Impact of Trade Openness on the Output Growth in the Nigerian Economy

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Authors' contribution

The authors CE and DD performed the whole research work together. There was no water – tight division of work when it was being done. Authors CE and DD wrote the first draft of the paper. Authors CE and DD read and approved the final manuscript.

Policy Article

ABSTRACT

This study examined the relationship between trade openness and output growth in Nigeria. The aim of this is to enable us suggest ways to raise productivity and wealth of the country. And thus, increase the standard of living in the country. Econometric techniques of the Non-Monotonic modelling was adopted. And the Ordinary Least Square (OLS) is used as the estimation technique. Unit root test and co-integration test were carried out as part of the estimation process. The data used was basically secondary (from 1970 to 2010). The variables used were real gross domestic product (RGDP) as the dependent variable, degree of openness, squared term of the degree of openness to capture the long run effect, real exchange rate, real interest rate and unemployment rate as the independent variables. The result shows that there is positive relationship between trade openness and output growth in Nigeria. The implication is that the Nigerian economy will grow more rapidly when she is opened to international competition. With this, it could be said that trade openness is very important and vital to the Nigerian economy. It is recommended that the government should focus on the other sectors in Nigeria such as the agricultural and manufacturing sectors other than petroleum. Secondary, the revenue generated from the export of crude oil can be used to develop the basic infrastructural facilities and essential social amenities needed in the country. The government should promote import liberalisation through the reduction of tariffs. The import of consumable and intermediate goods should be reduced and the local industries should be encouraged to produce such goods. The government needs to reduce import

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tariffs in other to prevent or discourage smuggling activities. Finally, government should re-orient its policies towards the external sector and make export more favourable.

1. INTRODUCTION AND BACKGROUND TO THE STUDY

With globalization and trade liberalisation, Economists have long been interested in factors which cause different countries to grow at different rates and achieve different levels of wealth. One of such factors is trade openness. One of the basic interests in development and international economics is to check if trade openness promotes economic growth. With regards to globalization, two major trends are visible: first is the emergence of multinational firms with strong presence in different, strategically located markets; and the second is the convergence of consumer tastes for the most demanded products, not minding from which country they are produced. Considering the world as "one united community", regional integration becomes a way of not only improving the level of participation of countries in the sub-region in global trade, but also their integration into the world economy [1].

As at 1950, the world trade was under the auspices of the General Agreement on Tariffs and trade (GATT), established in 1947, and currently under the auspices of the World Trade Organization (WTO) which replaced the GATT in 1993. By this development, Tariff levels in both developed and developing countries have reduced drastically, averaging approximately 4% and 20% in the respective cases. Furthermore, we noticed that non-tariff barriers to trade such as licenses, quota, etc, have also been reduced but at a slower pace when compared with tariffs.

Due to trade liberalisation, there has been a huge increase in growth of world trade when compared to that of world output. While world output has expanded five folds, the volume of world trade has grown 16 times at an average compound rate of over 7% per annum. Thus, trade performance re-enforces the understanding of growth and development process of countries [2]. He noted further that tariff rates have been reduced to 10% of the former rate since the end of the World War II, at the global level, international trade increased by 17 times, while global income increased by 4, and income per capita doubled. Furthermore, countries with high trade performance have recorded higher rates of GDP growth than others. Following from the above, it is obvious that trade is essential in promoting, improving and sustaining the growth and development of economies. This is why we need to examine the relationship between trade openness and output growth in Nigeria.

Today, as part of moving with the trend of globalization and trade liberalisation in the global economic system, Nigeria is a member of, and signatory to, many international and regional trade agreements such as International Monetary Fund (IMF), World Trade Organization (WTO), World Bank, Economic Community of West African States (ECOWAS), and others. The overriding objective of this economic partnership on international trade has been to create a free trade zones by removing the barriers on trade, lessen tariffs, and embark on outward-oriented trade policies. Despite Nigeria's great attempt to meet up with the demands to these economic partnerships, as reflected in the 2007 assessment of trade policy review, Nigeria's trade freedom was rated 56% making her the worlds 131st freest economy while in 2009, it was ranked 117th freest economy, the country's GDP was also ranked 161st in the world in February, 2009. The economy has thrived to arouse growth through openness to

trade; in reality, it seems that as the country put greater effort to boost her economic growth by opening up to trade with the global economy the more she becomes worse-off relative to her trading partners in terms of country output growth.

Consequently, it becomes imperative to examine the relationship that exists between trade openness and output growth in Nigeria. In doing so, the study intends to check the impact of trade openness on output growth in Nigeria.

1.1 Justification of the Study

Nigeria is presently going through a cycle of change in almost all sector of the economy, including the external sector. Of recent, we have seen several existing literature on the topical issue that trade openness has impact on output growth in Nigeria. Some believe there is a positive correlation between trade openness and economic growth; and the implication being that government should reduce or remove trade barriers. The central point of this research work is to recognize the short comings and benefits of this argument as well as check the validity of this mainstream axiom in Nigeria in the existence of various internal and external shocks. This research work will further serve as a guide and provide insight for future research on this topic and related field for researchers who are willing to improve it. This research work compromise of five parts. Part one constitutes the introduction, part two deals with the theoretical framework and the empirical reviewed. Part three focuses on the research methodology, while part four deals with the data interpretation and analysis. And finally, part five gives a summary, conclusion and policy recommendations.

2. EMPIRICAL REVIEW AND THEORIES OF TRADE

2.1 Empirical Review

Trade openness measures the international competitiveness of a country in the global market to measure trade openness, we use the addition of imports and exports over GDP. Increased openness facilitates greater integration into global markets. Trade openness is interpreted to include import, export taxes, exchange-rate policies, domestic taxes and subsides, competition and other regulatory policies, education policies, the nature of the legal system, the form of government, and the general nature of institution and culture [3].

The relationship between trade openness and growth is a highly debated topic in the growth and development literature, yet this issue is far from being resolved. Some studies, include Rodriguez and Rodrik [4], which critically argued that trade policy variables are mostly uncorrelated with growth, while the trade shares can correlate with income levels and growth rates. Theoretical growth studies suggest very complex and different relationships between openness and growth and the empirical evidence is ambiguous. The growth theory supposes that "a country's openness to world trade improves domestic technology, and hence an open economy grows faster than a closed economy through its impact on technological enhancement" (Harrison [5]). He stressed further that openness to trade provides access to imported inputs, which embody new technology, increases the size of the market faced by the domestic producers, which raises the return to innovation, and facilitates a country's specialization in research intensive production.

Rodriguez and Rodrik [4] argued that much of the work to correlate trade openness and economic growth has been plagued with subjective and collinear measures of openness that,

though positively related with economic growth, arrive at their conclusion through problematic econometric methodologies. Harrison [5] show that the various measure of trade openness tends to be only weakly correlated and are often of the wrong sign.

The weak empirical evidence on the link-between trade liberalisation and growth can also be due to problems of misspecification. In particular, the effects of trade liberalisation may materialize only with a lag. In the short run, liberalisation may have negative effects, especially by undermining domestic production because of competitive import, retarding growth [6].

Another explanation relates to the structure of trade. Whether a country benefits from trade liberalisation or not in terms of growth depends on the composition of trade. Mukhopadhyay [6] hypothesized that the composition of trade determines the strength of the engine of growth." Dollar and Kraay [7] brought an important contribution to the trade and growth debate. The authors defined openness as the combination of two diversions: (i) a low level of protection, hence of trade distortions and (ii) a real exchange rate so that incentives remain constant over time. From the above definition, follow two measures of openness: a trade distortion index, and a real exchange rate variability index. The distortion index measures the deviation from the law of one price after controlling for the impact of non-tradable. The variability index captures the variance of the real exchange rate. The author considers a sample of 95 countries over the period 1976 -1985 and regresses average per capital growth upon his openness indexes and the average investment rate. Both the distortion index and the variability index are significantly negatively correlated with growth and the investment rate comes out with a significantly positive coefficient.

Dowrick and Jane [8] tests whether trade openness affects output growth and /or investment. He considers a sample of 74 countries over the period 1960-1990. As openness indicator, the author considers the residuals of an OLS cross-country regression of the average trade intensity upon a constant and average population. In a second stage, the author runs cross-country OLS regressions of average per capita GDP growth upon the average investment rate, the initial GDP level and his openness indicator. The coefficient on openness is significant and positive. Moreover, dropping the investment rate considerably lowers the overall fit of the model but enhance the coefficient on openness, which according to the author "suggests that openness works partly through increased investment rates".

In a third stage, the author computes decade averages for his variables and turns to panel data techniques, gauging that such techniques "enable some control for time invariant country-specific factors such as institutional arrangements that might be correlated with the explanatory variables". The author uses labour productivity growth as dependent variable and estimated both fixed-effects and random-effects models. He reported that the coefficient on openness is still significant and positive, but its point estimate is much lower than in the OLS specification. In a fourth set of regressions, the author also considers growth in openness instead of openness itself.

Edwards [9] explained that after taking into account the roles of all other factors including capital accumulation, growth in labour force including differences in level of technology, countries with lower degrees of protectionism, on the average tend to grow at a much faster pace than countries with higher trade restrictions. In a data set spanning 100 countries, Dollar and Kraay [7] found that changes in growth rates are highly correlated with changes in trade volumes. In fact, there have been a number of attempts to relate trade policy variables to growth rates.

Shafaeddin [10] stressed that least developed countries particularly in Africa, have been increasingly marginalized in international trade mainly due to their high dependence on the production and export of primary commodities. The study found no clear systematic association between exchange rate devaluation on the one hand, and growth and diversification of exports on the other hand since the early 1980s. His paper attributed success or failure of GDP and industrial growth, inter alia, to the volume of investment and the availability of imports.

2.2 Theories of Trade

Trade theories, either in closed or opened economy, have to an extent explained the debate of whether trade openness affects output growth or not. There have been arguments as discussed by Edwards [9] thus: Argument one: Economies will grow faster if they protect domestic industry from import competition. This is a general statement of the infant-industry hypothesis", which states that manufacturing sectors in underdeveloped economics must be sheltered from competition in order to have the incentive to invest capital, learn how to produce goods efficiently, take advantage of scale economies through large scale production, and develop innovative or distinctive products that can be sold on world markets. The broadest application of the infant-industry argument for isolation from global markets emerged in the widespread use of import substitution policies in developing countries.

However, the question to be asked is does such policies have limited growth. What we gathered so far is that such countries do not perform well in technological advancement, they also lag behind in new product innovation, have unproductive and vague agricultural and manufacturing sectors, and have also not been able to build up human capital formation, physical capital, and basic infrastructures. Thus, these sources of growth have likely been limited in countries pursing ISI program.

2.3 Argument Two: Countries Will Grow Faster If they are Open to International Competition

This is the basic believe underlying trade-reform programmes that involve extensive liberalisation of trade and investment barriers, unification of tariff rates and domestic tax rate, removal of consumption and production subsidies, and deregulation of industry and privatization of state owned enterprises. It is the essential philosophy behind World Bank loans to facilitate restructuring and IMF lending packages that require microeconomic structural reforms. It is also a very old idea (going back to Adam Smith and David Ricardo period) but its modern translation into trade liberalisation largely began with the reforms in Chile in the 1970s advocated by the "Chicago School" of economists (e.g. Milton Friedman, George Stigler, etc.).

A somewhat different version of this approach is the export promotion, which is the policy followed largely by East Asian and Western countries. These approaches are not necessarily liberal in the sense of free competition. There are many examples of sheltered and subsidized domestic firms or industrial groupings; much of this protection was designed to encourage infant industries to mature and export. However, the key component of export promotion programs is not to discourage exports, as is done under ISI programs. The basic policies under export promotion include to Properly valued exchange rates, meaning exchange rates that do not discriminate between imports and exports; and to rely on some active forms of export promotion in manufacturing and high-tech sector, such as favourable

allocation of loans and subsides and rebates of import tariff paid on imported industrial inputs. Although, most international bodies (WTO, IMF World Bank etc) strongly support the case for trade openness and financial liberalisation when setting up programmes for developing countries or when multilateral meetings occur.

2.4 Other Trade Theories Include: Heckscher–Ohlin Trade Theory

The heckscher-ohlin model (H-O model) is a general equilibrium mathematical model of international trade, developed by Eli Heckscher and Bertil Ohlin at the Stockholm School of Economics. It builds on David Ricardo's theory of comparative advantage by predicting patterns of commerce and production based on the factor endowments of trading region.

2.5 Theory of Customs Unions and Free Trade Areas

Free trade area is a form of economic union in which all members of the group remove tariffs on each other's products, while at the same time each member retain its independence in establishing trading policies with non-members (De Melo, Panagariya and Rodick) [11].

2.6 Models of Export –Led Growth

The three main models of export-led growth. They include, the neo classical supply –side model, the balance of payments constrained model which is also branded as the Hicks super-multiplier model, and the virtuous circle model.

2.7 Balance of Payments Constrained Growth Model

The balance of payment is defined as a systematic record of all economic transactions between the residents of the country and residents of foreign countries during a certain period of time. A country's balance of payments equilibrium growth rate can be modelled by stating the balance of payments equilibrium condition specifying multiplicative (constant elasticity) import and export demand functions in which imports and exports are a function of domestic and foreign income, respectively, and of relative prices, and substituting these functions in the equilibrium conditions [12].

2.8 Virtuous Circle Models of Export-Led Growth

These models provide a challenge to both orthodox growth theory and trade theory which predict the long run convergence of living standards across the world. In neoclassical growth theory, capital is assumed to be subject to diminishing returns so that rich countries should grow slower than poor countries for the same amount of investment undertaken. Neoclassical trade theory predicts convergence through the assumption of factor price equalization [2].

From the foregoing, we can conclude that trade liberalisation does not necessarily imply faster export growth, but in practical terms, the two appear to be highly correlated. The relative importance of the precise mechanisms by which export growth impacts on economic growth are not always easy to qualify.

3. RESEARCH METHODOLOGY

This study employed Econometric techniques of the Non-Monotonic modelling. And the Ordinary Least Square (OLS) is used as the estimation technique. The choice of the method is necessitated by the nature of the study which hings on test of theoretical relationships of variables.

3.1 Model Specification

The functional form of this model can be specified as follows:

Model 1: $RGDP_T = F(OPN_T, OPN_T^2, RER_T, RIR_T, UNEMPLOY_T)$.......... (1)

The mathematical expression is as follows;

Model I:

$$RGDPt: \alpha o + \alpha_1 OPN_t + \alpha_2 OPN_t^2 + \alpha_3 RER_t + \alpha_4 RIR_t + \alpha_5 UNEMPLOY_t......(2)$$

In order to allow for the inexact relationship among the variables as in the case of most economic variables, stochastic error term 'μ_t' is added to the equation. Thus, we can express the econometrics form of the model as:

Model 1:

$$RGDP_T = \alpha_0 + \alpha_1 OPNT + \alpha_2 OPN_T^2 + \alpha_3 RER_T + \alpha_4 RIR_T + \alpha_5 UNEMPLOY_T + \mu_{1t} ....(3)$$

Where; RGDP = real gross domestic product; OPN = the degree of openness measured as trade – GDP ratio i.e. (import + export)/ GDP; OPN^2 = the squared term of the degree of openness to capture the effect of long run openness; RER = the exchange rate to explain real imports/exports ; RIR = Real interest rate ; UNEMPLOY = Unemployment rate. μ = the stochastic error term.

In order to properly estimate the parameters of the postulated model, we rescale the dependent variable by logging it, thus, transforming it into a log-line model as follows:

Model I:

$$LOG (RGDP_t) = \alpha_o + \alpha_1 OPN_t + \alpha_2 OPN_t^2 + \alpha_3 RERt + \alpha_4 RIR_t + \alpha_5 UNEMPLOY_{t+} \mu_{it}.........(4)$$

Also, in order to avoid a spurious regression, we subjected each of the variables used to unit root (or stationarity) test so as to determine their orders of integration, since unit root problem is a common feature of most time-series data.

3.2 Test of Stationarity

The test is specified thus:

$$\Delta Y_t = \square + \alpha \Delta Y_{t-1} + \mu_t. \quad \text{Where } \Delta = \text{difference operator}$$
$$Y_t = \text{Time series;} \quad \mu_t = \text{Pure white noise;} \quad \square = \text{autonomous value}$$

Under the null hypothesis that $\alpha = 1$ for stationarity, we use the PP test statistics to verify the presence of unit root in the series.

3.3 Test of Co-integration

We employed the Johansen co-integration test in exploring the long run relationship between the variables.

3.4 Estimation Techniques

The Ordinary Least Square (OLS) is used as the estimation technique. One basic short comings of the OLS method is the fact that some of its assumptions are unrealistic (such as no autocorrelation and homoscedasticity). Hence, we have to apply individual initiative along side with the empirical rules and tests so as to obtain tenable and robust results. Thus, an econometric modelling is said to be more of an art than a science.

3.5 Evaluation Procedure: Economic Test (A Priori Expectation)

Tests was conducted to determine the a priori expectations which observed the magnitude and signs of the parameter estimates. The evaluation was guided by economic theory.

4. PRESENTATION AND ANALYSIS OF DATA

4.1 Degree of Openness (OPN)

The degree of openness is 0.474081 which has a positive sign. This conforms to the standard economic theory which postulates that trade openness enhance economic growth. The coefficient of 0.474081 implies that over the study period, on average, a one percentage (1%) increase in the degree of trade openness leads to approximately 47.4% (0.474081 x100%) increase in output growth. This early stage increase in output growth as a result of openness to trade may be due to internal vibrancy of government objectives, development of infrastructure and, indeed, the oil boom of the 1970's.

4.2 Squared Term of Degree of Openness (OPN^2)

The coefficient of the squared OPN^2 is negative which conforms to the economic theory. This implies that as an economy continue to open its border to external trade over a longer time, output growth begins to decrease at an approximate rate of1.08% (=-0.010854 x 100%).

4.3 Real Exchange Rate (RER)

The sign of the real exchange rate coefficient is positive. This does not conform to the theoretical postulation which stressed that as foreign currency say (dollar) appreciate (negative) against the domestic currency (say Naira), exports will become cheaper while imports will be more expensive, hence, greater net export which in turn means increase in GDP (output). Thus there should be a negative relationship between RER and RGDP. The coefficient of 0.005253 means that over the period of study, a 1% increase in real exchange rate, on average, leads to approximately 0.52% (= 0.005253 x100%) decrease in the output growth (RGDP). Although the economic impact of RER on RGDP in Nigeria is very small, it is

also statistically insignificant. But in the case of Nigeria, we have a positive relationship and this can be attributed to some factors like monetary instability, high inflation rate, etc.

4.4 The Interest Rate (RIR)

The coefficient of the interest is also positive (0.078101). This does not conform to a priori expectation that an increase in rate of interest leads to rise in cost of borrowing which discourages investors from borrowing for investment purpose, thus, reducing investment level; hence, reducing productivity and output. The result shows that an increase in interest rate will also lead to an increase in borrowing 7.8% (=0.078101 x 100%). But this result is statistically significant. In Nigeria, most businessmen look at the marginal rate of efficiency when collecting loans not whether interest rate is high or not. This is one of the reasons why there is a positive relationship between GDP and inflation.

4.5 Unemployment Rate (UNEMPLOY)

The coefficient of the unemployment rate is negative, which conforms with the economic theory that states that a rise in unemployment rate will lead to decreased productivity which will reduce total output. The unemployment rate coefficient of -0.057216 indicates that a 1% increase in unemployment rate, on average, leads to approximately 5.72% decrease (= -0.057216 x 100%) in real GDP. One of the arguments in favour of openness to trade is that new technologies and skills in the production process may require more of capital and little labour.

5. SUMMARY, RECOMMENDATION AND CONCLUSION

This study was conducted to test the relationship between trade openness and economic growth in Nigeria. Many people have done several works on this topic but have gotten different results. Thus using the econometric test, we noticed that there exist a positive relationship between trade openness and economic growth. The model used was the non-monotonic model. Six variables were used in the research work, namely, gross domestics 'product (regressand), degree of openness, squared term of the degree of openness, exchange rate, interest rate and unemployment (regressors). Secondary data was used. The data was gotten from the central bank statistical bulletin 2010 and the Nigerian bureau of statistics. We used E-views 7 to carry out the econometric analysis.

From the regression results, it shows that there is a reversed U-shaped quadratic relationship between trade openness and economic growth in Nigeria, due to the negative long run effect of the degree of openness. It also shows that the macro-economic (internal and external) variables in the model were statistically significant at 10%. Also, there exists long-run and short run relationships.

5.1 Policy Recommendations

5.1.1 Diversification of the economy

Since the Oil boom in 1970's, the Nigerian Economy has concentrated only on the exportation of crude oil. Due to the high dependence on oil, Nigeria has been affected by the different international shocks such as inflation, recession etc. It is recommended that the

government should focus on the other sectors in Nigeria such as the agricultural and manufacturing sectors.

5.1.2 Provision of adequate infrastructural facilities

Inadequate infrastructural facilities have a negative impact on the output because of the high costs of transportation, low electricity generation and other costs. The revenue generated from the export of crude oil can be used to develop the basic infrastructural facilities and essential social amenities needed in the country.

5.1.3 Import liberalisation

The government should promote import liberalisation through the reduction of tariffs. The import of consumable and intermediate goods should be reduced and the local industries should be encouraged to produce such goods.

5.1.4 Check on illegal trades

Smuggling, bunkering, child trafficking, drug trafficking, etc are the underground activities which need to be checked in Nigeria. The government needs to reduce import tariffs in other to prevent or discourage smuggling activities.

5.1.5 Granting of tax relief or subsidy in the various sectors

In the agriculture and manufacturing, it should also re-orient its policies towards the external sector and ensure that the sector contributes optimally to output growth.

6. CONCLUSION

It has been established that there is a positive relationship between trade openness and output growth in Nigeria which follows the apriori expectation. If government can follow the policy recommendations, there will be improvement in trading activities in Nigeria, which will in turn lead to increase in output growth. We recommended that further studies be genuinely carried out using VAR and any other more sophisticated methodologies to identify the internal and external macroeconomic shocks that can determine output growth in Nigeria.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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APPENDIX 1

YEAR	RGDP	OPN	OPN2	RER	RIR	UNEMPLOY
1970	5281.10	0.3892	0.1515	0.7143	8.00	4.1
1971	6650.9	0.5031	0.2531	0.6955	10.00	4.6
1972	7187.50	0.4955	0.2455	0.6579	10.00	5
1973	8630.50	0.6597	0.4353	0.6579	10.00	5
1974	18823.10	0.4731	0.2239	0.6299	10.00	5.1
1975	21475.24	0.3182	0.1013	0.6159	9.00	4.8
1976	26655.78	0.4083	0.1667	0.6265	10.00	4.9
1977	31520.34	0.4671	0.2182	0.6466	6.00	5
1978	34540.10	0.4887	0.2388	0.6060	11.00	5.6
1979	41974.70	0.6114	0.3738	0.5957	11.00	6
1980	49632.32	0.738	0.5447	0.5464	9.50	6.4
1981	47619.66	0.1163	0.0135	0.6100	10.00	7.2
1982	49069.28	0.095	0.009	0.6729	11.75	8.7
1983	53107.38	0.0884	0.0078	0.7241	11.50	10.2
1984	59622.53	0.0886	0.0079	0.7649	13.00	7.9
1985	67908.55	0.0934	0.0087	0.8938	11.75	6.1
1986	69146.99	0.0724	0.0052	2.0206	12.00	5.3
1987	105222.84	0.2355	0.0554	4.0179	19.20	7
1988	139085.30	0.2394	0.0573	4.5367	17.60	5.1
1989	216797.54	0.3752	0.1408	7.3916	24.60	4.5
1990	267549.99	0.5816	0.3382	8.0378	27.70	3.5
1991	312139.74	0.7952	0.6323	9.9095	20.80	3.1
1992	532613.83	1.2852	1.6518	17.2984	31.20	3.5
1993	683869.79	1.3987	1.9563	22.0511	36.09	3.4
1994	899863.22	1.3391	1.7931	21.8861	21.00	3.2
1995	1933211.55	6.0616	36.743	21.8861	20.79	1.9
1996	2702719.13	6.3734	40.621	21.8861	20.86	2.8
1997	2801972.58	6.9113	47.767	21.8861	23.32	3.4
1998	2708430.86	5.112	26.133	21.8861	21.34	3.5
1999	3194014.97	6.5714	43.183	92.6934	27.19	17.5
2000	4582127.29	8.9032	79.267	102.1052083	21.55	13.1
2001	4725086.00	9.0369	81.666	111.943325	21.34	13.7
2002	6912381.25	7.5181	56.522	120.9701667	30.19	12.2
2003	8487031.57	10.823	117.13	129.3565333	22.88	14.8
2004	11411066.91	12.491	156.02	133.5004	20.82	13.4
2005	14572239.12	17.88	319.7	132.147	19.49	11.9
2006	18564594.73	17.511	306.62	128.6516	18.70	12.3
2007	20657317.67	19.27	371.31	125.8331	18.36	12.7
2008	24296329.29	22.837	521.54	118.5669167	18.70	14.9
2009	24794238.66	18.72	350.42	148.9017417	22.90	19.7
2010	29205782.96	24.553	602.83	150.298025	22.51	21.1

Source: computed by author

APPENDIX 2

Table 1. Regression Result

Variable	Co-efficient	Std. Error	T-statistic	Prob.
C	10.48390	0.334255	31.36501	0.0000
OPN	0.474081	0.055722	8.507995	0.0000
OPN2	0.010854	0.001789	-6.068287	0.0000
RER	0.005253	0.005059	1.038357	0.3090
RIR	0.078101	0.011638	6.710835	0.0000
UNEMPLOY	-0.057210	0.028941	-1.977008	0.0592

R-squared	*0.982931*	*Mean dependent var*	*13.92186*	
Adjusted R-squared	*0.979517*	*S.D. dependent var*	*2.261664*	
S.E. of regression	*0.323686*	*Akaike info criterion*	*0.753898*	
Sum squared resid	*2.619310*	*Schwarz criterion*	*1.031443*	
Log likelihood	*-5.685411*	*Hannan-Quinn criter.*	*0.844371*	
F-statistic	*287.9279*	*Durbin-Watson stat*	*2.238449*	
	Prob(F-statistic)	*0.000000*		
	Source: Computed by the Author			

Dependent Variable: LOG(NGDP)

Method: Least Squares

Date: 05/18/13   Time: 13:45

Sample (adjusted): 11 41

Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	10.48390	0.334255	31.36501	0.0000
OPN	0.474081	0.055722	8.507995	0.0000
OPN2	-0.010854	0.001789	-6.068287	0.0000
RER	0.005253	0.005059	1.038357	0.3090
RIR	0.078101	0.011638	6.710835	0.0000
UNEMPLOY	-0.057216	0.028941	-1.977008	0.0592

R-squared	0.982931	Mean dependent var	13.92186
Adjusted R-squared	0.979517	S.D. dependent var	2.261664
S.E. of regression	0.323686	Akaike info criterion	0.753898
Sum squared resid	2.619310	Schwarz criterion	1.031443
Log likelihood	-5.685411	Hannan-Quinn criter.	0.844371
F-statistic	287.9279	Durbin-Watson stat	2.238449
Prob(F-statistic)	0.000000		

CORRELATION TEST

	RGDP	OPN	OPN2	RER	RIR	UNEMPLOY
RGDP	1.000000	0.968358	0.980951	0.863517	0.284138	0.787923
OPN	0.968358	1.000000	0.955766	0.915868	0.353511	0.778610
OPN2	0.980951	0.955766	1.000000	0.806495	0.228328	0.747524
RER	0.863517	0.915868	0.806495	1.000000	0.469202	0.865984
RIR	0.284138	0.353511	0.228328	0.469202	1.000000	0.229644
UNEMPLOY	0.787923	0.778610	0.747524	0.865984	0.229644	1.000000

HETEROSCEDASTICITY TEST

F-statistic	2.192771	Prob. F(19,11)	0.0918
Obs*R-squared	24.52482	Prob. Chi-Square(19)	0.1768
Scaled explained SS	44.83315	Prob. Chi-Square(19)	0.0007