00	12,475.51	6680744591
1990	8.0378	7.3644003	3.9321799	1	258.00	634.40	84,344.61	14,702.40	5431169980
1991	9.9095	13.006973	4.4436374	1	208.70	406.80	97,464.06	19,356.00	5074686590
1992	17.2984	44.588843	6.4250039	1	455.97	1,140.87	145,225.25	27,004.01	4098548677
1993	22.0511	57.165253	10.097874	1	1,803.81	2,323.46	231,832.67	38,987.14	1507830243
1994	21.8861	57.031709	15.856864	1	1,183.29	1,144.09	349,244.86	62,897.69	1141538829
1995	21.8861	72.835502	27.40629	1	1,510.40	1,699.10	619,806.83	105,289.59	3355738346
1996	21.8861	29.268293	35.427643	1	1,592.56	932.50	841,457.07	132,897.06	2374332000
1997	21.8861	8.5298742	38.449576	1	2,058.88	1,807.98	953,549.37	144,106.95	2396228987
1998	21.8861	9.9963781	42.293141	1	2,891.70	5,634.62	1,057,584.01	141,496.44	-2173178977
1999	92.6934	6.6183734	45.092259	1	59,316.17	16,638.77	1,127,693.12	150,946.52	4265996376
2000	102.1052	6.9332922	48.218638	1	6,335.78	4,991.09	1,192,910.00	168,037.02	14880715751
2001	111.9433	18.873646	57.319253	1	7,064.55	7,202.04	1,594,895.53	199,079.32	4009185099
2002	120.9702	12.876579	64.700012	1	9,993.55	7,452.14	3,357,062.94	236,825.53	5053158536
2003	129.3565	14.031784	73.778577	1	7,537.35	16,951.37	3,624,579.49	287,739.38	2947695039
2004	133.5004	14.998034	84.843913	1	11,256.63	14,897.64	3,903,758.69	349,316.32	10430213031
2005	132.1470	17.863493	100	1	16,325.96	17,915.36	4,773,198.38	412,706.60	14104656280
2006	128.6516	8.2395265	108.23953	1	17,919.03	20,060.42	5,940,236.97	478,524.14	31432245262
2007	125.8331	5.3822237	114.06522	1	32,484.23	71,361.81	6,757,867.73	520,883.03	4983770906
2008	118.5669	11.577984	127.27167	1	65,399.01	94,464.27	7,981,397.32	585,573.04	30779606625
2009	148.9017	11.537673	141.95586	1	22,435.20	80,628.45	9,186,306.05	612,308.89	-450179354.9
2010	150.2980	13.720202	161.43249	1	28,217.95	57,090.96	10,310,655.64	643,070.22	24073188586
2011	153.8616	10.840793	178.93305	1	41,169.88	195,862.88	11,590,120.18	694,722.21	40637405382
2012	na	12.217007	200.79332	1	na	na	na	na	85639581807

Source: Compiled from WDI 2014, WEO 2013, and CBN 2008, 2011, 2113. The variables are as defined in Table1; their units of measurement are also as indicated.

Table A4: Result of Over-parametized and Parsimonious Error Correction Models (ECMs)
Equation 1: Result of Long Run model of Agricultural Output and Globalization Indices:

Dependent Variable: LOG(AGR)
Method: Least Squares
Date: 08/18/14 Time: 16:27
Sample (adjusted): 1971 2008
Included observations: 37 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.067321	1.659200	3.656776	0.0010
LOG(AGRFDI)	0.233421	0.093525	2.495814	0.0185
LOG(TRADEY)	-0.608005	0.297285	-2.045191	0.0500
LOG(NCAPY)	-0.087418	0.093113	-0.938846	0.3556
INF	-0.007729	0.004139	-1.867328	0.0720
LOG(GSA)	0.714424	0.069030	10.34942	0.0000
LOG(INFRAS)	0.594326	0.319788	1.858499	0.0733
D1	0.358766	0.290744	1.233960	0.2271

R-squared	0.982768	Mean dependent var	11.59537
Adjusted R-squared	0.978608	S.D. dependent var	2.605570
S.E. of regression	0.381089	Akaike info criterion	1.097245
Sum squared resid	4.211645	Schwarz criterion	1.445551
Log likelihood	-12.29903	Hannan-Quinn criter.	1.220039
F-statistic	236.2692	Durbin-Watson stat	1.773469
Prob(F-statistic)	0.000000		

Equation 1: Result of *Over-parametized* ECM of Agricultural Output and Globalization Indices:

Dependent Variable: DLOG(AGR)
Method: Least Squares
Date: 08/30/14 Time: 12:54
Sample (adjusted): 1974 2009
Included observations: 33 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.186024	0.055477	3.353143	0.0040
DLOG(AGR(-1))	0.151666	0.162998	0.930477	0.3660
DLOG(AGR(-2))	0.193436	0.211655	0.913924	0.3743
DLOG(AGRFDI(-1))	-0.152878	0.057467	-2.660284	0.0171
DLOG(AGRFDI(-2))	-0.074215	0.047182	-1.572945	0.1353
DLOG(TRADEY(-1))	0.162181	0.123386	1.314419	0.2072
DLOG(TRADEY(-2))	0.081854	0.137418	0.595655	0.5597
DLOG(NCAPY(-1))	0.057141	0.048357	1.181645	0.2546
DLOG(NCAPY(-2))	0.038505	0.037651	1.022673	0.3217
D(INF(-1))	0.004186	0.001569	2.668100	0.0168
D(INF(-2))	0.001029	0.001717	0.599628	0.5572
DLOG(GSA(-1))	-0.207681	0.098696	-2.104257	0.0515
DLOG(GSA(-2))	-0.052486	0.068842	-0.762401	0.4569
DLOG(INFRAS(-1))	-0.330175	0.190192	-1.736011	0.1018
DLOG(INFRAS(-2))	-0.132477	0.172000	-0.770215	0.4524
EC1(-1)	-0.491938	0.150734	-3.263619	0.0049
D1	0.081274	0.063678	1.276320	0.2201

R-squared	0.609337	Mean dependent var	0.207651
Adjusted R-squared	0.218674	S.D. dependent var	0.132121
S.E. of regression	0.116785	Akaike info criterion	-1.150583
Sum squared resid	0.218219	Schwarz criterion	-0.379655
Log likelihood	35.98462	Hannan-Quinn criter.	-0.891189
F-statistic	1.559750	Durbin-Watson stat	2.194280
Prob(F-statistic)	0.191667		

Equation 1: Result of Parsimonious ECM of Agricultural Output and Globalization Indices:

Dependent Variable: DLOG(AGR)
Method: Least Squares
Date: 08/29/14 Time: 03:56
Sample (adjusted): 1972 2009
Included observations: 36 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.138875	0.044587	3.114718	0.0043
DLOG(AGR(-1))	0.230717	0.164982	1.398443	0.1734
DLOG(AGRFDI(-1))	-0.075236	0.038482	-1.955113	0.0610
DLOG(TRADEY(-1))	0.127466	0.112680	1.131223	0.2679
DLOG(NCAPY(-1))	0.010802	0.037221	0.290202	0.7739
D(INF(-1))	0.003851	0.001522	2.530249	0.0175
DLOG(GSA(-1))	-0.134376	0.057343	-2.343382	0.0267
EC1(-1)	*-0.259334*	*0.083319*	*-3.112548*	*0.0044*
D1	0.109758	0.050759	2.162350	0.0396

R-squared	0.458529	Mean dependent var	0.213029
Adjusted R-squared	0.298093	S.D. dependent var	0.160791
S.E. of regression	0.134711	Akaike info criterion	-0.959055
Sum squared resid	0.489969	Schwarz criterion	-0.563176
Log likelihood	26.26300	Hannan-Quinn criter.	-0.820883

F-statistic	2.858019	Durbin-Watson stat	1.966987
Prob(F-statistic)	0.019366		

Equation 2: Result of *Long Run* Model of Manufacturing output Trade and Globalization Indices

Dependent Variable: LOG(MAN)
Method: Least Squares
Date: 08/19/14 Time: 22:10
Sample (adjusted): 1971 2008
Included observations: 37 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.649111	0.923909	-0.702570	0.4881
LOG(MANFDI)	1.224751	0.100790	12.15154	0.0000
LOG(INFRAS)	-0.326462	0.222454	-1.467548	0.1534
LOG(TRADEY)	0.228391	0.162243	1.407709	0.1702
LOG(NCAPY)	-0.183060	0.051848	-3.530710	0.0015
EXR	0.005124	0.002197	2.332171	0.0271
CPI	-0.011818	0.004257	-2.775828	0.0097
LOG(GSC)	0.027471	0.053563	0.512884	0.6121
D1	0.122144	0.219310	0.556947	0.5820

R-squared	0.991794	Mean dependent var	9.857491
Adjusted R-squared	0.989449	S.D. dependent var	2.213039
S.E. of regression	0.227319	Akaike info criterion	0.082847
Sum squared resid	1.446869	Schwarz criterion	0.474692
Log likelihood	7.467322	Hannan-Quinn criter.	0.220991
F-statistic	423.0006	Durbin-Watson stat	1.436442
Prob(F-statistic)	0.000000		

Equation 2: Result of Over-parametized ECM of Manufacturing Output and Globalization Indices:

Dependent Variable: DLOG(MAN)
Method: Least Squares
Date: 08/30/14 Time: 12:59
Sample (adjusted): 1974 2009
Included observations: 33 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.152101	0.165526	0.918895	0.3737
DLOG(MAN(-1))	-0.073176	0.381647	-0.191738	0.8507
DLOG(MAN(-2))	0.244302	0.316390	0.772155	0.4529
DLOG(MANFDI(-1))	-0.090383	0.461912	-0.195671	0.8477
DLOG(MANFDI(-2))	-0.026416	0.410149	-0.064406	0.9496
DLOG(INFRAS(-1))	0.175791	0.377496	0.465676	0.6486
DLOG(INFRAS(-2))	0.156950	0.374552	0.419034	0.6815
DLOG(TRADEY(-1))	0.258797	0.281294	0.920024	0.3731
DLOG(TRADEY(-2))	-0.124275	0.334436	-0.371597	0.7158
DLOG(NCAPY(-1))	-0.092927	0.103964	-0.893845	0.3865
DLOG(NCAPY(-2))	0.025052	0.111542	0.224601	0.8255
D(EXR(-1))	-0.022433	0.032247	-0.695666	0.4980
D(EXR(-2))	0.054381	0.037703	1.442356	0.1712
D(CPI(-1))	-0.001698	0.036530	-0.046470	0.9636
D(CPI(-2))	-0.015645	0.027513	-0.568654	0.5786

DLOG(GSC(-1))	-0.044414	0.075917	-0.585031	0.5678
DLOG(GSC(-2))	-0.003534	0.072487	-0.048749	0.9618
EC2(-1)	-0.428959	0.396820	-1.080991	0.2980
D1	0.049106	0.161697	0.303692	0.7658

R-squared	0.397339	Mean dependent var	0.195182
Adjusted R-squared	-0.377511	S.D. dependent var	0.223799
S.E. of regression	0.262667	Akaike info criterion	0.458205
Sum squared resid	0.965915	Schwarz criterion	1.319830
Log likelihood	11.43962	Hannan-Quinn criter.	0.748116
F-statistic	0.512795	Durbin-Watson stat	1.762724
Prob(F-statistic)	0.908569		

Equation2: Result of ***Parsimonious*** ECM of Manufacturing Output and Globalization Indices:

Dependent Variable: DLOG(MAN)
Method: Least Squares
Date: 08/29/14 Time: 04:27
Sample (adjusted): 1973 2009
Included observations: 35 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.216810	0.077572	2.794941	0.0100
DLOG(MAN(-1))	-0.214443	0.249509	-0.859460	0.3986
DLOG(MANFDI(-1))	0.103046	0.270005	0.381646	0.7061
DLOG(INFRAS(-1))	0.036000	0.259533	0.138710	0.8908
DLOG(TRADEY(-1))	0.136333	0.179025	0.761533	0.4538
DLOG(NCAPY(-1))	-0.070287	0.073882	-0.951347	0.3509
EXR(-1)	0.003212	0.002500	1.284525	0.2112
CPI(-1)	-0.005663	0.003355	-1.688314	0.1043
DLOG(GSC(-1))	-0.051087	0.046413	-1.100690	0.2819
EC2(-1)	*-0.171198*	*0.240421*	*-0.712074*	*0.4833*
D1	0.085517	0.098634	0.867013	0.3945

R-squared	0.236583	Mean dependent var	0.194619
Adjusted R-squared	-0.081507	S.D. dependent var	0.217148
S.E. of regression	0.225824	Akaike info criterion	0.113155
Sum squared resid	1.223915	Schwarz criterion	0.601979
Log likelihood	9.019788	Hannan-Quinn criter.	0.281897
F-statistic	0.743761	Durbin-Watson stat	2.101060
Prob(F-statistic)	0.677978		

Equation 3: Result of *Long Run* Model of International Trade and Globalization Indices:

Dependent Variable: EXBD
Method: Least Squares
Date: 08/22/14 Time: 15:41
Sample (adjusted): 1971 2011
Included observations: 40 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.32E+11	5.21E+10	-2.528294	0.0163
EXR	36077771	36546310	0.987180	0.3305
INF	-35626303	79495955	-0.448152	0.6569
LOG(GDPC)	1.52E+10	6.62E+09	2.296992	0.0279
LOG(INFRAS)	8.78E+09	4.27E+09	2.054888	0.0476

LOG(NCAPY)	1.33E+09	1.21E+09	1.097323	0.2802

R-squared	0.544866	Mean dependent var	5.71E+09
Adjusted R-squared	0.477935	S.D. dependent var	9.76E+09
S.E. of regression	7.05E+09	Akaike info criterion	48.32829
Sum squared resid	1.69E+21	Schwarz criterion	48.58162
Log likelihood	-960.5657	Hannan-Quinn criter.	48.41988
F-statistic	8.140661	Durbin-Watson stat	2.430809
Prob(F-statistic)	0.000039		

Equation 3: Result of *Over-parametized* ECM of International Trade and Globalization Indices:

Dependent Variable: D(EXBD)
Method: Least Squares
Date: 08/29/14 Time: 04:44
Sample (adjusted): 1974 2012
Included observations: 36 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.38E+09	3.97E+09	-0.598910	0.5551
D(EXBD(-1))	0.860368	0.635277	1.354321	0.1888
D(EXBD(-2))	1.087427	0.352789	3.082374	0.0053
D(INF(-1))	87099583	1.31E+08	0.662944	0.5140
D(INF(-2))	30679806	1.31E+08	0.233380	0.8175
DLOG(GDPC-1)	1.44E+10	2.95E+10	0.488712	0.6297
DLOG(GDPC(-2))	-1.43E+09	3.29E+10	-0.043477	0.9657
DLOG(INFRAS(-1))	1.44E+10	1.53E+10	0.940757	0.3566
DLOG(INFRAS(-2))	1.40E+09	1.50E+10	0.093393	0.9264
DLOG(NCAPY(-1))	-4.32E+09	3.51E+09	-1.231641	0.2305
DLOG(NCAPY(-2))	-9.30E+08	3.30E+09	-0.282095	0.7804
EC3(-1)	-1.177744	0.800248	-1.471723	0.1546
D1	3.63E+09	4.65E+09	0.780212	0.4432

R-squared	0.479205	Mean dependent var	2.35E+09
Adjusted R-squared	0.207485	S.D. dependent var	1.27E+10
S.E. of regression	1.13E+10	Akaike info criterion	49.41497
Sum squared resid	2.96E+21	Schwarz criterion	49.98680
Log likelihood	-876.4695	Hannan-Quinn criter.	49.61455
F-statistic	1.763601	Durbin-Watson stat	1.698442
Prob(F-statistic)	0.117108		

Equation 3: Result of Parsimonious ECM of International Trade and Globalization Indices:

Dependent Variable: D(EXBD)
Method: Least Squares
Date: 08/29/14 Time: 04:46
Sample (adjusted): 1973 2012
Included observations: 38 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.18E+09	3.01E+09	-0.724483	0.4746
D(EXBD(-1))	0.906725	0.481795	1.881975	0.0699
D(EXBD(-2))	1.090444	0.284648	3.830847	0.0006
D(INF(-1))	92698890	1.12E+08	0.824693	0.4163
DLOG(GDPC-1)	1.53E+10	2.44E+10	0.625614	0.5365
DLOG(INFRAS(-1))	1.46E+10	1.19E+10	1.231936	0.2279

DLOG(NCAPY(-1))	-4.34E+09	2.96E+09	-1.464157	0.1539
EC3(-1)	-1.226184	0.619595	-1.979010	0.0574
D1	3.10E+09	3.66E+09	0.848963	0.4029

R-squared	0.473466	Mean dependent var	2.26E+09
Adjusted R-squared	0.328215	S.D. dependent var	1.24E+10
S.E. of regression	1.02E+10	Akaike info criterion	49.12440
Sum squared resid	2.99E+21	Schwarz criterion	49.51225
Log likelihood	-924.3636	Hannan-Quinn criter.	49.26239
F-statistic	3.259641	Durbin-Watson stat	1.679053
Prob(F-statistic)	0.009012		