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Analysis of the Determinants of Consumption in Nigeria: An Autoregressive Distributed Lag Approach

By Joseph M. Ibbih & Siyan Peter
Nasarawa State University

Abstract- The need for economic theory to address the problem of unsustainable consumption patterns in a developing economy, Nigeria cannot be overemphasized. The literature suggests that present consumption patterns which use up economic resources beyond the capacity of the environment to replenish may make development unsustainable. This study analyzed consumption behavior vis-à-vis the factors that weakly or strongly influence consumption decisions. This key objective of this study is to establish the determinants of consumption among individual households in Agyaragu community of Nasarawa and by inference Nigeria. The study also investigated the extent to which consumption behavior of individuals supported the predictions of conventional models of consumption. A sample of 500 households was drawn from the community population of 22,750, with a response rate of 97%. The model employed alongside others is the Autoregressive Distributed Lagged (ADL) model. The results and findings revealed that individuals do not behave according to the baseline models of consumption. Consumption patterns favored non-durable consumption and necessities. The study recommended the model used in this study as a model of consumption that should incorporate the additional factors revealed by this study. The study, therefore, called for an economic policy and programme that will switch consumption away from non-durables to durables. This recommendation would enhance wealth creation, savings, investment and economic growth and development.

Keywords: *consumption, consumer behavior, marginalism, income, households, ADL model.*

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Analysis of the Determinants of Consumption in Nigeria: An Autoregressive Distributed Lag Approach

Joseph M. Ibbih [α] & Siyan, Peter [σ]

Abstract- The need for economic theory to address the problem of unsustainable consumption patterns in a developing economy, Nigeria cannot be overemphasized. The literature suggests that present consumption patterns which use up economic resources beyond the capacity of the environment to replenish may make development unsustainable. This study analyzed consumption behavior vis-à-vis the factors that weakly or strongly influence consumption decisions. This key objective of this study is to establish the determinants of consumption among individual households in Agyaragu community of Nasarawa and by inference Nigeria. The study also investigated the extent to which consumption behavior of individuals supported the predictions of conventional models of consumption. A sample of 500 households was drawn from the community population of 22,750, with a response rate of 97%. The model employed alongside others is the Autoregressive Distributed Lagged (ADL) model. The results and findings revealed that individuals do not behave according to the baseline models of consumption. Consumption patterns favored non-durable consumption and necessities. The study recommended the model used in this study as a model of consumption that should incorporate the additional factors revealed by this study. The study, therefore, called for an economic policy and programme that will switch consumption away from non-durables to durables. This recommendation would enhance wealth creation, savings, investment and economic growth and development.

Keywords: consumption, consumer behavior, marginalism, income, households, ADL model.

I. Introduction

There are virtually no aspects of economic theory and policy that do not require some knowledge of household or individual consumer behavior (Blundell, 1988). The increased availability of diverse types of information on the subject of consumer behavior makes this problem an attractive area of study. Empirical evidence on consumer behavior is very much needed. One of the questions that attract attention is the issue of optimality and the impact of personal disposable incomes, past consumption, past income, wealth, family size, etc. on consumption behavior. Also, what should be the appropriate cost of living indices to choose for the individuals to maximize welfare?

The study of consumption and its change over time has been one of the pillars of Economics. It is one of the critical variables that determine individuals' welfare and quality of life. Since the time of John Stuart Mills and the classical economists of the 18th and 19th centuries, consumption has dominated much of the microeconomic debate and discussion. Similarly, it is one of the basic components of Gross National Product (GNP). The GNP and Gross Domestic Product (GDP) themselves are the important variables for measuring economic growth, consumer expenditure and the nature of the consumption function. GNP and GDP vis-a-vis consumption have provided the desired direction for the macroeconomic debate of the 20th century.

The marginalist revolution produced the marginal utility theory which was proposed in the 19th century by the marginalist economists. They studied the impact of small changes in economic quantities. Thus, individual's demand for a product is determined not by the total utility but by its marginal utility. The higher the total supply of a good, the smaller its marginal utility. The marginalist rejected the labor theory of value which has been central to classical economics. The theory of choice and consumer is the basic tenets of the Neoclassical economics. In this, the concept of marginality played a crucial role in the marginalist revolution. This revolution led to the replacement of the labor theory of value by the neoclassical value theory, whereby relative prices of goods and services are determined simultaneously by marginal rates of substitution (MRS) in consumption and marginal rates of transformation in production. Changes are assumed to begin from the total resources (endowment) available for utilization individuals. The marginal approach provided a dividing line between classical theory and modern economics. This revolution focused on the conditions under which the amount of resources (capital and labor) tend to be allocated among competing uses with optimal results. The optimality is in the sense of maximizing consumers' satisfaction. The marginal revolution resulted from the works of three men, namely Stanly Jevons, Karl Menger and Leon Walras.

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The objective of this study is to establish the determinants of consumption in a developing Economy. Therefore, the testable hypotheses are as follows:

H0: Consumption cannot be predicted from personal disposable income and consumption lagged by one period.

H0: Consumption cannot be predicted from only its lagged values.

H0: Consumption cannot be predicted from its lagged values and lagged values of income.

The study report is divided into five parts. Part I is the introduction, Part II is the literature review, Part III is the methodology, Part IV is the data analysis and discussion of findings while Part V is the conclusion and recommendations.

II. Literature Review

One of the empirical works is that of Hall (1978) which was work on time series consumption function. According to him, lagged consumption is controllable. Once this is done, under rational expectations, only permanent income affects current consumption. He used distributed lag models and data from the US economy. According to him, consumption is too sensitive to current income for it to conform to the LC-PI principle. He accepted that some measures of wealth have a strong influence on consumption, therefore lagged wealth is recommended as a variable to test (Davidson, 1978; Mankiw, 1982). Gali (1990) Haug (1991) proposed an aggregate life cycle model. The model assumes finite horizons and declining labor income for the individuals.

O' Donoghue and Rabin (2000) applied formal behavioral – economic models to theoretical and empirical research on youthful behavior. Their goal, apart from providing an economic analysis of risky behavior among youths, was to provide an understanding of the welfare consequences of their consumption behaviors. Whereas young people are also competent decision makers, they are very often overly pessimistic about their future, which greatly influences their inter-temporal perspective and future expectations. The youths' perceptions of consequences, a likelihood of effects and the importance of consequences of the consumption decisions predict their consumption behavior.

Relying on the work of Flavin (1981), Kankaanrata (2006) showed that if consumption were treated on a micro basis, then rational expectations permanent income hypothesis should be able to deal with what he discovered to be the excess sensitivity of consumption and excess smoothness of it. The excess sensitivity of consumption is the notion that it is excessively influenced by consumer's income rather than lag income (Yt-1) in period t-1 and consumption in period t-1 (i.e., Ct-1). The test suggested by Kankaanrata (2006) is to test the empirical validity that consumption follows a "martingale property." That is, an individual exploits any information that may be available about his future labor income.

The test for excess sensitivity of consumption to income is based on an equation, which was extended to include lagged income change: The null hypothesis is that the PIH is accepted if the coefficient of lagged income is equal to zero. The null hypothesis is rejected because the anticipated change in income positively predicts changes in consumption. This finding contradicts the PIH. That is, the parameter estimates of lagged income were statistically significantly positive. The estimation and testing procedure is based on the autoregressive specification for labor income. Thus, an excess sensitivity of consumption to income was seen to be a feature of aggregate time series data in the United States, and this may also be applicable elsewhere.

According to the PIH, consumption was smooth because permanent income (Yp) was smoother than normal income. The theory is aimed at explaining why consumption is smoother than income (Brown and Crossley, 2001). Thus, change in consumption should be equal to the amount warranted by revisions in expectations concerning future labor income. Using a time series model, aggregate earnings is created by a general ARMA process of order (p,q). Thus, the change in consumption is given by

$$\triangle C_t = r/1+r\ 1+ \frac{\sum_{i=1}^{\infty}(1+r)^{-i}\,\theta_i}{1-\sum_{i=1}^{\infty}(1+r)^{-i}\,\psi_i}\,\varepsilon_t \quad \text{----} \quad (1)$$

Where, θi = the moving average (MA), ψi = the autoregressive coefficient of the ARMA, and εt = multiplier of income in innovation. Equation (1) is said to be valid for both stationary process and non-stationary process.

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The estimated AR (1) models in first differences showed positive autoregressive parameters. Hence, the et ought to be greater than one (1). Thus, the prediction of the PIH is that change in consumption should be more than the innovation to income. If income obeys a random walk, disturbances to income process could be more persistent than expected (Palley, 2005; lloyd, 2006; Romer, 2001)

III. Methodology

The research design, population of study and the method of data collection are explained in this section. It sets the parameters for the data collected as well as described the mode for data analysis. The blueprint for collecting and analyzing data relates to the problem of investigating consumption pattern in Agyaragu community, Nigeria. Due consideration is given to the models used, the population of the study and the type of data. (Creswell, 1998 and 2003)

a) Autoregressive Lag Model

The ADL is necessary for the study because the habit or behavior of the consumer is involved in consumption decisions. The increase in incomes, wealth and other variables may not attract an immediate reaction from the households. However, over time they will change their habits and lifestyles in line with the change in their fortunes. Besides, the variation in their incomes may be permanent or transitory. Where such is transitory, households may resort to savings.
The ADL take the following forms:

$$Y_t = \alpha_0+\alpha_1X_t+\alpha_2X_{t-1}+\alpha_3X_{t-2}+e_t. \quad (2)$$

and

$$Y_t =\beta_0+\beta_1X_t+\beta_2Y_{t-1}+e_t. \quad (3)$$

Whereas the former (i) is a distributed-lag model, the later (ii) is the autoregressive distributed lag model.

The coefficients in the model are called the short-run or impact multipliers. They gave or measure the change in the mean value of consumption resulting from the unit change in the explanatory variables. They are the partial derivatives of consumption concerning the respective explanatory variables. What is finally obtained is called the long run or total distributed lag multiplier(s) given the total sum for all the coefficients (βi). The partial sums of the standardized parameter give the proportion of the overall impact felt. The ADL model addressed objectives (ii) to (v) and also the hypothesis of the study.

b) Model Specification

In formulating a model for this study, we relied on and borrowed from the works of Hall (1978), Ahumada and Garegnani (2003), Baker et al. (2006), Bonne et al. (1998), and Davidson et al. (1978). Modifications are made to arrive at the model that fit our purpose, expectations and the data used. We adapted the unrestricted autoregressive distributed lag model also called dynamic model. We chose to use the autoregressive distributed lag model because the study of consumption involves time series data. The regression equation includes not only the current values but also the lagged (past) values of the explanatory variables. In some cases, the model has one or more lagged values of the dependent variable (i.e., consumption) included as an explanatory variable.

Our model, therefore, took the linear log approximations with six (6) model equations as follows:

i. *Model 1 Equation 1:* Consumption predicted from current income and consumption lagged by one period

$$\ln C_t = \beta_0 + \beta_1 \ln Y_t + \beta_2 \ln C_{t-1} + U_t \quad (4)$$

The autoregressive distributed lag is our basic model.

Where, C_t = consumption in the present period, Y_t = current disposable income, C_{t-1} = consumption in the previous period t – 1, β_0 = coefficient for the constant term, β_1 and β_2 = the coefficients for Y_t and C_{t-1} respectively. The parameter estimates show the elasticities of C_t to Y_t and C_t to C_{t-1} respectively, U_t = Error term or white noise.

ii. *Model 1 Equation 2:* Consumption predicted from its own lagged values

$$\ln C_t = \propto_0 + \propto_1 \ln C_{t-1} + \propto_2 \ln C_{t-2} + U_t \quad (5)$$

iii. *Model 1 Equation 3:* Consumption predicted from its lagged values and lagged values of income of the individuals

$$\ln C_t = \lambda_0 + \lambda_1 \ln C_{t-1} + \lambda_2 \ln C_{t-2} + \lambda_3 \ln y_{t-1} + \lambda_4 \ln y_{t-2} + U_t \quad (6)$$

iv. *Model 1 Equation 4:* Predicting consumption based on expected future income

$$\ln C_t = \delta_0 + \delta_1 \ln y_t + \delta_2 \ln y_{t+1} + U_t \quad (7)$$

y_{t+1} = income expected in period t+1 (in the future).

v. *Model 1 Equation 5:* predicting consumption from wealth (assets)

$$\ln C_t = \phi_0 + \phi_1 \ln S_t + \phi_2 \ln N_t + \phi_3 \ln L_{t-1} + \phi_4 \ln I_t + U_t \quad (8)$$

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where, S_t= Stock market wealth in period t, N_t= Non – stock market wealth in period t, L_{t-1} = Wealth in period t-1 (period in the past), It = Saving or investment period t.

vi. *Model 1 Equation 6:* Predicting consumption from consumer durable goods and family size.

$$\ln C_t = a_0 + a_1 \ln X_t + a_2 \ln X_{t-1} + a_3 F_t + a_4 D_{1t} + a_5 D_{2t} + U_t \quad (9)$$

where, X_t = Consumption in period t of the non-durable items defined as recreation, social parties, smoking, expenses on recharge cards, etc, X_{t-1} = Consumption of non-durable in t-1, F_t = a vector for family size, education (represented by level of schooling attained) and age of the individual, D_{1t} = dummy variable for sex with 1 = male and 0 = female.

D_{2t} = Dummy for marital status (married = 1 and single = 0).

In addition to the linear log forms above, we also used the linear approximation in order to compare our results.

c) Study Geographical Area

Agyaragu is in Lafia Local government area of Nasarawa state. The town is located at a latitude of 80 25` 00`` and a longitude of 80 31` 00``. It has a land mass (area) of 21 square kilometers. The community shares boundary with Lafia in the North, Doma LGA in the South – West and Obi LGA in the South (Field survey, 2009). The Population of Agyaragu is estimated to be 22,750 people (NPC, 2008).

Different economic activities are found in the community: farmers, traders, artisans, civil servants, among others. Farming activities predominate other activities. It is famous for the production of yam, groundnut, maize, guinea corn, millet, cassava, rice, beans, melon, etc.

The data used in this study is the primary data generated from the chosen community, Agyaragu. It is a cross-sectional data series, which comprised of large sample units of individual households. In the survey conducted in Agyaragu, we had 484 cross-sectional observations out of a population of 22,750 and for each; we have data on consumption, income, wealth and non-durable consumption. These were in addition to other variables on expected income, savings, a vector for family size, education and age; sex and marital status – a total of fifteen variables. The SPSS, Eview and Stata Computer packages were employed in this study to routinely calculate the slope and intercept parameters and others estimates such as the F-statistic, t-statistic, z-statistic values along with the usual regression output.

IV. Data Analysis And Discussion Of Findings

a) Demographic Characteristics of Respondents

i. *Gender Statistics*

Table 4.1: Gender Data

Category	Absolute Frequency	Relative Frequency %
Male	364	75
Female	120	25
Total	484	100

Source: Field Survey, Feb. 2009.

Table 4.2: Marital Status

Category	Absolute Frequency	Relative Frequency %
Married	249	51.4
Unmarried	235	48.6
Total	484	100.00

Source: Field Survey, Feb. 2009.

From the 484 households that responded, 75% were males while 25% were females. Similarly, 51.4% were married while 48.6% were unmarried. No widow or widower and divorced responded.

Table 4.3: Work Participation Data: Frequency Distribution

S/No.	Category	Absolute Frequency	Relative Frequency	Cumulative Frequency %
1.	Missing Cases	16	3.2	3.2
2.	Civil Servants	147	29.4	32.6
3.	Farmers	125	25.0	57.6
4.	Businessmen/Women	133	26.6	84.2
5.	Artisan	44	8.8	93.0
6.	Others	35	7.0	100.0
	Total	500	100.0	

Source: Field Survey, Feb. 2009.

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The response rate from the sampled units of 500 people was 97% while the non-response rate stood at 3%. From the sample survey, 25% are farmers while 28.2% are Businessmen/Women and 9% are Artisans. Thus, 60.4% of the people are self-employed while 29.4% are engaged in paid jobs.

Table 4.4: Distribution of Respondents Education Attainment

Category	Absolute Frequency	Relative Frequency %
Primary School	66	13.6
Secondary	157	32.4
Tertiary/University	215	44.4
None	46	9.6
Total	484	100.0

Source: Field Survey, Feb. 2009.

From the survey, 44.4 percent of the households in the community are either polytechnics, college of education or university graduates, 32.4 percentages have attained secondary education while 9.6 percent have not attended any schooling.

Table 4.5: Demographic Data of Respondents

Category	Absolute Frequency	Relative Frequency %
Head of Family	199	41.1
Non -Head of family	263	54.3
Nil Response	22	4.6
Total	484	100.0
Family Size	134	
1 – 4	157	27.7
5 - 8	130	32.4
9 – above	63	26.9
Nil Response		13.0
Total	484	100.0

Source: Field Survey, Feb. 2009.

Whether or not individuals spent so much on family upkeep, the survey revealed the following:

		No.	%
Yes	=	305	63.0
No	=	133	27.5
Nil	=	46	9.5
Total	=	484	100

Family heads constitute 41.1 percent of the households covered in the survey while non-family heads are 54.3 percent. Regarding family size, 27.7 percent of the individuals in the community has a family size 1 – 4 persons while 32.4 percent has 5 – 8 persons. Those with a family of above nine persons constitute 26.9 percent. The implication is that family size influence consumption positively that add little to wealth for the future. From the survey, 63 percent households affirmed that they spend so much on consumption expenditure. This expenditure pattern is supported by the evidence in the table. This is further explained by the fact that 18.4 percent of the households are unable to save because of high consumption expenses on family upkeep.

b) Results and Interpretations

i. *Autoregressive Distributed Lag Model*

Our analyses are based on the data collected from the field (Appendix 8). The results are presented as follows:

Model 1 Equation1: Predicting consumption from personal disposable

Income and past consumption lagged by one period.

Table 4.6: Analyzed Result of model equation 1

Dependent Variable: LOG(CT)
Method: Least Squares
Date: 03/15/09 Time: 13:23
Sample: 1 484
Included observations: 479
Excluded observations: 5
LOG(CT)=C(1)+C(2)*LOG(CT -1)+C(3)*LOG(YT)

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	0.976718	0.125878	7.759249	0.0000
C(2)	0.374948	0.030331	12.36197	0.0000
C(3)	0.436343	0.033818	12.90260	0.0000

R-squared	0.702174	Mean dependent var	4.992145
Adjusted R -squared	0.700879	S.D. dependent var	0.853379
S.E. of regression	0.466729	Akaike info criterion	1.320323
Sum squared resid	100.2046	Schwarz criterion	1.347134
Log -likelihood	-302.6548	F-statistic	542.2639
Durbin -Watson stat	1.667343	Prob abilit (F-statistic)	0.000000

Source: Author's Computation, 2009

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Note: $\beta_0 = C_{(1)}$, $\beta_1 = C_2$, $\beta_2 = C_{(3)}$

$$\text{Therefore, } InC_t = 0.98 + 0.38InY_t + 0.44InC_{t-1} \quad (10)$$

The signs of the estimated coefficients for Log income and past consumption (t-1) were expectedly positive showing a positive relationship between consumption in period t and income in period t and consumption in t-1. Both coefficients of income (Yt) and consumption lagged by one period were statistically significant as indicated by the high t values and the low probability values. The regression coefficient of log income was 0.44 showing that one percent increase in income leads to increase in consumption by 44% per annum, all things being equal. The coefficient of consumption lagged by one year was statistically significant, i.e., 0.38 showing the presence of significant lag in the adjustment of consumer behavior to its desired level. The value of partial adjustment or spread of adjustment (i.e., 1-0.38) is 0.63. This spread implies that about 63% of the disequilibrium between actual change and desired change in consumption eliminated in a year, all things remaining constant. The variables of income (Yt) and past consumption lagged by one period explained 70% of the variation in consumption behavior and decision in period t. However, income had a greater influence on consumption behavior than past consumption. Most consumption present habits termed over the years. We assume the absence of positive or negative first-order autocorrelation because the DW statistic was towards 2 (=1.67).

Hypothesis: we hypothesized as follows:

H0: $\beta1=\beta2 = 0$ (Consumption cannot be predicted from income and its past value lagged by one period).

H1: $\beta1=\beta2 = 0$ (Consumption can be predicted from income and its past value lagged by one period).

If all the slope coefficients are all simultaneously zero, which means the computed value of the F-statistic (Fc) is greater than the critical value of F-statistic (Ft) at 5% significant level, then we can accept H0 but if otherwise, we reject H0 and accept H1. From the result in table 4.6, the Fc > Ft, hence we accepted H1. That consumption can be predicted from the income and past value of consumption lagged by one year.

Model 1 Equation2: Predicting Consumption from only its values lagged by two periods.

Table 4.7: Analyzed Result of model equation2

Dependent Variable: LOG(CT)
Method: Least Squares
Date: 03/15/09 Time: 11:11
Sample: 1 484
Included observations: 442
Excluded observations: 42
LOG(CT)=C(1)+C(2)*LOG(CT-1)+C(3)*LOG(CT-2)

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	1.607511	0.130459	12.32194	0.0000
C(2)	0.319840	0.064491	4.959469	0.0000
C(3)	0.377781	0.069044	5.471596	0.0000

R-squared	0.626906	Mean dependent var	5.004511
Adjusted R -squared	0.625206	S.D. dependent var	0.857986
S.E. of regression	0.525263	Akaike info criterion	1.556928
Sum squared resid	121.1205	Schwarz criterion	1.584697
Log -likelihood	-341.0810	F-statistic	368.8229
Durbin -Watson stat	1.861052	Probability (F-statistic)	0.000000

Source: Author's Computation, 2009

Note: $\alpha_0 = C_{(1)}$, $\alpha_1 = C_2$, $\alpha_2 = C_{(3)}$

$$\text{Therefore, } InC_t = 0.61 + 0.32InC_{t-1} + 0.38InC_{t-2} \quad (11)$$

The coefficients of log past values of consumption lagged by two periods, i.e., Ct-1 and Ct-2 were significantly positive, but their values were low. The coefficients for the two variables were 0.32 and 0.38

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respectively. Thus, a 1% increase in consumption lagged by two periods increased current consumption by 32% while a 1% increase in consumption lagged by one period increased consumption now by 38%. This positive relationship still points to the fact that there is the presence of significant lags in the adjustment of consumption decisions but the significant lags were lower for two-period lags. The spread of adjustment for the two variables were (1-0.32) 0.68 and (1-0.38) 0.62 respectively. The spread was higher in the remote period (year) than in the immediate past period. Thus, the immediate past period's consumption has a stronger influence on current consumption than the remote period. The variables were not positively or negatively auto correlated because the Durbin – Watson statistic of 1.86 tends towards 2.

Hypothesis:

H0: $\square_1 = \square_2 = 0$ (Consumption cannot be predicted from its past values)

$\square_1 =/ \square_2 =/ 0$ (Consumption can be predicted from its past values)

By the F-Statistic and test, we reject H0 and accept H1, that consumption can be predicted by its past values. However, the immediate past year consumption has a stronger impact on current consumption. Judging from the acceptance of H1, we can say that habits formation also played a role in consumption decision of the households in the current period.

Model 1 Equation3: Predicting consumption from its lagged values and lagged values of Income

Table 4.8: Analyzed Result of model 1 equation 3

Dependent Variable: LOG(CT)
Method: Least Squares
Date: 03/15/09 Time: 13:25
Sample: 1 484
Included observations: 392
Excluded observations: 92
LOG(CT)=C(1)+C(2)*LOG(CT-1)+C(3)*LOG(CT-2)+C(4)*LOG(YT-1)+C(5) * LOG(YT-2)

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	1.292606	0.153994	8.399880	0.0000
C(2)	0.344450	0.082129	4.194033	0.0000
C(3)	0.207021	0.087455	2.367163	0.0184
C(4)	-0.016144	0.060923	-0.264997	0.7912
C(5)	0.219006	0.065220	3.357951	0.0009

R-squared	0.625595	Mean dependent var	5.061179
Adjusted R-squared	0.621725	S.D. dependent var	0.839198
S.E. of regression	0.516141	Akaike info criterion	1.527798
Sum squared resid	103.0973	Schwarz criterion	1.578452
Log-likelihood	-294.4484	F-statistic	161.6598
Durbin-Watson stat	1.885178	Probability (F-statistic)	0.000000

Source: Author's Computation, 2009

Note: $\lambda_0 = C_{(1)}, \lambda_1 = C_{(2)}, \lambda_2 = C_{(3)}, \lambda_3 = C_{(4)}, \lambda_4 = C_{(5)}$

Therefore,

$$InC_t = 1.29 + 0.34InC_{t-1} + 0.21InC_{t-2} - 0.021InY_{t-1} + 0.221InY_{t-2} \quad (12)$$

The slope coefficients of the variables were individually statistically significant judging by their significant t values which were high. The only exception was income lagged by one period (Yt-1) i.e., income in the remotest year. Income in year t-1 was not only statistically insignificant, but it has a wrong sign (a negative sign) which defeats our a priori expectation. Of the four variables tested in this equation, consumption

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lagged by one year has the strongest influence on current consumption, followed by personal income in period t-2 i.e., the immediate past disposable income. This result shows that only past income lagged by one period (t-2) had a positive and a significant impact on consumption decision while the remote year (t-1) had a negative impact.

Thus, a 1% increase in income will lead to increase in consumption in periods Ct-1 and Ct-2 by 34.4% and 21% respectively. Similarly, a 1% unit increase in income in periods t-1 and t-2 increased consumption by 22%. All these changes showed the presence of significant lags in the adjustment of consumption decision to its desired level. The value of coefficient or the spread of adjustment for the three important variables are as follows: Consumption lagged by one period (Ct-1) is (1 - 0.34) 0.66. Consumption lagged by two periods (Ct-2) is (1-0.21) 0.79 and income lagged by two periods (Yt-2) is (1-0.22) 0.78. This result means it takes a longer time to remove the disequilibrium between actual change and desired change in consumption that is caused by changes in its past level and past income. As expected, the variables in this particular model equation accounted for 63% changes in consumption behavior (R2). And because we are dealing with autoregressive distributed lagged models, the R2 will continue to deteriorate, as more variables are added.

Based on the DW statistic of 1.885, we can assert that there was an absence of the first-order autocorrelation between the variables.

Hypothesis:

H0: $\lambda_1 = \lambda_2 = \lambda_3 = \lambda_4 = \lambda_5 = 0$ (Consumption cannot be predicted from its lagged values and lagged values of income)

H_1: $\lambda_1 = \lambda_2 = \lambda_3 = \lambda_4 = \lambda_5 = 0$ (Consumption can be predicted from its lagged values and lagged values of income)

We tested the above hypothesis simultaneously and individually. Using F-test, we reject H0. This reject implies that consumption can be predicted from the past values of income lagged by two periods. Also, it can be predicted from its previous values lagged by two periods, Ct-1 and Ct-2. Thus, habits formed have great influence on current consumption.

Model 1 Equation 4: Predicting Consumption from expected future income (t+1

Table 4.9: Analyzed Result of model equation 4

Dependent Variable: LOG(CT)
Method: Least Squares
Date: 03/15/09 Time: 13:29
Sample: 1 484
Included observations: 479
Excluded observations: 5 after adjusting endpoints
LOG(CT)=C(1)+C(2)*LOG(YT)+C(3)*LOG(YT+1)

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	1.532055	0.164592	9.308192	0.0000
C(2)	0.621918	0.035282	17.62686	0.0000
C(3)	6.473540	0.022499	4.072525	0.0001

R-squared	0.575805	Mean dependent var	5.086906
Adjusted R-squared	0.573461	S.D. dependent var	0.793903
S.E. of regression	0.518497	Akaike info criterion	1.532422
Sum squared resid	97.31995	Schwarz criterion	1.532422
Log -likelihood	-276.6670	F-statistic	245.6903
Durbin -Watson stat	1.570946	Probability (F-statistic)	0.000000

Source: Author's Computation, 2009

Note: $\delta_0 = C_{(1)}$, $\delta_1 = C_{(2)}$, $\delta_2 = C_{(3)}$

$$\text{Therefore, } InC_t = 1.53 + 0.62InY_t + 6.47Iny_{t+1} \quad (13)$$

The variables investigated in this equation were individually statistically significant based on their high t-values and zero probabilities. All of them had positive signs which confirmed our a priori expectation, though expected income has a higher coefficient value than current disposable income. As noted in model one and as we shall see ahead, current disposable income has a great influence on consumption decisions of the sampled units. In this model equation, expected income has the greatest predictive power on consumption. We

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infer that consumption by the sampled units is influenced by expectation. An increase of N1.00 in disposable income in the current period increases consumption by only 62% or N0.62, whereas the same increase in expected income increased consumption by 647% or N6.47. Since the expected income in the future lagged by one period (t+1) is statistically significant, the presence of significant lag in the adjustment of consumption to the desired level is necessary. The coefficient of adjustment for expected income is 0.353, meaning that it will take less than one year to eliminate a disequilibrium of 11% from the system. Thus, expectation plays a great role in influencing consumption decision.

We tested the hypothesis (H0) for $\delta 1 = \delta 2 = 0$ against an alternate hypothesis of $\delta 1 = \delta 2 = 0$ at 5% level of significance. Based on the F-test, we rejected H0 for H1 implying that consumption can be predicted from future (expected) income. If it is regressed on expected income alone, the significance will improve. For now, the variable (t+1) is a strong determinant of consumption.

Model 1 Equation 5: Predicting Consumption from wealth (Assets

Table 4.10: Analyzed Result of model equation5

Dependent Variable: LOG(CT)
Method: Least Squares
Date: 03/15/09 Time: 13:31
Sample(adjusted): 13 453
Included observations: 26
Excluded observations: 415 after adjusting endpoints
LOG(CT)=C(1)+C(2)*LOG(ST)+C(3)*LOG(NT)+C(4)*LOG(LT_1)+C(5)*LOG(IT)

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	4.434085	0.816265	5.432163	0.0000
C(2)	0.136987	0.144342	0.949042	0.3534
C(3)	0.203430	0.219863	0.925258	0.3653
C(4)	0.009086	0.225191	0.040350	0.9682
C(5)	-0.114510	0.110353	-1.037671	0.3112
R-squared	0.165153	Mean dependent var		5.686149
Adjusted R-squared	0.006135	S.D. dependent var		0.623369
S.E. of regression	0.621454	Akaike info criterion		2.057531
Sum squared resid	8.110301	Schwarz criterion		2.299472
Log-likelihood	-21.74790	F-statistic		1.038578
Durbin-Watson stat	0.480259	Probability(F-statistic)		0.410854

Source: Author's Computation, 2009

$$\text{Therefore, } InC_t = 4.43 + 0.14InS_{t-1} + 0.20InN_{t-2} + 0.01InI_t \quad (14)$$

Regarding signs, all the slope coefficients fulfilled the a priori signs. Log stock market wealth (St), Non-Stock market wealth (Nt) and Past-wealth (Nt-1) were positively related to consumption (Ct), whereas, Savings as negatively related to consumption. Though the variables individually have a marginal influence on consumption; they were individually statistically significant except for past wealth which was insignificant based on the low t-values. Based on even the critical values at 10% significance level, the computed t-values were less.

Regarding magnitudes, non-stock market wealth influences consumption more, followed by stock market wealth. Past wealth did not change consumption much. Savings influences the behavior of the households because an increase of one unit, say N1.00, in savings reduced consumption by 11% or N11.45. This result implies by inference that there is a low saving culture in the community. This marginal impact on consumption could be taken to mean that past wealth as a variable also influenced consumption but very weakly. The basis of our position is that at periods of low income, these individuals fall back on their non-stock market wealth such as plots of lands, buildings, etc. and the stock market assets (shares) to maintain previous consumption habits.

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Hypothesis

H0: $\varphi_1 = \varphi_2 = \varphi_3 = \varphi_4 \quad 0$ (Consumption cannot be predicted from wealth)

H1: $\varphi_1 = \not\varphi_2 = \not\phi_3 = \not\varphi_4 \quad = \not 0$ (Consumption can be predicted from wealth)

Where; $\varphi_0 = C_{(1)}, \varphi_1 = C_{(2)}, \varphi_2 = C_{(3)}, \varphi_3 = C_{(4)}, \varphi_4 = C_{(5)}$

Based on the F-statistic of 1.0386 we accepted H0 and concluded that consumption cannot be predicted from wealth. This is despite the marginal influence of wealth on consumption decision and behavior. Thus, computed F-Statistic of 1.0386 was less than the critical F-Statistic at both the 5% and 1% levels of significance (= 5.64).

Model 1 Equation 6: Predicting Consumption from Non-durable consumption: (a vector for family size, age, and educational attainment), sex and marital status. This model is a consumption switching model.

Table 4.11: Analyzed Result of model 1 Equation 6

Dependent Variable: LOG(CT)
Method: Least Squares
Date: 03/15/09 Time: 13:44
Sample(adjusted): 1 483
Included observations: 467
Excluded observations: 16 after adjusting endpoints
LOG(CT)=C(1)+C(2)*LOG(XT)+C(3)*LOG(XT-1)+C(4)*LOG(FT)+C(5)*D1T+C(6)*D2T

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	2.651816	0.282544	9.385500	0.0000
C(2)	0.246815	0.055552	4.442931	0.0000
C(3)	0.238242	0.043436	5.484852	0.0000
C(4)	0.153717	0.076413	2.011658	0.0450
C(5)	-0.024614	0.082510	-0.298318	0.7656
C(6)	0.139885	0.069796	2.033336	0.0428
R-squared	0.298377	Mean dependent var		5.129101
Adjusted R-squared	0.288119	S.D. dependent var		0.746393
S.E. of regression	0.629754	Akaike info criterion		1.930117
Sum squared resid	135.6340	Schwarz criterion		1.996534
Log-likelihood	-329.8404	F-statistic		29.08819
Durbin-Watson stat	1.747786	Probability(F-statistic)		0.000000

Source: Author's Computation, 2009

Note: $a_0 = C_{(1)}, a_1 = C_{(2)}, a_2 = C_{(3)}, a_3 = C_{(4)}, a_4 = C_{(5)}$ and $a_5 = C_{(6)}$

Therefore,

$$\ln C_t = 2.65 + 0.25\ln X_t + 0.24\ln X_{t-1} - 0.15\ln F_{t-1} - 0.031\ln D_{1t} + 0.14\ln D_{2t} \quad \ldots \quad (15)$$

This model contains two dummy variables, for sex and marital status. It is a mixture of quantitative and qualitative variables which belong to the realm of models known as the Analysis of Covariance (ANCOVA). ANCOVA is an extension of the ANOVA models. ANCOVA models provide a means of statistically controlling the effects of quantitative variables called covariates. Again, the use of ANCOVA is our modest contribution to knowledge in this area of research in a developing economy.

The regression (slope) coefficients were positive and individually statistically significant with good t-values, except the estimate for the dummy variable of sex. Though Sex had a wrong sign from the a priori, it has its implication when applied to interpret consumption behavior. All the variables affected consumption and changed it though at different magnitudes. Non-durable consumption has the most impact followed by lagged non-durable consumption lagged by one period, i.e., last year's position. Family size and marital status followed in that order with sex being the least.

When non-durable consumption increased by one unit, N1.00, consumption increased by 25% or

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N25.00. The same increase in non-durable pruducts lagged by one period (t-1), family size, increased consumption by 24% or N24.00, 15% or N15.00 and 14% or N14.00 respectively.

Our regression results showed that the sex dummy variable had a negative sign since male were 1 and female were 0. This dummy implies that the yearly average consumption by males was lower than that of females by N2.46 or 2% - a marginal impact.

Similarly, the result for marital status was positive and since the married was 1 and unmarried was 0, this means that yearly consumption among the married was higher than that of the unmarried by N14.00 or 14%. The low R2 in this model and others before it is a typical case with cross-sectional data where the R2 is always low due to the diversity of individual economic units used in the sample.

In our hypothesis formulation, we have:

H0: $a_1 = a_2 = a_3 = a_4 = a_5 = 0$ (Consumption cannot be predicted from the
Variables involved, i.e., consumption does not exhibit switching behavior)

H1: $a_1 = a_2 = a_3 = a_4 = a_5 = 0$ (Consumption can be predicted from the Variables involved, i.e., consumption exhibits switching behavior)

We tested this hypothesis individually and simultaneously. Based on the F-Statistic, we rejected H0 while accepting H1. We concluded that consumption decision by individual households in the community exhibited consumption switching behavior.

ii. *Discussion of Results and Findings*

Previous works such as Duesenberry (1949) and Brown (1952) treated current income as exogenous because it was regarded as the major independent factor in the consumption function. Thus, consumption was too sensitive to current income (Yt). The LC-PI baseline model posited that no other variables observed in period t-1 or earlier could predict the residuals in the consumption regression model or equations; except income. In this work, we added value to empirical research by treating current earnings as an endogenous variable. The model we used adequately accounted for the endogeneity of current income for the reason that it is one of the main independent determinants of consumption but not the only key determinant.

From our findings, consumption is always smoothening over fluctuations in income. That is, consumers were able to smooth consumption over their transitory fluctuations in earnings even though they face liquidity constraints and other practical considerations. By smoothness of consumption, we mean the pace of the response of consumption to changes in income and other variables. Thus, it responds to predictable changes in income and other variables, but the reaction is slow or weak as opposed to the robust response identified by the LC-PI hypothesis. That is, consumers are not too sensitive to current income. This sensitivity is evident from the predictive power of income of 0.44 in our model one equation (1) result.

Besides, the individuals in our sample do not merely behave in line with the baseline models of consumption because consumption is not modeled on income alone but other variables as well. Our chosen model did not reject the other variables used except only one, precisely the wealth variable based on statistical significance criterion. Even the variable statistically excluded has been shown to have a level of marginal impact on consumption decision and behavior of the individuals. The interesting aspect to note is that the received theories modeled consumption on income alone. Also, their studies were centered on the developed economies where these models worked well with expected outcome. Now that a study based on a developing economy, with data evidence from Nigeria, abound, the work suggests that a new model of consumption should to be formulated. The new model takes into consideration other variables – expected income, lagged consumption, wealth, particularly non-stock market wealth, savings, conspicuous consumption, family size, educational level, age, sex and marital status of the consumers; which could cause disequilibrium in consumption. Saving was meant to capture the modest liquidity constrained aspects of the consumers' decision pattern. These factors other than income reflect the particularities and the contemporaneous feature of the consumption function and the consumers and their consumption pattern in a developing economy.

A point of agreement between this study and the previous works is the constant elasticity of consumption, otherwise known as the marginal propensity to consume (MPC). As expected, the MPC, in all the model equations where current income was modeled in this study, shows that it is less than unity (i.e., $0 < MPC < 1$). The positive intercept, as in model equations 1 and 3 shows that individuals in the community consume even out of zero income, thereby borrowing or drawing on past savings and selling part of their properties (assets) such as the plot of land to sustain current consumption.

Thus, based on the log-linear distributed lag autoregressive model, the following factors have a stronger influence on consumption: current income, lagged consumption in 2 periods, immediate lagged income, expected income, conspicuous consumption, non-stock market wealth.

V. Conclusion and Recommendations

The cross-sectional data series were used to establish the long run relationships between current

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consumption and disposable income, lagged incomes and other variables that were considered as useful for modeling their effects on consumption behaviors. Thus, not only current earnings determined consumption, but other variables also influenced consumption. Not only the first lagged value of consumption but both the first and second lagged values of consumption predicted consumption significantly. In fact, lagged consumption was also established and had a bigger predictive influence on consumption decisions than lagged incomes. That is, consumers do not depend much on past earnings. This conclusion demonstrates that individuals always try to maintain and sustain habits formed in the past.

Conspicuous consumption habits and behaviors in the community were high. Also, consumption patterns of the respondents favored non-durable goods and necessities.

a) Recommendations

Policy actions tailored towards increasing the output and incomes of the residents of the community on the one hand and those aimed at changing their consumption patterns are imperatives. Policy makers had not focused enough attention on the issues of consumer behavior. If properly formulated and implemented, such policy actions required should include looking at consumer behaviors and patterns that hindered sustainable development. Henceforth, policies should focus both on economic variables and behavior related social policies.

The empirical results from this study confirmed our apriori expectation for the model which included lagged consumption, lagged incomes, conspicuous consumption and marital status. The regression results demonstrated a robust predictive power for changes in consumption. The study worked on the assumption that the consumers maximized their expected utility and that they were able to borrow freely to sustain consumption. The Agyaragu community consumers did not behave absolutely or strictly as the Lifecycle – Permanent Income models predicted. Besides, various tests conducted showed that the variables cointegrate. Hence there exists a long-run relationship between consumption and the selected variables. Furthermore, our model is stable and reliable.

On this basis, we recommend the autoregressive distributed lag model, as the model of consumption for our economy. The model as modified, with the additional variables included, is adequate. It reflects our contribution to knowledge. Both the probit and logit analyses confirmed the results and findings of the ADL model. Both the linear and log-linear approximations should be applied to the model. Similarly, cross-sectional, panel and time series data should be applied to the model appropriately.

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Impact of Goods and Service Tax after Implementation

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Abstract- Before implementation of GST in India, Government of India collected indirect taxes in the various names. Direct tax is mostly define clearly to tax payer, but indirect tax does not define clearly because it collected by government to each stage manufacturer to customer. For clearing of indirect tax government of India introduced biggest tax reforms after independence since 1947 in the name of GST. After implementing of GST in India, there are several issues arises in front of the GOI, Professionals, business man and even customers. These are the issues highlighted in this paper.

Keywords: goods and service tax, government of india, CGST, SGST, IGST.

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Impact of Goods and Service Tax After Implementation

Sudip Banerjee [α] & Priya Agrawal [σ]

Abstract- **Before implementation of GST in India, Government of India collected indirect taxes in the various names. Direct tax is mostly define clearly to tax payer, but indirect tax does not define clearly because it collected by government to each stage manufacturer to customer. For clearing of indirect tax government of India introduced biggest tax reforms after independence since 1947 in the name of GST. After implementing of GST in India, there are several issues arises in front of the GOI, Professionals, business man and even customers. These are the issues highlighted in this paper.**

Keywords: goods and service tax, government of india, CGST, SGST, IGST.

I. Introduction

In India goods and service tax was a historical movement for implementation a significant indirect tax reforms. It means that mixed up various number of indirect taxes which(levied by both central and state government) to made up a single tax and give a big advantage for customer to filling a tax return.

II. Literature Review

Monika Sehrawat, Upasana Dhanda (December 2015) defined goods and service tax and the key tax reform and explain the concept, feature, advantages and challenges of GST.

Dr. N. Bagyalakshmi (2015) studied that impact of GST on various sectors and challenges for GST implementation and founded those benefits of introduction of GST, and suggested various measures to overcome challenges of GST.

Deepika Bendapudi & Sheba M Sam (2015)studied GST and its impact on government and retail sector and founded various provision of GST and its impact of GST on retail sector and government revenues.

Ruth Priyanka Immanuel, Wiston Terence (2015)studied that GST and its impact on tax burden and founded that tax burden on individuals and benefit of GST on different sector of the market.

Milan Deep Kour, Kajal Chaudhary, Surjan Singh, Baljinder Kaur (November 2016) studied the impact of GST after its implementation and founded that the present condition of indirect tax and the GST, benefits and challenges for GST.

III. Objectives of the Study

a) To know the changes of various tax rates.
b) Impact of GST in different sector after implementation.
c) Changing in product price.

IV. Research Methodology

Sources of Data: The source(s) of data is based on secondary. This includes to journals, articles, newspaper highlights and various website.

V. Data Analysis

a) The main highlights of the GST is as follows:

i. In 1stjulyGSTcomes effect for the public.
ii. From coming of GST it does not expected have much impact of inflation.
iii. GST system, tax collected only VALUE ADDED TAX AT EVERY STAGES.
iv. It means single tax (collected at multiple tax).
v. The overall final consumer will bear GST charged only.
vi. It will depend on respective state government who control the price of commodities.
vii. In GST petroleum product does not have much space.
viii. The Finance Minister "ARUN JATIELY" gave the information to the public for GST Launched event in parliament central hall on Friday midnight.
ix. The GST embodies the principle of "ONE NATION, ONE TAX, ONE MARKET".
x. In GST rate tax fall in under various categories:0%,12%,18% and 28%.
xi. The biggest advantage of GST reduction in the multiple tax burden of goods.
xii. It gave various cheat- sheet points:

a. GST is a biggest game changer in Input tax credit.
b. The tax paid on each stage on production to consumer but with the help of GST tax is Paid on last point of supply chain.

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c. The government was included an ANTI-PROFITEERING clause in GST.
d. The petroleum product like: petrol, diesel, aviation turbine fuel, alcohol was left out in GST.

VI. Impact of 5 Sectors of India's Economy

a) Real Estate

During the new tax structure of India having input credit benefits various builders have Buy their raw materials at the base price of property project which is launched at 1stJuly 2017 will be compare to more cheaper. For buying during construction properties will be attract 12% to 5.5% rate earlier(including value added tax and service tax).Real estate buyer have more prosperous and quicker to take cost benefit on to Property buyers. For new projects input credit passed by the buyer at 100% and land 50%.Any tax rate change under GST purely depends on demand and supply.

b) E- Commerce

E-Commerce website like Amazonian, Snap deal, etc. It collects TCS (tax collected at source) which is fixed at 1%, and it pay to the Seller at a listed website. It is more expensive. The latest update by GST is that TCS collected (sector 52 of the CGST/ SGST act, 2017).

c) Travel and Tourism

IT depends on room rates for their slab for hotel and lodges. It comes out 7.5% of the GDP. For the business class fares will goes increase 9% to 12%.

d) Ride Halling Apps

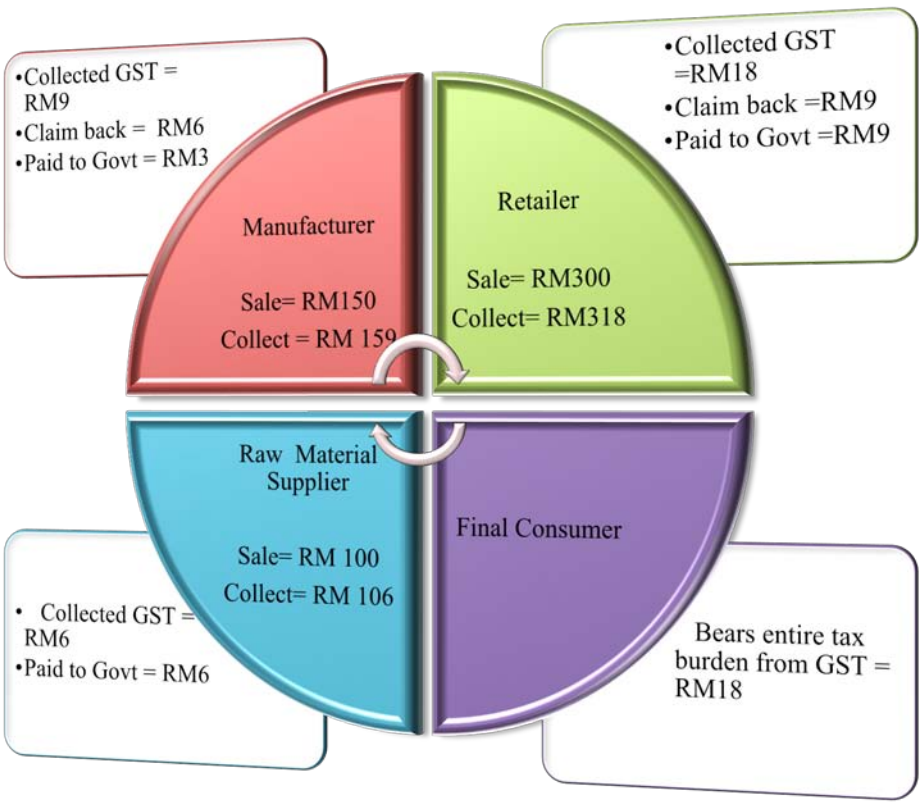
TAX rate will rise 14.5% to a range between 29% to 43% for driver that who does not work for olla and uber cab. The individual pay 25,000 for EMI but it rise and they pay around RS.35,000 to 40,000 for post GST.

e) Smart Phones

IT raise 12% to range of 8% to 18% after implementation at various stage.

Ex: APPLE consider for theirI-phone 7.5% after reduction of price of their apple mode

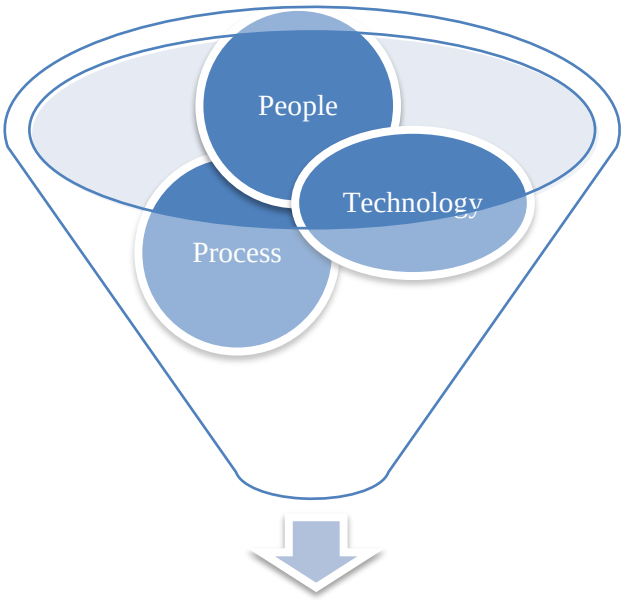
Standard-Rated GST



6% GST with RM6 Raw Material supplier to Manufacturer.
6% GST with RM9 Manufacturer to Retailer.
6% GST with RM18 Retailer to Consumer.

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VII. Key Focus for Successful GST Implementation



a) People:-Education & training, Selling for the upcoming GST, Communication Plan.
b) Process: Business Process flows and document flows, place and time of supply, rules and managing cash flow, Supply chain analysis of suppliers and customer, Transitional issues.
c) Technology: IT System configuration and modification, Current IT system caters for GST.

To understand and identify the "AS It" and "To Be" in order to be GST compliant.

VIII. A Turning Point in History

With the introduction of GST, indirect tax will have a flat rate of around 18%. In the current system consumer pay 25-26% more than the cost of production.

Inflation:

Currently, certain goods have a lower tax rate such as food products, gold(1-2%), small cars(8%) etc but under the proposed GST almost all the products will be charged at a uniform rate much higher compared to the current level of these products. Thus these products are likely to get dearer.

Earlier Experience:

6 time out of inflation has increased after introduction of GST.

1 out of 2 times inflation fell after the GST rate was decreased.

Inflation tends to rise when there is a change in the rate or structure of tax. It might not comply with macro-economic concepts but trends some time defines more than anything else.

7 times out of 10 inflation rose after GST was increased.

IX. Goods and Service Tax

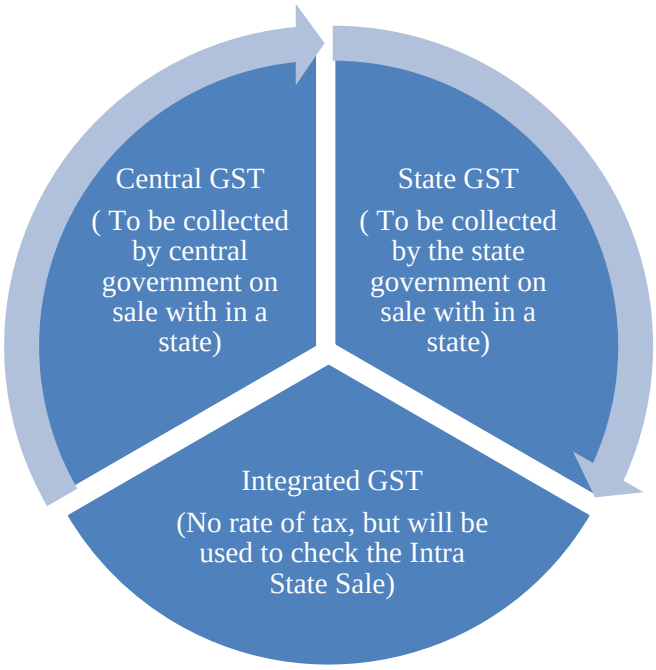


Table 1: Effect on Tax GDP Ratio for India

	Total Indirect Tax Collections (in Rs.)	Total Direct Tax Collections (in Rs.)	Total Tax in GDP Ratio	Change in Total Tax to GDP Ratio
Current	13.5	6.8	17.80%	Not Applicable
At Rnr of 18%	13.5	6.8	17.80%	0%
At 25%	16.4	6.8	19.70%	1.90%

RNR= Revenue Neutral Rate Whereas Tax to GDP Ratio is expected to remain unchanged. It is expected to increase by 1.9% at RNR of 25%. Thus at 25%, government would get the money to boost the GDP through increasing its capital expenditure.

a) Structure of GST

For India has implemented GST structure by Canadian model of dual GST.

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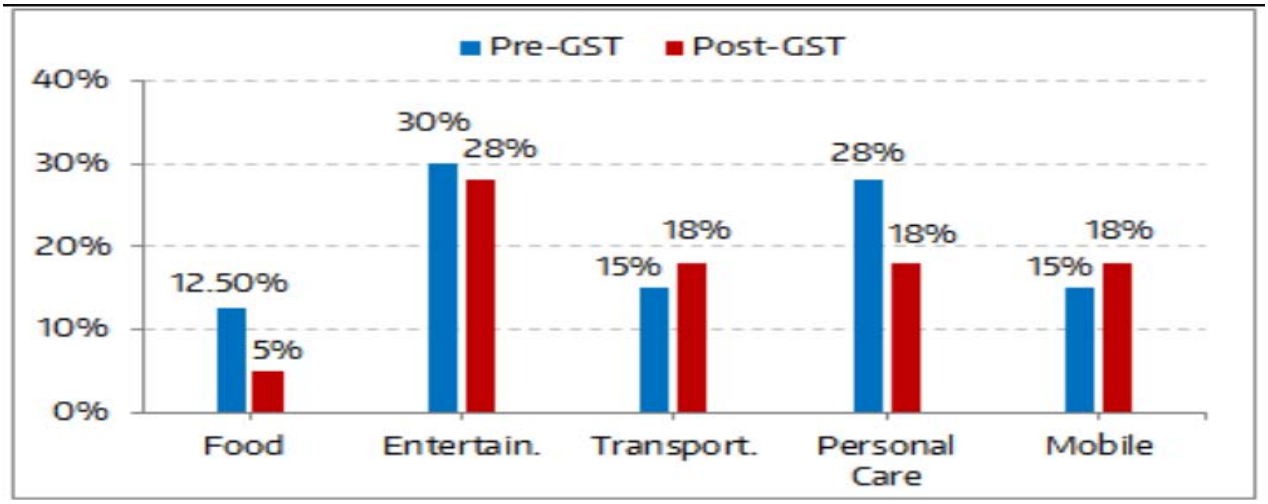
b) 3 types of GST collected by

i. CGST (central goods and service tax): Collected by central government.
ii. SGST (state goods and service tax): Collected by state government.
iii. IGST (Inter Goods and Service Tax): It is applicable on inter-state sales. It work between state and central government For help in smooth transfer.

c) Impact on Price on GST

Expecting in reduction in price of FMCG goods such as shampoos, chocolates, eating out, small cars, DTH.

For increasing in price luxury cars. Tabaco Products, Aerated beverages. textiles.



www.equitymaster.com, source: clear tax. In

X. Impact of GST on Various Sectors

Before implementation of GST most of tax burden held by it service, telecommunication the insurance industry, business support service, banking and financial service, etc. But after implementing market are unified. There are various sector which impact on GST like Logistics, Pharma, Telecommunications, Textile, Agriculture, FMCG, Freelancers, Automobiles, Startups etc.

a) Positive Impact on GST

i. There is no inter –state tax.
ii. There will be no burden of check post.
iii. It gives benefit transport industry and suppliers of goods.
iv. From inter-state tax there are more goods will be imported and exported among states.
v. They leads to reduction in tax evasion.
vi. Tax benefit GST provide that the reduction the price of goods in the long run.
vii. In India GST will gain the trust of foreign investor.

b) Negative Impact on GST

i. Smuggled goods may travel freely throughout the country.
ii. The local people may feel discriminated.

XI. Decision Taken by 21st GST Council Meeting

a) Second Review Meeting

The 21st GST council meeting was held on 9th September 2017 at Hyderabad. In GST council meeting, various decision are pertaining to the implementation and regulation of GST was decided.

There are major decision are highlights in 21st GST council meeting:

i. Artisans turnover of up to Rs. 20 lakh exempt from registration under GST.
ii. Last date for filling of sales return or GSTR-1 extended by a month to October 10, 2017.
iii. The overall GST collection robust with over 70%.
iv. GST rate are reduced in 30 items like roasted gram, idli/dosa butter, oilcakes, raincoats, rubber band etc.
v. Khadi sold through KVIC stores to be exempted from GST.

b) GST Return Filling

i. The due date for filling GSTR-1 for July was beextended up to 10th October 2017. For tax payers with annual turnover of more than Rs. 100 crores, the due date for filling July GSTR-1return will be 3rd October, 2017.

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ii. The due date for filling July GSTR-2 return was be extended up to 31th October, 2017.
iii. The due date for filling July GSTR-3 return was be extended up to 10th November 2017.
iv. The due date for all other GSTR-1, GSTR-2, GSTR-3 returns will be mentioned at a later date.

c) Decision in 22nd Meeting in GST Concil

i. It was held on 6 th October 2017.
ii. Relaxation for small and medium enterprises.
iii. To facilitate the easy payment and return filling for small and medium business with annual aggregate turnover up to Rs. 1.5 crores.
iv. Return filling to required quarterly basis.
v. The registered buyers from small tax payer would be eligible to avail input tax credit on a monthly basis.
vi. Small enterprises which aggregate turnover is less than Rs. 20 lakh are free for obtaining registration.

d) Composition scheme under GST

Types of business	CGST	SGST	TOTAL GST
Traders (Goods)	0.50%	0.50%	1%
Manufacture	1%	1%	2%
Supplier of food or drinks for human consumption (without alcohol)	2.50%	2.50%	5%

Note: service providers cannot opt for composition scheme.

XII. Date and Period for Filling Tax Return

For annual aggregate turnover more than INR 1.5 crore:

PERIOD	DATES
Jul - Oct 2017	31 Dec 2017
Nov 2017	10 Jan 2018
Dec 2017	10 Feb 2018
Jan 2018	10 Mar 2018
Feb 2018	10 Apr 2018
Mar 2018	10 May 2018

XIII. Conclusion

The structure of GST which was changed after implementation of GST. During the implementation of GST procedure it make various impact on different sector like: changing in product price due to increasing and decreasing tax slab rates ,abolition of various indirect tax in the states as well as central level. As it is expected by the Government that in long term GST will grow India's economy but long distance has to travel in this root.

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Evaluating the Forecasting Performance of Symmetric and Asymmetric GARCH Models across Stock Markets: Stock Market Returns and Macroeconomic Variables

By N. Chitra Devi

Abstract- Recently, the stock market volatility has created a surge among the researchers to focus their attention towards studying the sensitivity of stock market returns. In this study, the method of OLS has been applied to study the sensitivity of stock market returns to macroeconomic fundamentals. The performance of OLS (Ordinary Least Square Method) has not been BLUE (Best Linear Unbiased Estimator) due to the existence of heteroskedasticity. The presence of heteroskedasticity is confirmed by the ARCH LM test of Heteroskedasticity. Therefore, Symmetric and Asymmetric GARCH models have been employed to investigate the interaction between the stock market volatility and macroeconomic fundamentals volatility. Apart from this, the forecasting performance of symmetric and asymmetric GARCH models are compared and ranked based on the error measurement approaches such as Mean Squared Error, Root mean squared error and Mean Absolute Percentage Error. The results of the Mean Absolute Percentage Error reveals that the asymmetric E-GARCH model is the superior model to other GARCH models namely TGARCH and symmetric GARCH models in explaining the stock market returns in USA and in UK. Subsequently, the GARCH models outperform well in the US stock market comparing with the UK stock market.

Keywords: *macroeconomic variables, stock market returns, model evaluation.*

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I. Introduction

Over the last two decades, a large number of researchers have turned their attention to figure out the sensitivity of asset returns to the volatility of macroeconomic fundamentals. The stock market is highly volatile and complex in nature. The volatility of stock market returns has gained significance among the researchers and become a fertile area in which application of various econometric tools on the financial time series facilitates to examine the disperse of returns over certain period. Hence, volatility measurement is the signal to know the performance of a stock market.

The ordinary least square method is the superior model in predicting the stock market prices under the Gauss Markov assumptions. In the presence of heteroskedasticity, the application of Ordinary Least Square method on the financial time series yields spurious regression. Consequently, a model namely ARCH (Autoregressive Conditional Heteroskedasticity) was developed by Engle (1982) to capture the volatility under the condition of heteroskedasticity. Following the model of ARCH, an extended model of ARCH was proposed by Bollerslev (1986) to capture the symmetric volatility of any financial time series data under the assumption of heteroskedasticity.

After the introduction of GARCH model, many researchers have focused their attention to extend the GARCH models under various specifications. The GARCH models such as T-GARCH proposed by Nelson (1991) E-GARCH developed by Glosten, Jagannathan, and Runkle (1993) capture the asymmetric volatility of any financial time series. Along with the T-GARCH and E-GARCH models, many researchers have developed other GARCH family models such as IGARCH, AGARCH, GARCH-M, FIGARCH under various specifications. There is no conclusion on the GARCH model that is superior to capture the volatility of a financial time series. But the performance of a model differs across markets due to distinguished characteristics of each stock market and time period. In general, the selection of the best model is based on the error measurement of the GARCH model.

In this study, we have considered USA and UK stock market returns to examine the unforeseen relationship with the macroeconomic variables over the period from 1991 to 2014. Apart from examining the relationship between stock market returns and macroeconomic variables, an attempt has been taken to analyze the performance of the model by using the error measurement techniques such as Mean Squared Error, Root Mean Squared Error and Mean Absolute Percentage Error. Subsequently, the results of the error measurement approaches are compared and ranked to find out the superior model that explains the interrelationship between stock market returns and selected key macroeconomic variables.

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II. Literature Review

A large number of studies documented the relationship between macroeconomic variables and stock market returns, but, very few studies evaluated the superior model in explaining the stock market returns. The empirical identification of the macroeconomic variables affecting the stock market returns by employing ARCH/GARCH models has focused mainly on developed and emerging stock markets. El-Nader and Alraimony (2012) investigated the relationship between stock market returns and macroeconomic variables and documented that the ARCH (1) model performs well and therefore, the extension of GARCH (1, 1) model is not necessary. Alberg, Shalit, and Yosef (2008) compared the forecasting performance of several GARCH models with different distributions and found that EGARCH under student-t distribution is the most promising model explaining the dynamic behavior of stock market returns. Ahmed and Suliman (2011) has employed both symmetric and asymmetric GARCH models and found that asymmetric GARCH models are fit than the symmetric GARCH model. Subsequently it reveals that the stock market behavior is asymmetric and it implies that negative news have more impact than the positive news.

Kirui, Wawire, and Onono (2014) evaluated the relationship using TGARCH model and observed that the impact of news is asymmetric and confirmed the presence of leverage effects in Nairobi stock market. Wei-Chong, See-Nie, and Ung (2011) compared the GARCH models with Adhoc models on Japanese stock market and documented that GJR GARCH model is superior to the simple GARCH (1, 1) model. Lim and Sek (2013) have used symmetric and asymmetric models to capture the volatility of stock returns in Malaysia and found that symmetric GARCH models outperform well in the pre and post crisis period, whereas, in the crisis period, asymmetric GARCH models outperform well. Atoi (2014) employed first order symmetric and asymmetric GARCH models under normal and student 't' distribution and found that the power GARCH (1, 1, 1) in student-t distribution is the best predictive model based on the error measurement approaches of Root Mean Square Error (RMSE). Al Freedi, Shamiri, and Isa (2011) examined the volatility of Saudi stock market prices using Symmetric and Asymmetric GARCH models and found that the GJRGARCH model outperforms in the pre-crisis period, whereas the Simple GARCH model performs better in the post crisis period. Miron and Tudor (2010) examined the presence of leverage effects in Romanian and US daily stock market returns by employing EGARCH, PGARCH and TGARCH models and documented that the EGARCH model exhibit lower forecast error comparing with the other asymmetric GARCH models.

Marcucci (2005) compared different GARCH models in forecasting ability of US stock market returns and found than Markov Regime Switching GARCH models outperform well in forecasting ability at shorter horizon, whereas, in the longer horizon Standard asymmetric GARCH models performed well. Hansen and Lunde (2005) reported that GARCH (1, 1) model is not inferior to other model in terms of their ability to forecast the conditional variance. The review of comparison of GARCH family models gives a notion that the performance of GARCH models differs across markets. This study is isolated from the previous literature by comparing the performance of GARCH models across stock markets using error measurement approaches such as Mean Squared Error, Root Mean Squared Error, and Mean Absolute Percentage Error.

III. Data and Methodology

The aim of the study is to evaluate the forecasting performance of the symmetric and asymmetric GARCH models in examining the linkage between macroeconomic variables and stock market returns. Thus, NYSE Composite Index from USA and FTSE 100 index from UK are selected as the dependent variable and Inflation, Interest rate, Money supply, Industrial Production Index, and exchange rate considered as the independent variables. The data used in the study consist of monthly time series observations covering the period of January 1991 to December 2014. Monthly closing price index of NYSE (New York Stock Exchange) composite and FTSE (Financial Times Stock Exchange) 100 are collected from Yahoo finance, whereas the other macroeconomic variables influencing the stock market returns are mainly collected from the Organization for Economic Co-operation Development (http://stats.oecd.org/). Three months Treasury bill rate has been collected from http://www.bankofengland.co.uk, http://www.federalreserve.gov/releases/h15/ data.htm and ACWI (All country World Index) of MSCI has been collected from https://www.msci.com websites

a) Macroeconomic Variables and Transformations

i. *Stock Market Returns*

Stock market returns depicts the pulse of an economic condition and the ups and downs of the stock price movements reveals the volatility of the market. Monthly average closing price of NYSE composite Index and FTSE 100 index are taken and converted into logarithmic returns using the following formula.

$$DLNSMR = Ln\ SMR_t - Ln\ SMR_{t-1}$$

ii. *Industrial Production*

Index of industrial production is a proxy used for real economic output of the economy. An increase in economic activity increases the profit of companies and in turn it raises the stock prices to go up. Many previous literatures have used industrial production index as a

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proxy for representing the economic conditions of a country. Moreover, the industrial production reveals the true picture of an industrial economic growth of a country. Chen, Roll, and Ross (1986) produced evidence that current stock prices are positively influencing the future level of economic activity. Therefore, increases in industrial production positively impact the stock prices and decreases in industrial production make an opposite effect on stock prices. It is expected from the study that there is a positive relationship exists between industrial production and Stock returns. Industrial production is transformed as,

$$DLNIP = Ln\ IPt - Ln\ IPt\text{-}1$$

iii. *Interest Rate*

Investors use interest rate as the barometer for earning profit or facing loss from investment in an efficient capital market. A rise or fall in interest rate influence the investment decision of the investors as they consider the interest is the minimum rate of return or the risk free rate of return expected from investment. An increase or decrease in interest rate obviously has a negative or positive impact on stock returns as investors motivated to change the portfolio structure in favor of or against the bonds. Therefore, Inverse relationship is expected between interest rate and stock market returns .(El-Nader & Alraimony, 2012); Fifield, Power, and Sinclair (2002) found that there is a significant relationship exists between stock market prices and interest rate, whereas, Quadir (2012) found that there is insignificant relationship between stock market prices and interest rate. 3 month Treasury bill rate is used to represent interest rate. The transformation of interest rate is given as,

$$DLNIR = Ln\ IR_t - Ln\ IR_{t-1}$$

iv. *Inflation*

A high inflation reduces the purchasing power of each unit of currency that spent to purchase goods and services and raises the disposable income and reduces the savings. Therefore, investment in stock market may considerably be reduced when inflation influences the stock market returns negatively. However, there is an ongoing debate on the impact of inflation on stock returns; the influence depends on various factors and time period. Hence the inflation is an unpredictable factor. It has given contradictory results in the previous literature. Fama (1981) concluded that there is a positive relationship between inflation and stock returns but, Mukherjee and Naka (1995) reported negative relationship between stock returns and inflation. Consumer price index is considered as a proxy to represent inflation rate. The inflation is transformed using the following formula.

$$DLNIF = Ln\ LIF_t - Ln\ LIF_{t-1}$$

v. *Money Supply (M3)*

Money supply represented by M3 is the broad money supply index including money with public, demand deposit of banks and demand deposit of Apex bank. The downturn of stock market price is substantially influenced by the liquidity of money supply. A high liquidity of money supply strengthens the stock market price of an economy. On the other hand, decrease in money supply tends to decreases the stock market returns. Fama (1981) documented that there is a negative relationship between inflation and stock market prices because of increasing money supply tends to increase the discount rate and lowers the stock market prices. On contrary to the result of Fama, Mukherjee and Naka (1995) found that there is a positive relationship between money supply and stock market returns as a result of increasing cash flows increases the investment in stock market. The money supply has been transformed using the following formula.

$$DLNMS = Ln\ M3_t - Ln\ M3_{t-1}$$

vi. *Exchange Rate*

Depreciation of domestic currency against foreign currencies creates a favorable pitch for the growth of an economy by attracting more portfolio investment from foreign investors and augmenting exports to foreign countries. Hence the capital flows from foreign countries would increase the stock returns and it creates a positive impact on stock market prices. On the other hand, Appreciation of domestic currency takes away the foreign capital flows and makes imports cheaper and it creates negative impact on stock market prices. Therefore the stock market prices are highly sensitive to the foreign exchange rate of a country and the impact of exchange rate and stock prices has conceived more importance in the literature. Nnenna (2012) found that there is a significant and positive impact on Nigeria stock market volatility. On contrary to Nnenna, El-Nader and Alraimony (2012) found negative relationship between real exchange rate and Amman Stock market returns. The relationship between exchange rate and stock market prices produced conflicting results and the magnitude of relationship differs from country to country. The exchange rate used for the study are US dollar against SDR currency and UK Pound Sterling(₤) against Per US dollar($). The transformation of exchange rate is done using the following equation.

$$DLNER = Ln\ ER_t - Ln\ ER_{t-1}$$

vii. *MSCI World*

The integration among the countries in the decade of 1990s became a major challenge for investors to understand the domestic stock market to the external shocks arising out of global equity markets volatility. The MSCI world index is used as a proxy to represent the global equity prices. This variable is included in the study to assess the impact of world stock market returns on domestic stock market returns. The following equation is applied to calculate world stock market returns.

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DLNWSR = Ln WSRt - Ln WSRt-1

b) Methodology

i. *Ordinary Least Square Estimation*

The OLS estimation is the conventional and superior model in explaining the cause and effect relationship between variables. The application of OLS is superior where the data is free from the problem of autocorrelation, non-stationary and heteroskedasticity. Therefore, as the initial attempt, OLS method is selected to examine the relationship between stock market returns and macroeconomic variables.

The basic mean equation model of Regression is given as

$$DL = \theta 0 + \theta 1 DLNIPt + \theta 2 DLNIRt + \theta 3 DLNIFt + \theta 4 DLNMSt + \theta 5 DLNERt + \theta 6 DLNWSRt\mu t \quad (1)$$

D denotes the first differences of the stock returns and key macroeconomic variables. Where LN denotes natural logarithm, $\theta 0$ denotes constant or intercept of the regression model $\theta_1\ \theta_2\ \theta_3\ \theta_4\ \theta_5\ \theta_6$ are the coefficients of the independent variables, μt is the white noise error term. Here, IP, IR, IF, MS, ER, and WSR are the independent variables and SMR is the dependent variable.

ii. *Arch- Lm Test of Heteroskedasticity*

The Autoregressive conditional heteroskedasticity Lagrange multiplier test is used to model observed time series data. In the conventional econometrics, the variance of the error terms is assumed as constant over time. Otherwise it is considered as the series is homeskedastic. If the error variance is not constant, it is called heteroskedastic. The ARCH model assume the variance of the current error term or innovation is the function of the previous time periods error terms. Such models are often called ARCH model and it was developed by Engle. 1982. It is found out by applying the following equation.

$$\hat{\varepsilon}_t^2 = \hat{\alpha}_0 + \sum_{i=1}^{q} \hat{\alpha}_i \varepsilon_{t-i}^2 \quad (2)$$

$\hat{\varepsilon}_t^2$ Denotes the squared error at lag t. $\hat{\alpha}_0$ is the constant. $\hat{\alpha}$ indicates the coefficient of lagged squared residuals.

c) GARCH (1.1) Generalized Autoregressive Conditional Heteroskedasticity

The application of ordinary least square method on the time series data where the conditional variance of the error terms is not constant will produce spurious regression results. To overcome the problem of heteoskedasticity, ARCH model has come into solve the problem arising out of error terms. In particular ARCH models assume the variance of the current error term or innovation to be a function of the previous time periods error terms or innovation. In simple, the current error term is related with the square of the previous innovations. The Generalized Auto Regressive Conditional Heteroskedasticity proposed by Bollerserv in 1986 captures the volatility clustering and unconditional return distribution. This study adopts the standard ARCH/GARCH (1.1) model using the following equations.

i. *Mean Equation*

$$DLNSMR_t = \theta_0 + \theta_1 DLNIP_t + \theta_2 DLNIR_t + \theta_3 DLNIF_t + \theta_4 DLNMS_t + \theta_5 DLNER_t + \theta_6 DLNWSR_t + \mu_t \quad (3)$$

ii. *Variance Equation*

$$h_t^2 = \theta_0 + \lambda_1 \mu_{t-1}^2 + \phi_1 h_{t-1}^2 \quad (4)$$

where θ_0 is the intercept, $\lambda 1$. and $\phi 1$ are the ARCH and GARCH coefficients and h_t^2 is the conditional stock return volatility

d) TGARCH (Threshold Generalized Autoregressive Conditional Heteroskdasticity)

One of the major weaknesses of the GARCH model is that the GARCH model assumes that error terms irrespective of the sign have similar magnitude of change on the volatility of stock market returns. To overcome the problem of symmetric effect, the TGARCH model was proposed by Zakoian and Runkle. In particular, the bad news creates more impact on the stock market returns than the degree of variations created by Good news. The TGARCH model divides the distribution of the innovations into two disjoint intervals and approximate a piecewise linear function for the conditional standard deviation. The Threshold GARCH(1,1) model is applied with the following equations.

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i. *Mean Equation*

$$DLNSMR_t = \theta_0 + \theta_1 DLNIP_t + \theta_2 DLNIR_t + \theta_3 DLNIF_t + \theta_4 DLNMS_t + \theta_5 DLNER_t + \theta_6 DLNWSR_t + \mu_t \quad (5)$$

ii. *Variance Equation*

$$h_t^2 = \theta_0 + \lambda_1 \mu_{t-1}^2 + \phi_1 h_{t-1}^2 + \gamma_1 \mu_{t-1}^2 d_{t-1} \quad (6)$$

$\lambda 1$. $\phi 1$ and $\gamma 1$ are the ARCH . GARCH and TGARCH co-efficients, h^2 is the conditional stock return volatility, Ω_{t-1} is the set of all information available at time $_{t-1}$, $d_{t-1} = \{ \mu_{t-1} \begin{matrix} < 0 \\ \geq 0 \end{matrix} \}$ < 0 indicates that bad news news ≥ 0 shows positive news

e) *EGARCH (Exponential Generalized Autoregressive Conditional Heteroskedasticity)*

The EGARCH model was put forward by Nelson in 1991 to examine the asymmetry effect of stock market volatility to the positive and negative error variance. Neither ARCH nor the GARCH capture the asymmetry effect on the volatility of stock market returns. The equation of E-GARCH (1,1, 1) is given below.

i. *Mean Equation*

$$DLNSM = \theta 0 + \theta 1 DLNIPt + \theta 2 DLNIRt + \theta 3 DLNIFt + \theta 4 DLNMSt + \theta 5 DLNERt + \theta 6 DLNWSRt + \mu t \quad (7)$$

ii. *Variance Equation*

$$log\,(h_t^2) = \alpha + \delta \left| \frac{\mu_{t-1}}{h_{t-1}} \right| \gamma \frac{\mu_{t-1}}{h_{t-1}} + \beta \log(h_t^2) \quad (8)$$

In the variance equation,, α *is the intercept*, δ β γ a re the co-efficients estimated in EGARCH model.

f) *Error Measurement Approaches for Model Evaluation*

The GARCH family models are evaluated using three error measurement approaches such as mean squared error (MSE) root means squared error (RMSE) and mean absolute percentage error (MAPE).

i. *Mean Squared Errors (MSE)*

Mean square error is the important error measurement approach which is commonly used to evaluate the performance of the model and it measures the average of the squares of the errors. Based on the average of the squares of the errors of each model, the forecasting performance of the symmetric and asymmetric GARCH models are compared and ranked to find out the most appropriate model to determine that the model that avoid large errors. The mean square error is estimated by

$$MSE = \sum_t^n \frac{\varepsilon t^2}{n} \quad (9)$$

ε_t^2 is the squared value of $Y_t - \hat{Y}_t$ Where, Y_t is the actual observed value and $\hat{Y}_t$ is the forecasted value at time t.

ii. *Root Mean Squared Error (RMSE)*

RMSE is the common error measurement approaches which amplifies and penalize the large errors to distinguish and compare the performance of the models. It is estimated as

$$RMSE = \sqrt{\sum_t^n \frac{\varepsilon_t^2}{n}} \quad (10)$$

ε_t^2 is the squared value of $Y_t - \hat{Y}_t$ Where, Y_t is the actual observed value and $\hat{Y}_t$ is the forecasted value at time t.

g) *Mean Absolute Percentage Error (MAPE)*

The MAPE is estimated as

$$MAPE = \sum_t^n \left| \frac{(\varepsilon_t) * 100}{Y_t} \right| \frac{}{n}$$

ε_t is the value of $Y_t - \hat{Y}_t$ Where, Y_t is the actual observed value and $\hat{Y}_t$ is the forecasted value at time t.

IV. Results and Interpretations

The macroeconomic variables such as Stock Market Returns (SMR), Industrial Production index in natural log (LIF), Interest rate in Log (LIR), Inflation in natural log (LIF) Money Supply in natural log (LMS), Exchange Rate in log (LER), World stock Market returns (WSR), are considered to analyze the basic statistical features of the data. The table 1 summarizes the descriptive statistics such as mean, minimum, maximum values, standard deviation, kurtosis, skewness and the Jarque-Bera Test. The Jarque-Bera test, a test for

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normality, is used to examine the randomness of the macroeconomic variables considered for the study. Based on the probability values of Jarque-Bera test, the null hypothesis of normally distributed can be rejected.

The average stock price of New York Stock Exchange Composite index and MSCI composite Index are 8.63 and 5.51 respectively. The standard deviation of USA Stock Index is 0.46 and the MSCI world standard deviation is 0.35.Therefore, it can be concluded from the table 4.1 that the US market is highly volatile comparing with the world market as the standard deviation of stock returns is low. While in UK, the standard deviation is 0.30 which is lower than USA and MSCI world indicates the volatility of stock market returns is comparatively low. The stock market indices, Industrial production index, Interest rate, Inflation in USA, Money supply in UK and Exchange rate in UK are negatively skewed and it indicates that these variables have long left tails. Few macroeconomic variables such as Money supply in USA, Exchange rate in USA and Inflation in UK are positively skewed and it shows the long right tails of the distribution. . The kurtosis value of all variables is less than 3 and it indicates that the distribution is platykurtic. The probability values associated with the jarque bera test, a test for normality, reveals that the stock returns and macroeconomic variables are deviated from the normal distribution. Based on the Jarque bera statistics and p-values, the null hypothesis of normally distributed is strongly rejected at 5% significance level. The descriptive statistics indicates that the data are not normally distributed and therefore, there is no randomness in the data.

Table 1: Descriptive statistics on Macroeconomic Variables

	SMR	LIP	LIR	LIF	LMS	LER	WSR	SMR	LIP	LIR	LIF	LMS	LER
				U.S.A			C.V				U.K		
Mean	8.63	4.55	0.20	4.43	29.37	-0.37	5.51	8.46	4.64	1.04	4.45	27.75	-0.50
Max.	9.31	4.77	1.83	4.69	30.08	-0.22	6.07	8.84	4.73	2.56	4.72	28.51	-0.34
Mini.	7.59	4.20	-4.61	4.12	28.82	-0.49	4.77	7.68	4.55	-1.49	4.16	26.87	-0.73
S.Dev.	0.46	0.15	1.83	0.17	0.40	0.06	0.35	0.30	0.06	1.17	0.14	0.56	0.09
Skew.	-0.70	-0.90	-1.07	-0.08	0.16	0.31	-0.47	-0.78	-0.33	-1.04	0.27	-0.04	-0.66
Kurto.	2.32	2.58	2.66	1.75	1.71	2.25	2.21	2.46	1.55	2.40	2.16	1.63	2.72
J-B	29.32	40.66	56.65	19.03	21.23	11.48	18.29	32.54	30.72	55.71	11.99	22.67	21.84
Prob.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Obs.	288	288	288	288	288	288	288	288	288	288	288	288	288

a) Unit Root Test on Macroeconomic Variables

Before examining the impact of macroeconomic variables on stock returns, it is necessary to find out whether the data is suffering from the problem of unit root or not. If the series has unit root or non-stationary, transformation of series from level data to differenced data is mandatory. The widely used tests for unit root are the augmented Dickey- Fuller (1979) (ADF) unit root test and Phillips-Perron (1988) (PP) test. The first step to examine the long run relationship between the stock market returns and macroeconomic variables is to know the order of integration of all variables. Augmented Dickey-Fuller test is applied on US stock market returns and macroeconomic variables to examine if there is a unit root in the time series of the variables. The Augmented Dickey-Fuller test applied on each macroeconomic variables of including stock market returns is presented in the table 2.

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Table 2: ADF unit root test results on macroeconomic variables

	Variables	I	I&T	I(Ist Difference)	I&T(Ist Difference)
USA	SMR	-1.77	-2.03	-15.45	-15.45
	LIP	-1.70	-2.21	-4.38	-4.43
	LIR	-0.34	-1.79	-13.75	-13.78
	LIF	-1.47	-2.45	-10.80	-10.89
	LMS	2.44	-3.62	-5.23	-7.26
	LER	-2.19	-2.77	-12.24	-12.22
C.V	WSR	1.58	-2.18	-15.41	-15.39
UK	SMR	-2.35	-2.28	-16.60	-16.61
	LIP	-1.20	-1.53	-20.97	-21.14
	LIR	-0.60	-1.66	-10.89	-10.88
	LIF	1.21	-1.71	-4.40	-3.82
	LMS	-1.32	0.52	-16.14	-16.23
	LER	-3.37	-3.44	-12.17	-12.16
CRITICAL VALUES					
	1%	-3.453072	-3.990470	-3.453072	-3.990470
	5%	-2.871438	-3.425616	-2.871438	-3.425616
	10%	-2.572116	-3.135961	-2.572116	-3.135961

C.V indicates common Variable I stand for Intercept, I&T stands for Intercept and Trend

b) Hypothesis of the model

Ho: $\delta = 0$ the time series has unit root or is a non-stationary

H1: $\delta \neq 1$ the time series has no unit root or is a stationary

The Augmented Dickey-Fuller test is applied to examine whether data at level or the differenced are stationary or not. The results of the test gives support that all the variables in time series are not stationary in their levels except money supply in USA and exchange rate in UK at five percent level of significance. Therefore, the null hypothesis of non-stationary is accepted at level data. It means that there is a unit root at level data. But all the individual time series become stationary in their first differences. Consequently, Null hypothesis of non stationary is rejected in the first differences of the data.

The Asterisk*** shows the rejection of the null hypothesis of non-stationary at the 1% level of significance, ** indicates rejection of null hypothesis at 5% percent level of significance and * shows the rejection of unit root at 10% level of significance. The Mackinnon (1996) critical values are used for the models with intercept and with intercept and trend of Augmented Dickey-Fuller test. The computed ADF test-statistic at first difference data is smaller than the critical values - "tau" statistics or critical values, the Null hypothesis of non- stationary is rejected.

c) Impact of macroeconomic variables on stock market returns

The Augmented Dickey Fuller test shows that all the macroeconomic variables are stationary at first difference. Hence, the first difference of all the macroeconomic variables are selected to examine the impact of macroeconomic variables on stock market returns by employing the Ordinary Least Square method. The result of the analysis is presented in the table 3.

The table 3 shows the regression co-efficient of macroeconomic variables including stock market returns. The SMR is the USA stock market returns which are used as the dependent variable whereas, the production index, Interest rate, Inflation, Money supply, exchange rate and MSCI world index are considered as the independent variables explaining the stock market returns in USA. Based on the regression results, it is understand that the macroeconomic variables considered for the study are influencing the stock market returns positively except the production index. As contrary to the expectations, the production index has negative impact on stock market returns and it indicates when industrial production falls down, the stock market prices may go up.

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Table 3: Results of the Regression Analysis – USA

Dependent Variable: SMR

Variables	Coefficient	Std.Error	Z-Statistics	Probability
Intercept	0.000562	0.001579	0.355890	0.7222
DLNIP	-0.024042	0.136884	-0.175634	0.8607
DLNIR	0.000554	0.003581	0.154596	0.8773
DLNIF	0.073282	0.268040	0.273397	0.7847
DLNMS	0.287962	0.244999	1.175362	0.2408
DLNER	0.194850	0.075220	2.590400	0.0101
DLNWSR	0.910337	0.020427	44.56539	0.0000
R-Squared	0.883142	Akaike Information Criterion		-5.599189
Adj R-Squared	0.880637	Schwarz Criterion		-5.509933
F-Statistic	352.6769	Hannan-Quinn Criterion		-5.563417
Prsob(F-statistic)	0.000000	Durbin Watson Statistic		1.937898

It is surprised to note that the index of industrial production reveals a detrimental effect which do not support the postulates presented by Chen et al. (1986) But still in line with the previous studies, the impact of industrial production on stock returns is ambiguous. The world stock return is the most significant factor influencing the stock market return at 5% significance level. The Durbin Watson statistics which is closer to two reveals that there is no auto or serial correlation in the data. The Adjusted R-square, the co-efficient of determination, is 88.06% which indicates that the 88.06% of the stock market return variations are explained by the independent variables.

Table 4: Result of the Regression Analysis - UK

Dependent Variable: DLNSMR

Variables	Coefficient	Std.Error	Z-Statistics	Probability
Intercept	-0.001083	0.001603	-0.675471	0.4999
DLNIP	0.028166	0.141027	0.199722	0.8418
DLNIR	-0.030050	0.013285	-2.262006	0.0245
DLNIF	0.024037	0.305178	0.078764	0.9373
DLNMS	0.089891	0.125411	0.716772	0.4741
DLNER	0.484769	0.058266	8.319892	0.0000
DLNWSR	0.828724	0.029626	27.97277	0.0000
R-Squared	0.743363	Akaike Information Criterion		-4.872292
Adj R-Squared	0.737864	Schwarz Criterion		-4.783037
F-Statistic	135.1728	Hannan-Quinn Criterion		-4.836520
Prob(F-statistic)	0.000000	Durbin Watson Statistic		2.176994

The results of the Regression analysis reveals that the macroeconomic variables, interest rate, exchange rate and world stock market returns are influencing the stock market returns significantly while other macroeconomic variables have insignificant impact on the stock market returns. The production index, as expected influence the stock market returns positively. If industrial production is higher, the stock market returns will also be higher. But the interest rate which is significantly negative shows that increasing

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interest rate decreases the stock market returns in UK. The adjusted R-Square value is 73.78%. It denotes that 73.78% of the stock market returns variations are explained by the independent variables. Moreover, the Durbin Watson statistics reveals that there is no auto or serial correlation in the data. However, the application of Ordinary Least Square method becomes BLUE when there is no auto correlation and free from the problem of Heteroskedasticity. Therefore Residuals of Regression model are extracted and applied the ARCH LM test of Heteroskedasticity to know whether the model applied is the appropriate one in explaining the variations of stock market returns.

d) ARCH –LM Test of Heteroskedasticity

For computing ARCH LM test, the ordinary least square method is used to compute the residuals and Resid^2 is used as the dependent variable and Resid^2(-1) is used as an independent variable. The result is presented in the table 5. The Arch test highly rejects the null hypothesis of no arch effect in the time series data. The result shows the data is suffering from the problem of heteroskedasticity. The p value of Chi-Square is 0.0002 in USA and 0.044 in UK. The probability values are lower than the critical value of 0.05. The residual squared at lag one coefficient are with a significant p value of 0.00 and 0.04. The table 5 shows that the error variance is not constant over the time period taken for the study.

Table 5: ARCH LM TEST of Heteroskedasticity on Regression Residuals

Country	Intercept	Resid	Chi-Square Value	Prob.	F-Statistics	Obs.R Squared
USA	0.000162	0.21754	0.0002	0.0002	14.09915	13.52690
UK	0.000375	0.118952	0.0444	0.0443	4.075626	4.046260

Hence, it is concluded from the results that ARCH effect is present in the data which proves the presence of heteroskedasticity. The presence of ARCH effect indicates that the application of OLS method is not the true representation of the relationship between macroeconomic variables and stock market returns. Therefore, Symmetric and asymmetric GARCH models have been applied to investigate the relationship between stock market returns and macroeconomic variables in USA and UK. After examining the relationship, the symmetric and asymmetric GARCH models have been evaluated and ranked using the error measurement approaches such as Mean Squared Error, Root Mean Squared Error and Mean Absolute Percentage Error.

e) Model Evaluation using out of Sample Analysis

The out of sample forecasting performance of symmetric and asymmetric GARCH models are evaluated and compared with the Mean squared Error(MSE), Root Mean Squared Error(RMSE) and Mean Absolute Percentage Error(MAPE) and the result of the analysis applied on USA is presented in the table 6.

Table 6: Comparison of Symmetric and Asymmetric GARCH Models in USA

MODELS	MSE	RANK	RMSE	RANK	MAPE	RANK
Symmetric Garch	0.010242	1	0.014651	2	116.4482	2
Asymmetric T-Garch	0.010246	3	0.014654	3	116.5536	3
Asymmetric E-Garch	0.010245	2	0.014643	1	115.9785	1

The different error measurement approaches have given different results to evaluate the forecasting accuracy of symmetric and asymmetric GARCH models applied in USA. The MSE shows that the symmetric E-GARCH model outperform well than the other asymmetric GARCH models while the RMSE reveals that Asymmetric E-GARCH model is the most accurate forecasting model comparing the values of T-GARCH and E-GARCH models. The MAPE indicates that the E-GARCH model is the best accurate forecasting model in USA. The GARCH and E-GARCH models are the worst performing model in forecasting the stock market returns in USA. Therefore, the majority of the error measurement approaches indicate that the Asymmetric E-GARCH model outperform well than the T-GARCH and GARCH models. The result is consistent with the results produced by Miron and Tudor (2010).

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Table 7: Comparison of Symmetric and Asymmetric GARCH Models in UK

MODELS	MSE	RANK	RMSE	RANK	MAPE	RANK
Symmetric Garch	0.015680	3	0.2075	1	127.2060	2
Asymmetric T-Garch	0.015653	2	0.2077	3	127.5035	3
Asymmetric E-Garch	0.015631	1	0.2077	2	126.9936	1

Based on the values of Mean Square Error, it is understood that the forecasting accuracy of E- GARCH model is the best performing model while the RMSE produced that the symmetric GARCH model is the best performing model. The MSE and RMSE show differences in evaluating the model but the MAPE indicates that E-GARCH is the appropriate model in forecasting the stock market returns in UK. The application of GARCH models in different stock markets is analyzed and the results are presented in the table 8.

Table 8: Comparison of Symmetric and Asymmetric GARCH Models in USA and UK Stock Markets

Country	Symmetric GARCH	RANK	Asymmetric T-GARCH	RANK	Asymmetric E-GARCH	RANK
			COMPARISION BASED ON MSE			
USA	0.010242	1	0.010246	1	0.010245	1
UK	0.015680	2	0.015653	2	0.015631	2
COMPARISION BASED ON RMSE						
USA	0.014651	1	0.014654	1	0.014643	1
UK	0.20753	2	0.20771	2	0.20770	2
COMPARISION BASED ON MAPE						
USA	116.4482	1	116.5536	1	115.9785	1
UK	127.2060	2	127.5035	2	126.9936	2

The forecasting accuracy of symmetric and asymmetric GARCH models are evaluated and ranked based on the lowest to highest error values. The model which shows lowest error carries the first rank and subsequent ranks are given to following models. The MSE, RMSE and MAPE values indicate that the Symmetric and Asymmetric GARCH model holds the first rank when comparing the error measurement values of UK. The error measurement techniques indicate that the GARCH models perform well in USA while comparing the error measurement values of UK.

V. Conclusion

The study evaluates the application of different symmetric and asymmetric GARCH models in USA and UK using the monthly observations of January 1991 to December 2014. The Augmented Dickey Fuller test applied on macroeconomic variables shows that the all the variables except exchange rate and money supply at level are non-stationary and became stationary at first difference.

Therefore the first difference logarithmic data are considered for application of ordinary least square method to find out the nexus between stock market returns and macroeconomic variables. But the application of regression is not the appropriate method due to the existence of conditional heteroskedasticity. The presence of conditional heteroskedasticity is confirmed with the help of ARCH LM test of heteoskedasticity.

Hence, Symmetric and Asymmetric GARCH models are applied to find out the linkage between stock market returns and macroecnomic variables and their performance are evaluated and ranked based on the error measurement approaches such as Mean Square Error, Root Mean Square error and Mean Absolute Percentage Error.

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The results indicate that the Asymmetric E-GARCH model outperforms well than the other models such as Asymmetric T-GARCH and symmetric GARCH models in both USA and UK stock markets. While comparing the performance of GARCH type models across stock markets, the forecasting accuracy of symmetric and asymmetric GARCH type models are superior to USA than the application of GARCH in UK.

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Assessing the Impact of Regional Integration and International Trade on Economic Growth and Food Security in Ecowas

By Almame A. Tinta, Daniel B. Sarpong, Idrissa M. Ouedraogo,
Ramatu Al Hassan, Akwasi Mensah-Bonsu & Edward Ebo Onumah

Abstract- This study analyzes the potential of regional integration through the potential of global value chains in accelerating economic growth and achieving food security with a focus on ECOWAS. Some strategies that regional integration can promote to stimulate economic growth and increase food security are compared. This study examines whether countries must develop strategies to raise international trade through increasing openness degree or whether countries must develop policies to reinforce community or regional trade through the potential of value chains inside the regional integration. Three instruments are investigated (trade openness, intra-regional trade and the community insertion to value chains). Two models are estimated with panel fixed effects using data from 1995 to 2012. The findings support that regional integration needs to be strengthen and better promoted in order to stimulate the potential of each country to move from discontinuous growth to sustained growth. International trade is not the better solution for ECOWAS countries to boost economic growth but regional trade linked to creation of value chains among each country can be the engine of the region growth and food security.

Keywords: *food security, economic growth, trade openness, regional integration, value chains.*

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Assessing the Impact of Regional Integration and International Trade on Economic Growth and Food Security in Ecowas

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Abstract- This study analyzes the potential of regional integration through the potential of global value chains in accelerating economic growth and achieving food security with a focus on ECOWAS. Some strategies that regional integration can promote to stimulate economic growth and increase food security are compared. This study examines whether countries must develop strategies to raise international trade through increasing openness degree or whether countries must develop policies to reinforce community or regional trade through the potential of value chains inside the regional integration. Three instruments are investigated (trade openness, intra-regional trade and the community insertion to value chains). Two models are estimated with panel fixed effects using data from 1995 to 2012. The findings support that regional integration needs to be strengthen and better promoted in order to stimulate the potential of each country to move from discontinuous growth to sustained growth. International trade is not the better solution for ECOWAS countries to boost economic growth but regional trade linked to creation of value chains among each country can be the engine of the region growth and food security.

keywords: food security, economic growth, trade openness, regional integration, value chains.

I. Introduction

Food security and economic growth constitute the two major challenges of contemporary economy particularly in developing countries. Despite the improvement of the performance of African countries these recent years, the economic growth rate is still low. In fact, the report of Africa Growth Initiative (2016) illustrates that African countries are characterized by low economic growth rate, weak industrial development, growing poverty rate due to poor human development, growing population living in urban slums with no access to basic services, raise of corruption and disadvantage in global trade. In the case of ECOWAS countries, the GDP per capita increased very slowly ($954 in 2010, $1,051 in 2011, $1,057 in 2012, and $1,137 in 2014) but the economic growth gap among Africa and other regions is not new and started to be structural between 1970 and 2000. While all other developing countries and the world experienced remarkable progress in reducing extreme poverty, in African countries the percentage of the population under poverty increased. This was the starting point of the fundamental contrast between Africa and the rest of the world. In addition, Ndulu and O'Connell (2006a) note that this divergence augmented sharply when the continent missed out on the economic structural transformation that took place in the developing world, making poverty in Africa mainly a growth challenge. The economic growth rate in African countries has always been too low to initiate the development process. Subsequently,

Maddison (2007) identifies the erratic growth performance of African countries as the most important reason behind its lagging position in eradicating poverty.

Several approaches based on country case studies followed each other since 1990s (World Bank, 2005; Berthelemy and Soderling, 2002; Azam *et al.*, 2002) to investigate growth pattern and identify the major constraints in order to implement sustained growth. This period has been marked by the design and the implementation of various development program schemes and macroeconomic stability program that failed to tackle poverty and generate a sustain growth. A summary of the large number of study on Africa's slow growth (Glaeser *et al.*, 2004; Calderon, 2009; Collier, 2007; Ndulu *et al.*, 2007; Chandra and Kolavalli, 2006; Comin and Mestieri, 2013) reaches the same conclusion that some factors (long distances from markets, geographical fragmentation, tropical climates and soils, small markets, demographic pressure, natural resource curse, aid, external economic shocks vulnerability, weak institutional capacity, low financial sector, poor information technology, risks and uncertainty of macroeconomic policies, political instability and conflict) are key dangers in achieving and sustaining growth. However, all these key factors influencing growth and channels through which these run, can be addressed by regionalism accompanied by transparency, innovation, sound policies and effective leadership. In fact, regional

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integration through the potential of regional trade offers enormous opportunities to boost economic growth.

Regional integration by enlarging the size of the market stimulates the efficient allocation of resources, increases human capital (education, labor skills, health) because of the high mobility of labor, develops agricultural research and development related activities, diversifies agricultural production and improves manufacturing sector, manages population growth, increases domestic saving and investment, improves infrastructure and reduce the need of foreign debt. Thus, regional integration directly affects economic growth by raising the economy competitiveness and accelerating industrialization, and by creating better employment opportunities which lead to poverty reduction in the region. However African economies are not strongly advanced in the insertion of global value chains which represent a key asset. Therefore, linking regional integration to global value chains can expand trade, create comparative advantage in world trade and strengthen regional partnerships opening the way to a faster economic growth rate.

In the same order, regional integration through its spill-over effects on agriculture, food prices and macroeconomic policies affects food security. FAO (2003) reports that "food security will be affected by international trade in general and agricultural trade in particular. To the extent that increased intra-regional trade fosters economic growth and increases employment prospects and the income-earning capacities of the poor, it will enhance access to food. Increased intra-regional agricultural trade could also promote food security by augmenting domestic food supplies to meet consumption needs and by reducing overall food supply variability". More specifically macroeconomic policies play important roles in influencing food security directly or indirectly by affecting poverty, food production, prices, foreign exchange, employment and wages. Reduce poverty among countries requires to raise food availability and at the same time food accessibility at national and household level. Integration is a better tool to address food security challenge because of the opportunities targeting trade and market integration, investment in agricultural resources, investment in agricultural and trade infrastructure, sophistication in improved agriculture technologies, reducing of domestic and foreign policy distortions, and economies of scale. It is well-established that integration substantially affects the agricultural sector performance by stabilizing food prices, strengthening regional market and reducing the dependence on international market, improving exports and decreasing imports which in turn influence the countries income distribution, rural development, employment creation and competitiveness of the economy, and the development of technologies against bad harvests or natural disasters. Consequently, all these channels target malnutrition, hunger and famine, create an enabling environment to increase consumption and improve population nutritional well-being which directly address poverty reduction. However, the impact of regional integration on food security goes beyond food and agriculture dimension and encompass non-agricultural economy that has various implications on countries trade policy, fiscal and monetary policy, interest rate policy, foreign exchange policy, balance of payments stability, debt and financial policy, food aid policy, food reserve stocking policy and support from international agencies.

Regional integration offers a space for "learning to compete" and for "self-discovery" to firms and organizes them for the greater rigor and competition in global value chains. Global value chains being in infant stage in most African countries, what can be the potential of a regional integration oriented on regional trade value chains promotion on food security? Several indicators assessing food security have been conceived but per capita daily dietary energy supply is mostly used to measure national food security. Consistent with the literature, per capita daily dietary energy supply is used in this study as food security indicator.

This study analyzes the potential of regional integration in accelerating economic growth and achieving food security with a focus of ECOWAS. The study analyzes whether countries must develop strategies to raise international trade through increasing openness degree or whether countries must develop policies to reinforce community or regional trade. Three particular strategies or instruments are investigated in ECOWAS integration (such as each country international trade openness, each country intra-regional trade openness and the community insertion in value chains) to identify the best way for economic growth and food security raising.

The remainder of the paper is organized as follows. Section 2 presents the literature review on empirical research between regional integration, economic growth and food security. The model specification, methodology and data are described in section 3. Section 4 shows the empirical results, interpretations and evidence based on policy recommendation and section 5 concludes.

II. Literature Review

The literature presented in this study is organized into two main part. The first part investigates some researches on regionalism, industrialization and growth, and the second part explores food security aspects. The relation between trade liberalization and economic development has been widely studied. Literature in international trade provides a lot of evidence on how trade liberalization positively influences economic performance of economies which have

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liberalized trade to world economy (Herath, 2010; Leamer, 1988; Dollar, 1992; Sachs and Warner, 1995). Trade liberalization is assumed to be a driving force of economic development in a country. Svatoš and Smutka (2010) show that international trade has become an important instrument in building external economic links among world economies. Grossman and Helpman (1992) show that openness to international trade increases domestic imports of goods and services which include new technologies. Through learning by doing and the transfer of technology, the most open economies are growing at a faster pace than most protectionist. However, the authors add that these gains depend on several factors, including the initial situation. The latter determines the nature of the specialization of the country in the long run and therefore its growth rate. The openness of a small country may lead her to specialize in a low-growth sector, contributing instead to leave the country in underdevelopment. In this case, the country should adopt protectionist policies during the early stages of its development, then opt for appropriate opening policies.

According to Levine and Renelt (1991), the causal relationship between openness and growth is through investment. A country liberalizing its trade will attract foreign investment flows. However, they may cause a decline in domestic investment due to stronger international competition and the net effect then remains ambiguous. Grossman and Helpman (1992) also argue that a country protecting its economy can stimulate growth. This is possible if government intervention encourages domestic investment according to the comparative advantages of the country.

Dollar (1992), Barro and Sala-I-Martin (1995), Sachs and Warner (1995), Edwards (1998) and Greenaway *et al.* (1998), using cross-sectional regressions, found that trade distortions due to the intervention of the State led to low growth rates. Ben-David (1996) has also shown that it is only in open economies that we could observe an unconditional convergence. Frankel and Romer (1999) use a method of instrumental variables including geographical features, and confirm that international trade has an important and significant impact on growth. Harrison (1996) reaches similar conclusions using a variety of indicators of openness. By using different methods (cross-section fixed effects, five-year average, first differences), the results suggest a positive relationship between openness and growth. However, not all the opening measures were significant, even though they were mostly a positive sign. Rodriguez and Rodrik (2000) criticize the measure of trade openness. They find that the positive correlation between openness and growth was not robust and the methodology used by other authors lacked important control variables to have a decisive effect on growth.

Jin (2004) analyzes the co-movement between openness and growth in China. He checks if the relationship openness-growth was also valid at the provincial level, and if we could detect a difference between the coastal provinces and those isolated. The results obtained are those expected: the effect for coastal provinces is significant and positive for four of them, and negative for the majority of landlocked provinces. Noguer and Siscart (2005) leading a study on a sample of 98 countries, find a positive relationship between international trade and economic growth, but also that international trade improves the income segments of the population who engage in production activities.

Hubert and Satoshi (2016) analyze East Asian trade and focus on global value chains effects on industrial networks. Using graph theory and input-output data to measure value-added, they show that trade value chains foster regional integration so that the inter-industry network moved from a simple hub-and-spokes cluster to a more complex structure with the rise of China and the specialization of several countries as secondary pivots. The intensification of value chains reduced variance among countries tariffs duties and lowered transaction costs which promote export-led growth accompanied by an industrialization based on domestic markets. It also improved logistics services and cross-border administrative procedures, lessened anti-export bias and enhanced the competitiveness of national suppliers. Their results prove the importance of global value chains in shaping industrial development based on trade.

Baldwin (2008, 2011b) examines the relationship between regionalism, trade and industrialization in East Asia, and why building a supply chain is crucial. He demonstrates that compared to the past where successful industrialization (South Korea and Taiwan) took decades and involved building a domestic supply chain, today intra-regional trade has the potential to bring countries in industrialization in only few years by joining directly supply chains. He discusses that the emergence of the international supply chain has fundamentally reduced the complexity and time required for developing countries to industrialize. Therefore, it is much easier to join an existing supply chain than to build one from scratch domestically, as earlier industrializers like South Korea and Taiwan did.

ESCAP (2015) provides stylized facts on participation of Asia-Pacific economies in regional and global value chains and explores the relationship between global value chains and regional integration processes, in particular the linkages between different types of preferential trade agreements and the evolution of global value chains. The study found that expansion of global value chains has opened opportunities for deeper integration in Asia and the Pacific by allowing

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countries to pursue the division of labour and specialization. Using gravity model and intercountry input-output tables, the impacts of regional integration on global value chain-related exports of the region are methodically investigated. The results confirm the potential of value chains. First regional trade agreements have a positive association with global value chain-related exports of Asia-Pacific countries. Second, the impacts on intraregional exports appear to be stronger than exports to the rest of the world. The reduction of trade barriers from the perspectives of both exporters and importers seem to be associated with an increase in global value chain-related exports from Asia-Pacific countries. Third, trade facilitation through the improvement of ICT, logistics and transportation systems, and removing behind-the-border obstacles can enhance global value chain-related trade between countries and make them major players in global value chains.

If numerous studies can be found on regionalism, integration and their spill-over effect on economic growth, only few empirical works have been done on regionalism and food security. Most of the studies done are limited to statistical analysis (FAO, 1996; Sen, 1981; Maxwell, 2001; FAO, 2009; Kakwani and Son, 2016). The links between regional trade, international trade and food security are complex and multiple. The debate that whether trade liberalization improves food security is hypothetically ambiguous. Based on studies, the nature and magnitude of the food security effect of liberalization depends on various factors such as the extent of adaptability of the poor to changing economic conditions; the degree of exposure of the country to food imports; the presence of favorable initial conditions and accompanying measures, such as adequate regulatory and export capacity, non-trade domestic policies and infrastructure; and the time horizon considered.

Chand and Jumrani (2013) explain the paradox of "hunger amidst plenty" prevailing in India and show that the income growth is a necessary but not a sufficient condition for reducing undernourishment and malnourishment because historical and cultural factors are linked to food security. Dorosh (2004) argued that trade liberalization has contributed largely to enhance national food security of Bangladesh by increasing the level of available foods for domestic consumption during the domestic production shortfalls and therefore stabilizing market prices benefitting poor consumers. Chen and Ducan (2008) report that an increase in real GDP resulting from trade in India improves the food security status of the poor. Herath *et al.* (2014) capture the effects of trade liberalization on food security in South East Asia. Their findings support that discriminatory trade liberalization policies have positively influenced food security. They found that after the formation of the Association of South East Asian Nations' Free Trade Agreement (AFTA), the level of per-capita daily dietary energy supply of the member countries has been increased moderately over time. Thomas and Morrison (2006) show that the food security outcomes of liberalization varied by country and the food security indicator used.

Bezuneh and Yiheyis (2014) investigate whether trade liberalization has improved food security of developing countries. By applying multiple regression analysis on panel data, they found that trade liberalization exerted a negative short run effect on food availability but the overall results fail to support the view that from the medium to long run, the effect of trade liberalization on food availability is favorable. Their results provide evidence on the ambiguity of the effect of trade liberalization on food security. Grant and Lambert (2005), Seck *et al.* (2010), Korinek and Melatos (2009), Nin-Pratt *et al.* (2008) show that regional integration has not led to substantial allocation effects and the expected decrease in food prices caused by efficiency gains. Hence, the direct effect of integration on food security seems to have been small. Taking into account that allocation effects have been small, accumulation effects have also been limited. The evidence on the mixed and inconclusive relationship between trade liberalization and food security is confirmed by McCorriston *et al.* (2013).

Maertens and Swinnen (2015) analyze the contribution of trade value chain in developing regions through the significant increase in foreign investment. The results show that the demand for high-value products raises rural incomes and creates opportunities for developing countries to realize economic growth through expanding and diversifying their agricultural exports. Jaud and Kukenova (2011) find similar results which is explained by the potential of labor-intensive production systems implemented. Xiang *et al.* (2012) simulate the general equilibrium effects of the trade growth on household welfare. Their findings confirm the benefit of value chain.

Beghin *et al.* (2015) and Maertens *et al.* (2011) explain that trade value chains directly and indirectly affect food security by impacting smallholder producers. Smallholders when included in value chains through contract-farming schemes across sectors and countries can increase their income, raise their production and improve their competitiveness and in the long term better insert themselves in global market. Along this process of insertion of smallholders in value chains, some authors (Negash and Swinnen, 2013; Dries and Swinnen, 2010; Minten *et al.*, 2009) show that the improved access to inputs lead to rise in technology transfer. This generates significant productivity increases both for the product itself and for other production activities at the farm level and has important spillovers on household food security. In the same

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perspective, Mano *et al.* (2011) illustrate that value chains enhance labour market by creating substantial employment and diversifying off-farm employment opportunities for women. The implications on gender and rural poverty are empowerment of women and more access to income which allow more spending on food.

III. Methodology

a) The impact of regional integration and international trade on economic growth

The theoretical frameworks used to assess the effect of regional integration and international trade on growth can be drawn to the endogenous and neoclassical growth (Solow, 1956) theories. Under neoclassical growth theory, institutional characteristics, policy regulations and economic integration, are useless in disturbing the equilibrium growth rate, which is exclusively fixed by the exogenous degree of technological evolution. Changes in investment, institutional innovations or increases in efficiency succeeding regional integration have just transitory impacts on the growth rate. Transitory growth impacts occur as a result of changes in the overall level of efficiency imputed to the formation, enlargement or extending of the regional integration agreement. The efficiency change induces faster physical capital formation that progressively decreases to the long run equilibrium. Therefore, regional integration is seen as any other crucial economic policy disturbing growth solely on the transition process leading to the steady state (Njoroge, 2010). The endogenous growth theory (Walz, 1997) on the contrary, by presuming increasing returns to the growth of capital considers long term or permanent effects of regional integration. The long-term effect is based on the insertion of human capital which will maintain investment and disseminate knowledge. In turn, economic growth can accelerate due to the integration agreements disseminating technology on a large scale. The theory also explains how international trade fosters economic growth through human capital which is seen as the engine of growth (Lucas, 1988).

Based on Bezuneh and Yiheyis (2014) and Herath *et al.* (2014), panel data with fixed effects is recommended. However, all preliminary tests and Hausman test are checked to validate if fixed effects or random effects are appropriate. The dependent variable is represented by real GDP per capita. The keys interest variables are trade openness which measures international trade, intra-community export trade which measures intra-regional trade and per capita domestic value added which measures global value chains performance. Per capita domestic value added captures the gains associated with exporting which accrue to domestic labor and capital. Domestic value added is the share of exported products that are not finished product and will be imported from other countries to be processed before being exported.

According to literature (Andersen and Babulal, 2008; Pam, 2017; Yaya, 2017), some control variables which are significant in determining economic growth are included such as gross capital formation, foreign direct investment and inflation rate. Gross capital formation and Foreign direct investment measure the level of investment in the country. Both are used to dissociate the mitigated effect of investment in economic growth discussed in literature review. Gross capital formation appreciates domestic investment which is connected to the industrial development of the country and therefore stimulate growth. In contrast, foreign direct investment is linked to technology transfer, transport and infrastructure, the level of the country attractiveness and also has a crucial impact on growth. Inflation measured by consumer prices index provides an indication of the economic stability of the country. The reduced model takes the following form:

$$\text{Log}\,(y_{it}) = \beta X_{it} + v_i + \varepsilon_{it} \qquad \text{(I)}$$

where yit is the real GDP per capita, εit is the stochastic error term, vi is the country specific effect, Xit is the set of explanatory variables such as trade openness, intra-community export trade, per capita domestic value added, inflation as a proxy of monetary policy, gross capital formation and foreign direct investment.

The data cover ECOWAS countries (Mali, Benin, Sierra Leone, Ivory Coast, Burkina Faso, Guinea-Bissau, Cabo Verde, Ghana, Togo, Niger, Guinea, Liberia, Gambia, Nigeria and Senegal) from 1995 to 2012. Real GDP per capita, trade openness, inflation and gross capital formation come from the World Development Indicator (2017). Intra-community trade and foreign direct investment come from UNCTAD (2017). Per capita domestic value added are provided by OECD TiVA (2016).

b) The impact of regional integration and international trade on food security

Based on literature (McCorriston *et al.*, 2013; Thomas and Morrison, 2006; IFPRI, 2006; Herath *et al.*, 2014; Darshini, 2012), direct and indirect channels are identified through which regional integration or trade influences food security. Food security can be affected by growth in national income and employment. It is widely accepted that economic growth is a required stage for sustainability of poverty reduction and food security, even if in the short-run, growth may not be fast enough to achieve food security. Growth raises incomes and the ability of the poor to gain access to food and health and can lead to improved food security. Economic growth also develops infrastructures, services

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and opportunities for a raise in the overall level of income.

Secondly food security is associated to regional integration's capability to rise global supply of production available (through a mixture of imports and domestic production) and to stabilize variations in food prices. Where local price of food was expensive compare to the rest of world due to trade barriers or tariffs, importing country will reduce domestic food at the same price to increase the level of food consumed. However, the decrease in domestic commodity prices and cheaper imports would negatively affect domestic production and thereby the poor food security status whose key source of income and employment is food production. The third channel is through improved foreign exchange earnings. With the improvement of exports market access via multilateral liberalization, and a more competitive production process based on comparative advantage, the export sector develops. The subsequent raise in foreign exchange gains improves the potential of the economy to expand domestic production and finance food imports. The fourth channel is reducing variability and uncertainty of food provision. Opening up the economy lessens the unpredictability of staple foods supply by helping offset negative domestic production shocks. Finally, market prices affect food accessibility and represent the purchasing power in the economy. The effect on the purchasing power is correlated to the magnitude of money supply which impacts local prices of goods and services and can also import inflation.

Per capita dietary energy supply is adopted to measure the food availability which approximates food security. The keys interest variables are trade openness, intra-community export trade and backward integration which assesses the extent to which a country is integrated and correspond to the country's place in the value chain. Backward integration is the share of the imported value added from foreign suppliers upstream that will be found in the country's exports. Increasing backward integration is associated with more competitive export, higher per capita domestic value-added in exports and increasing income. A higher share of backward participation is also linked to access of competitive inputs and a more-sophisticated export bundle and greater diversification of exports over time.

To take into account the theoretical direct and indirect channels through which regional integration or trade influence food security (McCorriston *et al.*, 2013; Thomas and Morrison, 2006; IFPRI, 2006; Herath *et al.*, 2014; Darshini, 2012), we introduce a set on independent variables such as real GDP per capita to measure growth effect, average value of food production to measure the overall supply of food available, reserves to measure foreign exchange effect, political instability to measure uncertainty effect, domestic credit provided by financial institution to measure market price and purchasing power effect. Even though these variables are the most important used, agricultural land irrigated and population growth are added which greatly influence African economies and their food security level.

$$Log(s_{it}) = \beta Z_{it} + v_i + \varepsilon_{it} \qquad \text{(II)}$$

where sit is per capita dietary energy supply as a proxy of food security, vi is the country specific effect, εit is the stochastic error term, Zit is the set of explanatory variables such as trade openness, intra-community export trade, backward integration, foreign direct investment, gross capital formation, real GDP per capita in logarithm, average value of food production in logarithm as a proxy of food variability, foreign reserves in logarithm, political instability, domestic credit provided by financial institution, agricultural land irrigated in percentage, and population growth.

Data on political instability, agricultural land irrigated, per capita dietary energy supply and the value of food production (constant 1$ per person) come from FAO (2016). Foreign reserves, domestic credit provided by financial institution and population growth are provided by World Development Indicator (2017). Backward integration is computed with OECD TiVA database (2016).

IV. Empirical Results and Discussion

The result of the Hausman test (Table 1) after the estimation with fixed effects and random effects for Model (I) and (II) rejects the null hypothesis that there is a no difference between the coefficients obtained by fixed effects and random effects. The correct specification for both Model (I) and (II) is the fixed effects.

Table 1: Specification test

Hausman Test		
	Ho: difference in coefficients not systematic	
	Model (I)	Model (II)
Dependent Variables	Real GDP per Capita (log)	Per capita dietary energy supply (log)
chi2	9.43***	117.21***
Prob>chi2	0.0027	0.0000
Number of observations	270	270

Note: *** significant at 1 %, ** significant at 5 %, and * significant at 10 %

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The estimation results for Model (I) and Model (II) are summarized in Table 2.

Table 2: Econometric Results

Variables	Model (I) Real GDP per Capita (log)		Model (II) Per capita dietary energy supply (log)	
	Coefficient	Prob	Coefficient	Prob
Trade Openness	-0.08306 (0.07460)	0.2668	0.03620** (0.01761)	0.0410
Intra-Community Trade	2.63028** (1.32824)	0.0489	0.37977 (0.33449)	0.2574
Per capita Domestic Value Added	1.38619*** (0.20036)	0.0000		
Backward			0.35605*** (0.12674)	0.0054
Foreign Direct Investment inflows	0.29282*** (0.09450)	0.0022	0.00679 (0.02162)	0.7538
Gross capital formation	0.543962*** (0.18045)	0.0029	0.14002*** (0.04233)	0.0011
Inflation	-0.3617*** (0.13236)	0.0068		
Real GDP per Capita (log)			0.04183*** (0.01433)	0.0039
Average value of food production (log)			0.24431*** (0.02332)	0.0000
Foreign reserves (log)			0.02442*** (0.00496)	0.0000
Domestic credits			0.03633** (0.01429)	0.0117
Agricultural land			3.18013*** (0.51138)	0.0000
Population growth			0.87490** (0.36240)	0.0166
Political instability			-0.00444** (0.00200)	0.0282
Constant	5.90854*** (0.04317)	0.00000	3.05299`*** (0.11481)	0.0000
Number of observations	270		270	
F-test	222.9256	0.00000	65.3645	0.0000
R-squared	0.94807		0.87850	

Note: *** significant at 1 %, ** significant at 5 %, * significant at 10 %, standard errors in parentheses

The coefficients for Model (I) are all significant except trade openness, and also have the expected sign according to theory. In the case of ECOWAS, trade openness which assesses the opening degree of each country to international trade does not affect economic growth. This result seems to be paradoxical but tend to support the viewpoint of some researchers (Noguer and Siscart, 2005; Rodriguez and Rodrik, 2000) who conclude after studies done in other developing countries that the relationship between openness and growth is inconclusive. Moreover, Grossman and Helpman (1992) and Levine and Renelt (1991) already discussed that the effect of trade openness on economic growth remains ambiguous. In ECOWAS, even if trade openness has an effect on growth, this effect is trivial which explains that in our estimation the coefficient is insignificant. Another explanation of this result in the specific case of ECOWAS is that countries

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trade more with world market than with regional market, and ECOWAS imports are not oriented to capital and industrial equipment which pulls economic growth. Trading with developed countries, the openness of ECOWAS countries which are small countries leads them to specialize in a low-growth sector, mainly the exports of primary products. The consequence is that the opening of each country to international trade is characterized by more imports than exports. To highlight this particular effect, international trade theory demonstrates that trade among countries with different levels of development does not benefit the poorest countries. For international trade to push countries, exchanges must be done among similar countries. In addition, opening to international trade is not a necessary and sufficient condition to increase economic growth, other factors such as infrastructure, investment, comparative advantages, industrial development, protectionist policies and technology progress need to be effective. However, in ECOWAS countries those factors are missing.

In contrast, intra-community trade and per capita domestic value added positively influence economic growth. Even if ECOWAS intra-trade is low, it affects the economic growth of each country. This result shows that intra-regional trade is crucial for economic growth. The more regional trade increases the more per capita income raises and the more economic growth can be boosted. This finding supports that regional integration needs to be strengthen and better promoted in order to stimulate the potential of each country to move from discontinuous growth to sustained growth. In fact, intra-community trade within ECOWAS is estimated only at 9 percent in 2015. It is clear that if trade agreements are put in place to motivate countries to trade with each other, the impact will be different for producers and households in term of improving income, raise of investment and increase of consumption. In addition, if the intra-regional trade is focused on the promotion of goods and services resulting from the consolidation of value chains among the different countries, economic growth can be exponential. A large domestic value added is associated with high volume of trade which will raise the competitiveness and diversification of exports, enhancing each country place in global value chains. Therefore, comparing the results, intra-regional trade and per capita domestic value-added boost more economic growth than international trade (trade openness).

International trade is not a solution for ECOWAS countries to boost economic growth but regional trade linked to the creation of value chains among each country can be the engine of the region growth.

An examination of other control variables shows that they significantly contribute to economic growth as indicated in literature. Foreign direct investment provides positive and significant effect on GDP. Klasra (2011) finds similar result in Pakistan. Ercakar (2011) shows that in African economies, openness cannot achieve economic growth without foreign direct investment. However, gross capital formation is even more important than foreign investment for countries. It affects positively more economic growth, showing the important role of domestic investment in the development process. This effect of domestic investment on economic growth is also highlighted by Pam (2017) in the case of sub-Saharan Africa.

Positive changes in inflation are associated with negative changes in economic growth, thereby suggesting that price volatility reduces growth because of the unpredictability of the macroeconomic environment and the challenge for individual to have rational expectation. This finding is in line with Kremer *et al*. (2009), Jafari *et al*. 2012) and Pam (2017) results.

In Model (II), all explanatory variables except foreign direct investment and intra-community trade significantly influence food security. International trade positively affects per capita dietary energy supply while intra-regional trade is not significant. This finding has two major implications; (i) even if trade openness does not affect growth in ECOWAS countries, it significantly raises food security status because ECOWAS trade with developed and emerging countries is focused on imports of consumer goods. Therefore, an increase in trade openness improves food security. Trade between ECOWAS and the rest of the world is characterized by imports of primary products mainly agricultural goods and services, raw materials, imports of foods and foodstuffs coming from Asian countries such as Thailand, China, Vietnam, South Korea, Malaysia and Latin America (UNCTAD, 2016). By not importing more capital and industrial equipment, the degree of openness is unusual to draw economic growth; (ii) intra-regional trade which significantly improves economic growth does not influences per capita dietary energy supply due to the weakness of trade among ECOWAS countries. The findings are consistent with Ivica (2016) results which suggest that international trade improves food security. Nevertheless, backward integration has a positive effect on food security thereby suggesting that integration in the value chain has spillover effects on countries food security.

In fact, the strengthening of trade value chains among ECOWAS countries can organize the production and manufacturing of goods in chains and concentrate the retail sector, the demand for higher quality products will increase followed by the increasing of prices in international food markets. Expansion and diversification of agricultural products generate opportunities for people in the region and raise rural incomes which will allow rural and urban households to access more adequate and nutritious food. Consequently, a joint

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effect of integration and value chains boosts food security.

Similarly, positive changes in economic growth and domestic investment translate into positive changes in per capita dietary energy supply while a growing of political instability in ECOWAS is seen to have a negative impact on food security. Economic growth improves food security, showing that a raise of household income directly targets the consumption of foods. This finding in line with Timmer (2005) confirms that food security in ECOWAS is mainly a growth challenge contrary to others developing countries where economic growth alone does not solve the problem of food security. In ECOWAS countries, economic growth is essential for food security, and strategies at regional and national level need to be investigated. The promotion of trade value chains may be the bottom line to design these strategies because of the effectiveness of per capita domestic value added on sustaining economic growth. Value chains need to be implemented across countries and across sectors and the development program of ECOWAS must only target this goal. As expected, the incidence of political instability negatively affects food security. Political instability creates unfavorable condition on food security through the decrease of investment and its impact on food supply from domestic production. Some researchers find similar results for ASEAN (Herath et *al.,* 2014) and for developing countries (Bezuneh and Yiheyis, 2014).

A growth in food production is associated with a raise in national food security. An enabling environment needs to be created by ECOWAS countries to encourage producers by increasing domestic consumption, improving the environment of the farm household, making them able to cope with risk, uncertainty and sources of technical change, and raise industrial development to make food cheaper. In addition, some measures must be taken by governments to improve market efficiency such as communications, transportation and storage facilities, legal codes to enforce contracts, credit availability to finance short-run inventories and processing operations, a market information system to keep all market participants from farmers to consumers fairly and accurately informed about market trends.

Positive changes in domestic credits, population growth, foreign reserves and agricultural irrigated land are associated with positive changes in per capita dietary energy supply. Domestic credits increase the consumer purchasing power and allow to access various and qualities commodities (Baldwin, 2011b). National food security can be improved if countries allocate more domestic credits for the segment of the population who needs it. It is well established that domestic credits in most developing countries go directly to consumption and are used as an asset to smooth people's income (Ivica, 2016). Furthermore, domestic credits act on food production and food prices which is linked to food security. The amount of foreign reserves in ECOWAS countries contributes to food security. Foreign reserves enhance the ability of food importation of countries and is a channel to buy the capital machinery to accelerate production to achieve self-sufficiency. Also, the development of industrial sector is mainly correlated to the earning of foreign exchange and the ability of people to buy food staples. The percentage of land irrigated significantly contribute to food security through its positive impact on domestic food production. The more households have access to land for growing crops the more food production and availability increase. An extension of agricultural land reduces prices and diversifies different cropping patterns that provide nutrient diversity and more stability of output.

Contrary to the findings of studies (Bezuneh and Yiheyis, 2014) obtained for some region where population growth undermines food production, the results shows that for ECOWAS countries, population growth affects positively per capita dietary energy supply. These results can be explained by the fact that in African countries, most of the labour force are affected to the agricultural sector. This sector employs more than fifty percent of the workforce. Therefore, a growing population raises food production, enlarges the variety of goods and improves the competitiveness of domestic market (Xiang *et al.*, 2012). The final result is a raise of food security due to more availability of food. However, stable population growth is better than rapid population growth which constitutes a danger.

V. Conclusion

International trade of agricultural products appeared very early as an enrichment factor of Nations. Through the development of exports, the precursors have demonstrated the strength of international trade to drive the economic growth of a country. On the basis of the international division of labor, international trade relies on trade liberalization. The promise of trade liberalization is that by creating incentives for producers from different States to specialize in the products or services in which they have a comparative advantage, it will benefit all the trading partners, since it will lead to efficiency gains within each country and to overall increase of world production. Therefore, comparative advantage suggests that economic growth and poverty alleviation may result.

However, international trade for African countries has not bring the expected results. This study focuses on ECOWAS and attempts to responds to the inconsistency of the economic policies in African

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countries that turn away from the regional integration for the benefit of foreign markets. Three particular strategies are investigated in ECOWAS integration (such as each country international trade openness, each country intra-regional trade openness and insertion to value chains) to identify the best way for economic development in term of economic growth and food security raising. Two models are estimated with fixed effects over the period 1995-2012.

The results show that the relationship between openness and growth is not robust, while intra-community trade and per capita domestic value added appear to positively influence economic growth. This finding supports that regional integration needs to be strengthen and better promoted in order to stimulate the potential of each country to move from discontinuous growth to sustained growth. International trade is not a solution for ECOWAS countries to boost economic growth but regional trade linked to creation of value chains among each country can be the engine of the region growth. Countries should move more to regional integration than international trade.

Furthermore, international trade positively affects per capita dietary energy supply while intra-regional trade is not robust. This irrelevance impact of regional trade on food security can be justified by the weakness of trade among ECOWAS countries. Nevertheless, backward integration of countries has a positive effect on food security, thereby suggesting that integration in the value chain has spillover effects on countries food security. A joint effect of intra-regional trade and value chains trade can boost food security. This strategy optimizes economic growth and food security.

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An Assessment of the Drivers of Health Care System: An Empirical Evidence from Nigeria

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Abstract- This study discusses the trend and features of the health care delivery system in Nigeria and delved into examining factors that affect its performance using data obtained from the CBN and World Bank spanning 1980 to 2014. Four models were estimated using different indices - economic and social - of health care system and the OLS technique used for estimation. Results obtained revealed that the states of institution and infrastructure as well as the levels of income and education were very significant determinants of health care system in the country. Government subsidy was not very significant and health policy or reform had no significant impact. Infrastructure, income and education had the expected relationships with all social indicators of health care as they improve life expectancy and reduce infant mortality rate; but were negatively related to the economic index with no significant impact. More so, institution and subsidy had a mixed relationship with the health care system. It recommends that the government, relevant authorities and practitioners in the health sector support policies that would bring about improved quality health outcomes in the country.

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An Assessment of the Drivers of Health Care System: An Empirical Evidence from Nigeria

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Abstract- This study discusses the trend and features of the health care delivery system in Nigeria and delved into examining factors that affect its performance using data obtained from the CBN and World Bank spanning 1980 to 2014. Four models were estimated using different indices – economic and social - of health care system and the OLS technique used for estimation. Results obtained revealed that the states of institution and infrastructure as well as the levels of income and education were very significant determinants of health care system in the country. Government subsidy was not very significant and health policy or reform had no significant impact. Infrastructure, income and education had the expected relationships with all social indicators of health care as they improve life expectancy and reduce infant mortality rate; but were negatively related to the economic index with no significant impact. More so, institution and subsidy had a mixed relationship with the health care system. It recommends that the government, relevant authorities and practitioners in the health sector support policies that would bring about improved quality health outcomes in the country.

I. Introduction

The health care system (HCS) of a nation is the organizational framework for the production, consumption and distribution of health care services and the health needs of the communities in the nation. A good health care system will enable health services to be produced and provided to reach the citizens of the nation wherever they are located in their homes, educational institutions, work and public places (social, recreational or worship places). Basically, HCS is a continuum between a competitive market system and a state monopoly, indicating that HCS ownership could be completely by the private sector or the public sector or a combination of some sort by both private and public sectors. The private sector owns 38% of these facilities and provides 60% of orthodox health care in the country (Omoluabi, 2014; 15). Therefore, different countries would have their HCS organized within the continuum and they can be assessed by their responsiveness to economic, social, technological, environmental and historical factors.

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In Nigeria, HCS is shared between the private sector and the public sector which includes the three tiers of government-local, state/regional and national/federal. Health services are provided by federal state and local governments, missionaries, corporate organizations, private agencies and individuals. Health care service delivery in the country is at the primary, secondary and tertiary levels. The three tiers of government have basic responsibilities of each level of health care though there is no stringent rule or demarcation between their services. The Federal government's role is basically restricted to university teaching hospitals and federal medical centres, the State governments are in charge of general hospitals and the Local government is in charge of dispensaries and their services. It is important to note that the Federal government provides supervisory role overall health care deliveries through its agencies such as Ministries of Health (federal and state) and recently some parastatals such as National Agency for Foods and Drug administration and Control (NAFDAC), National Drug Law enforcement agency (NDLEA). The health service delivery system in Nigeria is characterized by: Federal government provision of supervisory role overall health care deliveries through its agencies and parastatals; modern and traditional health care which exists side-by-side; a free choice of health service provider by individuals; private production of health care services; fixed salaries for hospital based physician and national health insurance scheme (NHIS) at infancy.

Government total health expenditure-GDP of Nigeria ratio rose from 1.2% in 1980 to its peak of 9.2% in 2001 and declined to 3.5% in 2013 over the period (Figure1).The proportionate change in this ratio between 2001 and 2013 amounts to a significant 62.5% and average ratio for the period was 2.8%. The values of this ratio did not perform favourably in 1995 and 2005 when compared to those of some African countries like Ghana, South Africa and Egypt (Table 1).

Nigeria's female and male life expectancy values of 53.1 and 52.42 years respectively in 2014 are lower than those of Ghana, South Africa and Egypt in same year (Figures 2 and 3). Life expectancy position of the country lies below the sub-Saharan Africa regional values of 59.9 and 57.2 years for female and male respectively. In 2015, the infant mortality rate in Nigeria stood at 69.4 which is higher than those of Ghana

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(42.8), South Africa (33.6), Egypt (20.3) and even in the sub-Saharan Africa (56.3 (Figure 4).

Nigeria ranks among the countries with the highest child and maternal mortality rates globally: the under-five mortality rate is 201 per 1,000 live births, maternal mortality ratio is estimated at 800 per 100,000 live births (UNICEF, 2004). Among the major contributors to the disease burden of the country are malaria, tuberculosis (TB), and HIV/AIDS. Malaria is a major health and developmental problem in Nigeria, with a prevalence of 919 per 100,000 population (WHO, 2012). The HIV/AIDS epidemic has unfolded on a large scale in Nigeria with adult prevalence put at 3.9 percent and nearly 2.9 million people living with the virus (UNAIDS,2006). Tuberculosis cases have also increased dramatically with the increase in HIV/AIDS cases in the country, with an estimated prevalence of 546 cases per 100,000 population in 2004. (UNAIDS, 2006).

Nigeria has one of the largest stocks of human resources for health in Africa comparable only to Egypt and South Africa. There are about 39,210 doctors and 124,629 nurses registered in the country, which translates into about 30 doctors and 100 nurses per 100,000 populations (NHR, 2012). This compares to a Sub-Saharan African average of 15 doctors and 72 nurses per 100,000 populations (WHO 2006). While the number of healthcare professionals in the country represents a cause to be joyful, the current exodus of qualified doctors and healthcare workers coupled with the inadequacy and obsolescence of health infrastructure presents a worrying trend.

Possibly the falling and failing institutional standards which cuts across various sectors of the economy could be a reason for the dismal status of health care delivery in the country. Ejumudo (2013) adds that the plausible explanations for the poor performance are the decline in governance and near absence of quality culture. Therefore, considering the relatively poor health indices in Nigeria, it is very necessary to critically investigate what drives the performance of the health sector of the economy. This study seeks to answer this vital question and proffer remedial policy suggestions that could enhance the health system of the country.

II. Literature Review

a) *Theoretical Literature*

Grossman (1972) developed a model of the demand for the commodity "good health" with a central proposition that health can be viewed as a durable capital stock that produces an output of healthy time. The model assumes that individuals inherit an initial stock of health that depreciates with age and can be increased by investment in health. In this model, the "shadow price" of health depends on many other variables besides the price of medical care. It is shown that the shadow price rises with age if the rate of depreciation on the stock of health rises over the life cycle and falls with education if more educated people are more efficient producers of health. A major deduction from the model is that under certain conditions, an increase in the shadow price may simultaneously reduce the quantity of health demanded and increase the quantity of medical care demanded. Also the health investment function is synonymous to a health production function having cost of medical care or services, time spent in health enhancing or producing activities and other factors which includes environmental factors as its arguments.

In a related manner, Wag staff (1986) further emphasized the economic theory of the "demand for health" as an apparatus for analyzing the interaction of the socioeconomic determinants of health and indicates how it can be used to shed light on a variety of topical policy issues such as socioeconomic inequalities in health and the design of prevention policies. He extends the discussion of the theory to "the health production function", "the budget constraint", "consumer equilibrium" and "effects of changes in income, price of health care/service and technical knowledge". Among some others he came up with the prediction that increase in the price of health inputs should lead to the deterioration of health status.

b) *Empirical Literature*

Ichoku and Fonta (2006) examined the extent to which a system of healthcare financing leads to catastrophic expenditures, defined as a threshold percentage of a household's income, and the extent of impoverishment arising from healthcare spending. They used the Aronson, Johnson, and Lambert (1994) decomposition framework to analyze redistributive effects in terms of vertical and horizontal inequities, as well as re-ranking effect in Enugu State, Nigeria. The study showed that healthcare spending engenders high incidence of catastrophic spending and impoverishment in the population. Also, they found that healthcare spending is pro-rich in its redistributive effect, with significant vertical and horizontal inequities as well as re-ranking inherent in the system. The paper suggested policy reforms that separate healthcare utilization from healthcare financing if the poor are to have access to healthcare services.

Aina, Waheed, Isiaka and Oluremi (2015) investigated the determinants of demand for health care services among rural household in Ekiti State of Nigeria using descriptive and multinomial logit model to analyze collected data. They discovered that majority of the respondents are males, married, in their middle age and preferred using Dispensary/Primary health care because of its proximity as source of health care services in the study area. The empirical analysis showed that, sex, marital status, household expenditure, and waiting time out of all the explanatory variables used were found to

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be significant factors affecting demand for health care services, among the rural households sourcing health care services from dispensary/Primary health care, private hospitals/clinics, patient medicine stores, general / teaching hospitals and traditional/spiritual homes. Patient medicine stores were used as the base category.

Akacho (2014) examined the factors that influence the provision of healthcare service delivery in Kenya using UasinGishu District Hospital in Eldoret as a case study. The study found that poor communication among management, staff and patients influenced the quality of performance and contributed majorly to the inefficient delivery of healthcare services in the hospitals. She also found lack of enough financial resources, inadequate laboratory equipment and medicine for patients hindered the effectiveness of the hospital. Some recommendations of the study was that there should be enough qualified staff employed by the Ministry of Health, adequate and equitable financial allocation to all the hospitals in Kenya and availability of hospital facilities.

Ejumudo (2013) examined the critical role of the management of environmental stakeholders in quality service delivery with data derived from in-depth analysis of secondary sources. The study recommended exigency of a service culture and development orientation in the public health sector, proactive and pragmatic management of health institutions and organizations as well as their interface with key environmental stakeholders (players) and concerns and synergistic mentality and systematic practice.

Lewis (2006) presented a study that demonstrated the relationship between governance indices and measures of health performance and outcomes. Measles immunization coverage was used as a measure of public service performance of government and child mortality as a variable for measuring health outcomes. The ordinary least squares results showed that government effectiveness (measles immunization coverage) has a significant positive impact on health outcome (child mortality). The study asserted that government effectiveness is consistent in its effect on immunization coverage in the various models considered and concluded that good governance is important in ensuring effective health care delivery, and that returns to investments in health are low where governance issues are not addressed.

Rajkumar and Swaroop (2002) measured the impact of corruption on the effectiveness of health spending analyzing data for 1990 and 1997 controlling for GDP per capita, female educational attainment, ethno-linguistic fractionalization, urbanization among other factors. They concluded that the effectiveness of public health spending in reducing child mortality hinges on the integrity rating (1-5 range based on level of perceived corruption), with higher integrity associated with reduced mortality. And that poor governance may help to explain the inconclusive findings of some studies on the lack of association between public health expenditures and infant and child mortality.

In a similar study Wagstaff and Claeson (2005) further extended the above analyses using more recent data on the World Bank's CPIA score (Country Policy and Institutional Assessment as a measure of governance. Their findings revealed that under 5 mortality was reduced by spending; and study concluded that extra spending in medium and low CPIA countries would not be expected to reduce child mortality, and that per capita income growth offers a better investment if mortality declines are the objective.

Azfar, Kahkonen and Meagher (2001) conducted a survey in four provinces covering eighty municipalities in the Philippines. They found that corruption perceptions of households was negatively related with providers' knowledge (of required immunizations), which in turn was strongly related to immunization coverage and disease incidence in the survey areas. The study established a negative relationship between corruption and health delivery performance at the local level.

Ademiluyi and Aluko-Arowolo (2009) in a study on Infrastructural distribution of healthcare services in Nigeria found that from the colonial period, the distribution of medical care deli- very in Nigeria has favoured the urban population at the expense of the rural settlers and that the health services in the country has tended to be placed specifically on three pedestals of primary, secondary and tertiary health institutions for rural, mixed population and urban elite respectively. They also, found that infrastructural distribution of healthcare did not favour the rural areas (that is, the rural majority) in Nigeria largely neglected to satisfy the urban areas, where the educated, the rich and government functionaries reside. The paper suggested the need to redistribute the provision of this infrastructure to benefit all, irrespective of where they live.

Limwattananon et al (2011) assessed the effectiveness of the UC policy on financing of the Thai health care system which was equitable before the implementation of the UC policy but became more so after the introduction of policy. The study revealed that a larger contribution of more progressive direct tax payments and reduction in the share of regressive household out-of-pocket payments for health were two key influences on the progressivity of overall health care financing. The Kakwani index for overall health care finance, which measures the capacity of the health financing system to correct income inequity, changed from -0.0038 (overall regressive) in 2000 to positive (progressive) values of 0.0014, 0.0342 and 0.0406 in 2002, 2004 and 2006, respectively. And results clearly indicate that even before the UC Policy in 2001,

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outpatient and inpatient services were both pro-poor due to various government interventions in extending health service infrastructure in rural districts and a variety of health insurance arrangements. After the introduction of the UC scheme, public service utilization remained pro-poor. Overall, public subsidies were found to be pro-poor for both outpatient and inpatient services. In contrast, the utilization and benefits of teaching hospitals are pro-rich as they serve the better-off members of insurance schemes. They concluded that having a private sector which the rich are able to use as an alternative for shorter queues and affordable care is a further enabling feature favouring pro-poor utilization and public subsidies.

The empirical studies reviewed are mainly micro studies especially for Nigeria. No macro study was discussed except for that conducted in other climes using cross country data (Lewis, 2006;Rajkumar and Swaroop, 2002;Wagstaff and Claeson, 2005 and Limwattananon et al, 2011). None of the related studies on Nigeria considered education, health policy or reform and government subsidy as very useful arguments in their models; emphasis had been on income level, and infrastructure. Studies on Nigeria were also restricted to single models of health outcome. This study therefore contributes to the body of knowledge in an attempt to close this identified lapses using more robust estimation technique.

III. Theoretical Framework and Methodology

a) Theoretical Framework

This study adopts a framework by Lewis (2006) on producing public health care which states that the production function represents the core of public health care systems embodying capital, labour and governance. A simple representation is the following:

Health Outcomes = (L, K, G)

Where L, K and G denote labour, capital and governance respectively. Labor encompasses management, physicians, nurses and other medical staff. Capital is made up of infrastructure, equipment and other fixed assets, as well as financing while governance represents some measure of institutional quality or government transfers for local purchase, in-kind provision of drugs and supplies, and third party and consumer payments.. Increases in labor and capital can improve outcomes, but governance may dampen or enhance these effects. The functioning of the public system is determined by the incentives facing the actors in the system, the manner in which inputs are managed and the accountability imbedded in the incentive structure.

b) Model Specification

Following the above framework this study hypotheses a model of health care system (HCS) that depends on status of institution (INST), state of health infrastructure (INFR), level of income (INC), level of education (EDU), health policy or reform (HPR) and government subsidy (SUB). This is expressed mathematically as:

$$HCS = f(INST, INFR, INC, EDU, HPR, SUB) \quad (1)$$

In econometric form the model can be represented as:

$$HCS_t = \alpha_0 + \alpha_1 INST_t + \alpha_2 INFR_t + \alpha_3 INC_t + \alpha_4 EDU_t + \alpha_5 HPR_t + \alpha_6 SUB_t + \mu_t \quad (2)$$

The symbols α_is, for i taking values from 0 to 6 are coefficients to be estimated, t is the time period and μ is the white noise error term. The dependent variable HCS is considered from economic and social perspectives. Three HCS indicators are used under the social perspective thereby giving rise to four different models which includes one from economic and three from social perspectives presented below:

i. *Economic Model*

$$HEC_t = \alpha_0 + \alpha_1 INST_t + \alpha_2 INFR_t + \alpha_3 INC_t + \alpha_4 EDU_t + \alpha_5 HPR_t + \alpha_6 SUB_t + \mu_t \quad (3)$$

ii. *Social Models*

$$LEF_t = \alpha_0 + \alpha_1 INST_t + \alpha_2 INFR_t + \alpha_3 INC_t + \alpha_4 EDU_t + \alpha_5 HPR_t + \alpha_6 SUB_t + \mu_t \quad (4)$$

$$LEM_t = \alpha_0 + \alpha_1 INST_t + \alpha_2 INFR_t + \alpha_3 INC_t + \alpha_4 EDU_t + \alpha_5 HPR_t + \alpha_6 SUB_t + \mu_t \quad (5)$$

$$IMR_t = \alpha_0 + \alpha_1 INST_t + \alpha_2 INFR_t + \alpha_3 INC_t + \alpha_4 EDU_t + \alpha_5 HPR_t + \alpha_6 SUB_t + \mu_t \quad (6)$$

Apriori expectation is that all the parameter estimates (α and β) be greater than zero in equations 3 to 5 and otherwise in equation 6 as we expect the independent variables to be positively related to HEC, LEF and LEM and negatively related to IMR.

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Equations 3 through 6 are estimated with different economic and social indices of HCS discussed in the next section. The estimation procedure includes: unit root test for stationarity of variables, cointegration test for long run relationship among variables and Ordinary Least Squares (OLS) regression technique.

c) Data, Source and Measurement

Data set used for this study is sourced from the Central Bank of Nigeria (CBN) annual statistical bulletin 2017 and World Bank 2017 development indicators spanning 1980 through 2016. Economic index of HCS was measured using total health expenditure – GDP ratio (HEC) while its social indices were measured by female life expectancy (LEF), male life expectancy (LEM) and infant mortality rate (IMR). World Bank's CPIA score (Country Policy and Institutional Assessment) measured institution and health infrastructure was captured by government capital expenditure on social community services as a percentage of total capital expenditure. Secondary school enrolment rate and real GDP per capita measured levels of education and income respectively. Health policy or reform was captured by ratio of government total health expenditure to government total expenditure and government subsidy measured by pump price of gasoline.

IV. Empirical Results and Discussions

a) Tests for Unit Root and Cointegration

Results of the unit root test show that all the variables were integrated of different orders and their Augmented Dickey-Fuller (ADF) statistics significant at 1per cent level except EDU which was significant at 5 per cent (Table 2). Specifically, INFR was stationary at level I(0), LEF and LEM were stationary after second differencing I(2) while the other variables were stationary after first differencing I(1).Since the variables have different orders of integration (Table 3), residual series of the various models were tested for stationarity to test for cointegration among variables following the two-step approach established by Engle and Granger(1987). The residual series obtained from the various models were integrated of order zero -stationary at level- implying the existence of cointegration or a long run relationship among variables.

b) Ordinary Least Squares (OLS) Result

In Table 4 estimated variants of the model of HCS were quite robust and at least 81.7 per cent of the systematic variations in any of the dependent variables were explained by the independent variables. The F-statistic values of all the models were significant at 1 per cent level indicating that a hypothesis of a joint significant impact of the regressors on any of the regressands cannot be rejected. This validates the overall significance of these estimated models. Moreso, the Durbin-Watson statistical values suggest that there is no serious threat of serial correlation among residual terms in each model, thus the models are useful for this study.

Furthermore, Table 4 reveals that while INST and HPR have significant influence on health care delivery in economic terms the other regressors had no significant effect in the first model. The negative and positive signs INST and HPR respectively simply express their relationship with the health care delivery system measured using an economic index. However, emphasis shall be on models (2, 3 and 4) of all social measures of HCS in the country.

Apparently, INST has a consistent significant impact on all social measures of HCS except LEM. While it improved LEF and LEM, it has an adverse influence on IMR contrary to the study of Lewis (2006) in others climes which suggests a favourable relationship. This outcome is not desirable and it is an indication of a poorly organized system of health care delivery. It suggests that the pattern of medical care delivery, management practices and other activities obtainable in these health facilities are not effective and efficient which lends credence to the findings of Azfar et al (2001) and Rajkumar and Swaroop (2002).

The effect of INFR was significant with the expected signs on LEF, LEM and IMR It implies that INFR consistently enhanced HCS in the country which further explains the view of Ademiluyi and Aluko-Arowolo (2009).Although a larger proportion of health care services are provided by the private sector (Omoluabi, 2014) these enhancements also may not be unconnected with the increasing amount of medical facilities which includes newly established hospitals at the federal and state levels as well as the primary health centers and dispensaries at the local level, quantity of drugs and laboratory equipment available in these health institutions, number of medical personnel that graduates from colleges of medicine and so on. However, its negative relationship with the system in economic terms connotes that it is insufficient.

Again, INC had the expected signs with consistent significant impact on LEF, LEM and IMR. This implies that level of plays a vital role improving life expectancy and mitigating infant mortality rate supporting Aina et al (2015) claim that household expenditure is a significant factor affecting demand for health care services, among the rural households in Ekiti state sourcing health care services. The more income an individual gets, the higher his capability of producing health or ability to demand for health care services. This undoubtedly will improve the health status of such an individual.

Interestingly the level of EDU has the most appealing expected effect on all social and economics indices of health care delivery in the country over the period. It has a significant effect on LEF, LEM and IMR

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although its impact was not significant on HCS measured in economic sense but it is positively related to it. It simply indicates that EDU is a very potent input that contributes to a healthy health care delivery system. This is necessarily true because the more educated and informed health care seekers and providers are, the better the HCS and the more effective is the service delivery pattern of health care. The health care providers are abreast with the latest drugs and technology used in the treatment of diseases and seekers understand better any prescription given to them by medical professionals.

On the contrary, HPR has a very worrisome influence on all indices of HCS considered supporting earlier findings by Ichoku and Fonta (2006). Results clearly show that its impact on LEF, LEM and IMR was not significant but its relationship with these indices was inappropriate as it hinders their improvement which contradicts the results of the study conducted in Thai by Limwattananon et al (2011). However, its relationship with HCS in economic sense was significant but infinitesimal and negligible. It indicates that the state of policies and/or reforms made on health over the period were not strong enough to bring about the expected health outcomes and service delivery in the system. This may be attributed to a poor implementation of these policies or reforms which often does not cut across all income groups or geographical location coupled with the NHIS in a nascent stage.

Government subsidy removal on the pump price of gasoline has no significant impact on the measures of HCS except IMR. It also has a mixed relationship with the various indicators of health outcome used. A very disturbing relationship observed is the one with LEF. Consequent on these health outcomes, subsidy removal of gasoline does not send positive signals to the health sector performance in Nigeria, save for a situation where the government pumps in some of the monies realized from the process into the health sector. This way more funds is made available in the health care delivery system which could bring about desirable health outcomes in the country in line with the findings of Limwattananon et al (2011).

V. Summary, Recommendations and Conclusion

The study observed the trend and features of the health care delivery system in Nigeria and delved into examining factors that affect its performance using data obtained from the CBN and World Bank spanning 1980 to 2014. Four models were estimated using different indices – economic and social - of health care system and the OLS technique used for estimation. Results obtained revealed that the states of institution and infrastructure as well as the levels of income and education were very significant determinants of health care system in the country. Government subsidy was not very significant and health policy or reform had no significant impact. Infrastructure, income and education had the expected relationships with all social indicators of health care as they improve life expectancy and reduce infant mortality rate; but were negatively related to the economic index with no significant impact. More so, institution and subsidy had a mixed relationship with the health care system. While institution supported life expectancy, increased infant mortality rate and reduced the economic index; subsidy had a mixed relationship with life expectancy, reduced infant mortality significantly and increased the economic index. Health policy or reform had a wrong relationship with all social indicators as it reduced life expectancy and increased infant mortality rate. However, it had a positive relationship with the economic index though with a negligible significant effect.

Based on the findings above, it is imperative that the government, relevant authorities and practitioners in the health sector support policies that would improve the state of health infrastructure, reduce the income inequality hiatus among various groups and enhance educational standards. Also important is the entrenchment of working, functional and reliable institutions via good governance as this would boost peoples' confidence on the running of affairs of the state. There should be zero tolerance for corruption particularly in this sector and the economy as a whole as lives and well-being of people are at stake. Lastly, subsidy policy and health reform should be structured in a way that would be pro-poor and cover a wider range of people rather than a few rich individuals in the society.

The benefits inherent in an effective and efficient health care delivery system cannot be overemphasized as it is pertinent to having an improved health status and outcome in a country. It is therefore necessary for the government, affected authorities and all stakeholders to partner together in realizing this highly favourable target for a healthy and sustainable growth and development of the Nigerian economy.

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Table 1: Selected Health Expenditure by Country

Country	HE as % of GDP	HE as % of GDP	Immunisation of DPT3 %	Access to safe water
	1995	2005	2006	2004-2005
Algeria	3.3	4.1	95	85
Egypt	1.6	5.1	98	98
Ghana	1.5	8.1	99	75
Niger	1.6	6.5	64	46
Nigeria	0.4	4.5	69	51
South Africa	2.9	8.4	97	85

Source: AfDB 2007.

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Table 2: Unit Root Test of Variables

	Level		1st/2nd Difference		
Variables	ADF Stat	5% Cri Value	ADF Stat	5% Cri Value	Remark
HEC	-1.64804	-2.95711	-7.0798	-2.96041	I(1)***
LEF	0.388748	-2.98104	-4.45574	-2.62299	I(2)***
LEM	0.355982	-2.96777	-4.08711	-2.96777	I(2)***
IMR	-2.38896	-2.96041	-3.99873	-2.99806	I(1)***
INST	-0.82285	-2.95711	-5.56776	-2.96041	I(1)***
INFR	-4.60868	-2.95711	-	-	I(0)***
INC	0.962729	-2.95711	-4.13879	-2.96041	I(1)***
EDU	0.338715	-2.96777	-3.54148	-2.96777	I(1)**
HPR	-1.82412	-2.96041	-9.84247	-2.96041	I(1)***
SUB	0.644053	-2.98623	-5.07738	-2.99188	I(1)***

*Note: ***, ** and * denote significance at 1%, 5% and 10% respectively*
Source: Authors' compilation from E-views output.

Table 3: Unit Root Test of Residuals

	Level		
Model	ADF Stat	5% Cri Val	Remark
1	-4.90299	-2.98623	I(0)***
2	-2.82872	-2.98623	I(0)*
3	-3.78096	-2.98623	I(0)***
4	-3.72964	-2.98623	I(0)***

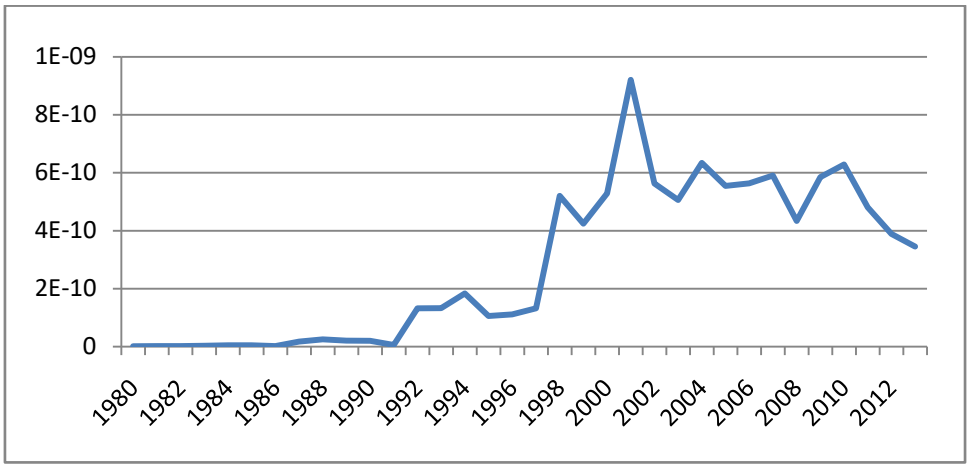
*Note: ***, ** and * denote significance at 1%, 5% and 10% respectively*
Source: Authors' compilation from E-views output.

Table 4: OLS Estimated Results

	HEC (1)	LEF (2)	LEM (3)	IMR (4)
C	2.43E-08	-6.502	27.41406	-147.216
INST	-3.58E-08***	70.10654**	16.63252	457.8187***
INFR	-5.42E-12	0.052111***	0.048129***	-0.22102**
INC	-6.54E-13	0.009609***	0.009007***	-0.04226***
EDU	2.75E-17	2.57E-07***	3.43E-07***	-2.60E-06***
HPR	0.0000000074**	-7.83488	-5.89768	17.10666
SUB	3.89E-13	-0.00402	0.004426	-0.09751**
R^2	0.817381	0.98307	0.993853	0.993629
F Stat	14.17362***	183.8788***	512.0184***	493.8898***
DW	2.011557	1.554139	1.520298	1.511518

Note: ***, ** and * denote significance at 1%, 5% and 10% respectively
Source: Authors' compilation from E-views output.

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Source: Author, underlined data from CBN Statistical Bulletin 2017

Figure 1: Nigeria Total Health Expenditure – GDP Ratio 1980-2013

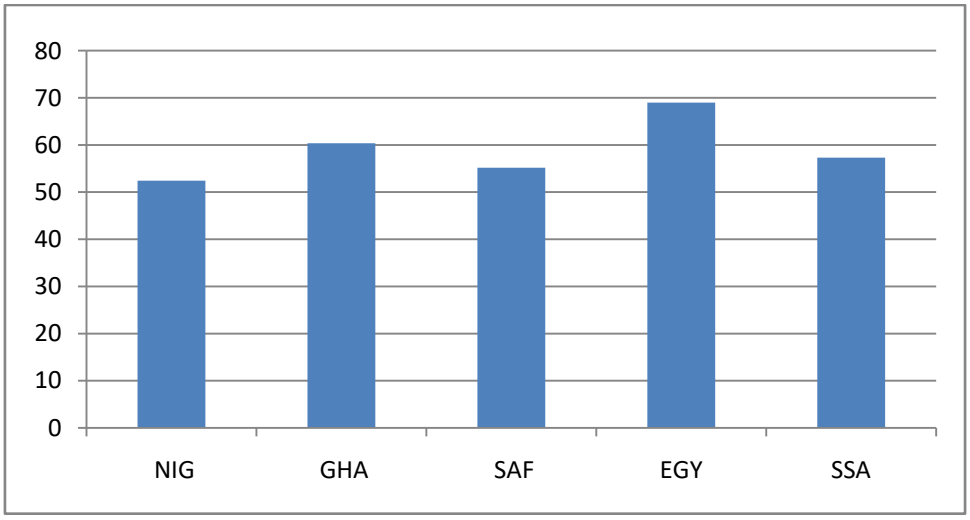
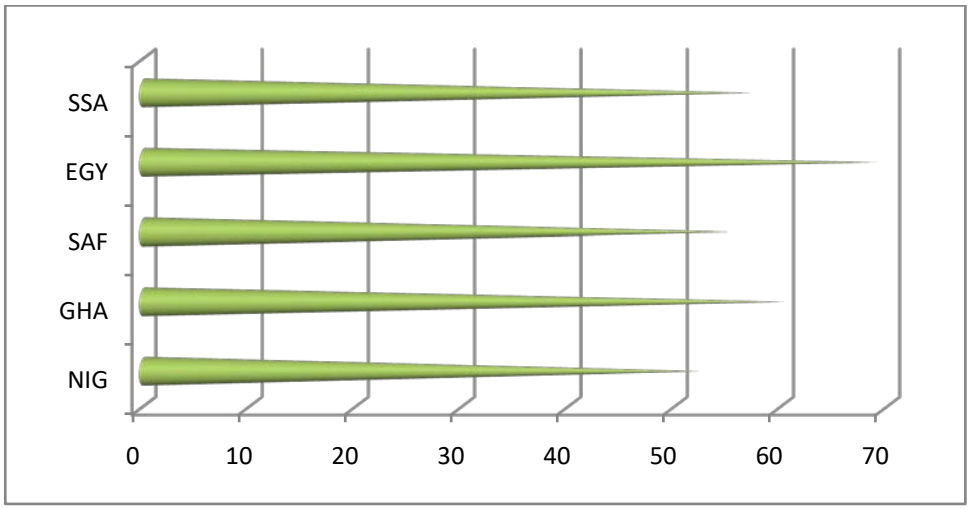


Figure 2: Female Life Expectancy 2016



Source: Author's, using World Bank Data 2017

Figure 3: Male Life Expectancy 2016

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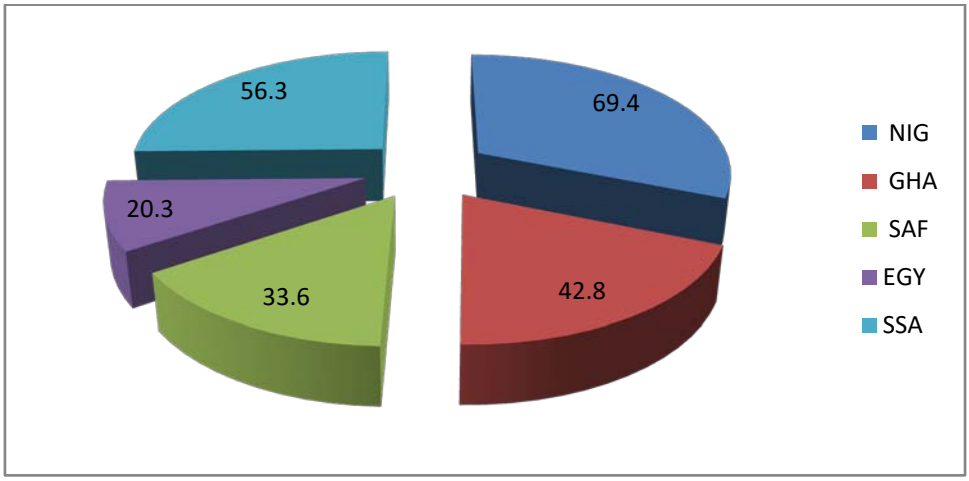


Figure 4: Infant Mortality Rate 2016

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The IBOARS can initially review research papers of their institute and recommend them to publish with respective journal of Global Journals. It can also review the papers of other institutions after obtaining our consent. The second review will be done by peer reviewer of Global Journals Incorporation (USA) The Board is at liberty to appoint a peer reviewer with the approval of chairperson after consulting us.

The author fees of such paper may be waived off up to 40%.

The Global Journals Incorporation (USA) at its discretion can also refer double blind peer reviewed paper at their end to the board for the verification and to get recommendation for final stage of acceptance of publication.





The IBOARS can organize symposium/seminar/conference in their country on behalf of Global Journals Incorporation (USA)-OARS (USA). The terms and conditions can be discussed separately.

The Board can also play vital role by exploring and giving valuable suggestions regarding the Standards of "Open Association of Research Society, U.S.A (OARS)" so that proper amendment can take place for the benefit of entire research community. We shall provide details of particular standard only on receipt of request from the Board.



The board members can also join us as Individual Fellow with 40% discount on total fees applicable to Individual Fellow. They will be entitled to avail all the benefits as declared. Please visit Individual Fellow-sub menu of GlobalJournals.org to have more relevant details.

We shall provide you intimation regarding launching of e-version of journal of your stream time to time. This may be utilized in your library for the enrichment of knowledge of your students as well as it can also be helpful for the concerned faculty members.



After nomination of your institution as "Institutional Fellow" and constantly functioning successfully for one year, we can consider giving recognition to your institute to function as Regional/Zonal office on our behalf.
The board can also take up the additional allied activities for betterment after our consultation.

The following entitlements are applicable to individual Fellows:



Open Association of Research Society, U.S.A (OARS) By-laws states that an individual Fellow may use the designations as applicable, or the corresponding initials. The Credentials of individual Fellow and Associate designations signify that the individual has gained knowledge of the fundamental concepts. One is magnanimous and proficient in an expertise course covering the professional code of conduct, and follows recognized standards of practice.

Open Association of Research Society (US)/ Global Journals Incorporation (USA), as described in Corporate Statements, are educational, research publishing and professional membership organizations. Achieving our individual Fellow or Associate status is based mainly on meeting stated educational research requirements.



Disbursement of 40% Royalty earned through Global Journals : Researcher = 50%, Peer Reviewer = 37.50%, Institution = 12.50% E.g. Out of 40%, the 20% benefit should be passed on to researcher, 15 % benefit towards remuneration should be given to a reviewer and remaining 5% is to be retained by the institution.

We shall provide print version of 12 issues of any three journals [as per your requirement] out of our 38 journals worth $ 2376 USD.

Other:

The individual Fellow and Associate designations accredited by Open Association of Research Society (US) credentials signify guarantees following achievements:

- The professional accredited with Fellow honor, is entitled to various benefits viz. name, fame, honor, regular flow of income, secured bright future, social status etc.

- In addition to above, if one is single author, then entitled to 40% discount on publishing research paper and can get 10%discount if one is co-author or main author among group of authors.
- The Fellow can organize symposium/seminar/conference on behalf of Global Journals Incorporation (USA) and he/she can also attend the same organized by other institutes on behalf of Global Journals.
- The Fellow can become member of Editorial Board Member after completing 3yrs.
- The Fellow can earn 60% of sales proceeds from the sale of reference/review books/literature/publishing of research paper.
- Fellow can also join as paid peer reviewer and earn 15% remuneration of author charges and can also get an opportunity to join as member of the Editorial Board of Global Journals Incorporation (USA)
- • This individual has learned the basic methods of applying those concepts and techniques to common challenging situations. This individual has further demonstrated an in–depth understanding of the application of suitable techniques to a particular area of research practice.

Note :

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- In future, if the board feels the necessity to change any board member, the same can be done with the consent of the chairperson along with anyone board member without our approval.
- In case, the chairperson needs to be replaced then consent of 2/3rd board members are required and they are also required to jointly pass the resolution copy of which should be sent to us. In such case, it will be compulsory to obtain our approval before replacement.
- In case of "Difference of Opinion [if any]" among the Board members, our decision will be final and binding to everyone.

"

Preferred Author Guidelines

We accept the manuscript submissions in any standard (generic) format.

We typeset manuscripts using advanced typesetting tools like Adobe In Design, CorelDraw, TeXnicCenter, and TeXStudio. We usually recommend authors submit their research using any standard format they are comfortable with, and let Global Journals do the rest.

Alternatively, you can download our basic template from https://globaljournals.org/Template.zip

Authors should submit their complete paper/article, including text illustrations, graphics, conclusions, artwork, and tables. Authors who are not able to submit manuscript using the form above can email the manuscript department at submit@globaljournals.org or get in touch with chiefeditor@globaljournals.org if they wish to send the abstract before submission.

Before and during Submission

Authors must ensure the information provided during the submission of a paper is authentic. Please go through the following checklist before submitting:

1. Authors must go through the complete author guideline and understand and *agree to Global Journals' ethics and code of conduct,* along with author responsibilities.
2. Authors must accept the privacy policy, terms, and conditions of Global Journals.
3. Ensure corresponding author's email address and postal address are accurate and reachable.
4. Manuscript to be submitted must include keywords, an abstract, a paper title, co-author(s') names and details (email address, name, phone number, and institution), figures and illustrations in vector format including appropriate captions, tables, including titles and footnotes, a conclusion, results, acknowledgments and references.
5. Authors should submit paper in a ZIP archive if any supplementary files are required along with the paper.
6. Proper permissions must be acquired for the use of any copyrighted material.
7. Manuscript submitted *must not have been submitted or published elsewhere* and all authors must be aware of the submission.

Declaration of Conflicts of Interest

It is required for authors to declare all financial, institutional, and personal relationships with other individuals and organizations that could influence (bias) their research.

Policy on Plagiarism

Plagiarism is not acceptable in Global Journals submissions at all.

Plagiarized content will not be considered for publication. We reserve the right to inform authors' institutions about plagiarism detected either before or after publication. If plagiarism is identified, we will follow COPE guidelines:

Authors are solely responsible for all the plagiarism that is found. The author must not fabricate, falsify or plagiarize existing research data. The following, if copied, will be considered plagiarism:

- Words (language)
- Ideas
- Findings
- Writings
- Diagrams
- Graphs
- Illustrations
- Lectures

- Printed material
- Graphic representations
- Computer programs
- Electronic material
- Any other original work

Authorship Policies

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1. Substantial contributions to the conception and acquisition of data, analysis, and interpretation of findings.
2. Drafting the paper and revising it critically regarding important academic content.
3. Final approval of the version of the paper to be published.

Changes in Authorship

The corresponding author should mention the name and complete details of all co-authors during submission and in manuscript. We support addition, rearrangement, manipulation, and deletions in authors list till the early view publication of the journal. We expect that corresponding author will notify all co-authors of submission. We follow COPE guidelines for changes in authorship.

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Appealing Decisions

Unless specified in the notification, the Editorial Board's decision on publication of the paper is final and cannot be appealed before making the major change in the manuscript.

Acknowledgments

Contributors to the research other than authors credited should be mentioned in Acknowledgments. The source of funding for the research can be included. Suppliers of resources may be mentioned along with their addresses.

Declaration of funding sources

Global Journals is in partnership with various universities, laboratories, and other institutions worldwide in the research domain. Authors are requested to disclose their source of funding during every stage of their research, such as making analysis, performing laboratory operations, computing data, and using institutional resources, from writing an article to its submission. This will also help authors to get reimbursements by requesting an open access publication letter from Global Journals and submitting to the respective funding source.

Preparing your Manuscript

Authors can submit papers and articles in an acceptable file format: MS Word (doc, docx), LaTeX (.tex, .zip or .rar including all of your files), Adobe PDF (.pdf), rich text format (.rtf), simple text document (.txt), Open Document Text (.odt), and Apple Pages (.pages). Our professional layout editors will format the entire paper according to our official guidelines. This is one of the highlights of publishing with Global Journals—authors should not be concerned about the formatting of their paper. Global Journals accepts articles and manuscripts in every major language, be it Spanish, Chinese, Japanese, Portuguese, Russian, French, German, Dutch, Italian, Greek, or any other national language, but the title, subtitle, and abstract should be in English. This will facilitate indexing and the pre-peer review process.

The following is the official style and template developed for publication of a research paper. Authors are not required to follow this style during the submission of the paper. It is just for reference purposes.

Manuscript Style Instruction (Optional)

- Microsoft Word Document Setting Instructions.
- Font type of all text should be Swis721 Lt BT.
- Page size: 8.27" x 11'", left margin: 0.65, right margin: 0.65, bottom margin: 0.75.
- Paper title should be in one column of font size 24.
- Author name in font size of 11 in one column.
- Abstract: font size 9 with the word "Abstract" in bold italics.
- Main text: font size 10 with two justified columns.
- Two columns with equal column width of 3.38 and spacing of 0.2.
- First character must be three lines drop-capped.
- The paragraph before spacing of 1 pt and after of 0 pt.
- Line spacing of 1 pt.
- Large images must be in one column.
- The names of first main headings (Heading 1) must be in Roman font, capital letters, and font size of 10.
- The names of second main headings (Heading 2) must not include numbers and must be in italics with a font size of 10.

Structure and Format of Manuscript

The recommended size of an original research paper is under 15,000 words and review papers under 7,000 words. Research articles should be less than 10,000 words. Research papers are usually longer than review papers. Review papers are reports of significant research (typically less than 7,000 words, including tables, figures, and references)

A research paper must include:

a) A title which should be relevant to the theme of the paper.
b) A summary, known as an abstract (less than 150 words), containing the major results and conclusions.
c) Up to 10 keywords that precisely identify the paper's subject, purpose, and focus.
d) An introduction, giving fundamental background objectives.
e) Resources and techniques with sufficient complete experimental details (wherever possible by reference) to permit repetition, sources of information must be given, and numerical methods must be specified by reference.
f) Results which should be presented concisely by well-designed tables and figures.
g) Suitable statistical data should also be given.
h) All data must have been gathered with attention to numerical detail in the planning stage.

Design has been recognized to be essential to experiments for a considerable time, and the editor has decided that any paper that appears not to have adequate numerical treatments of the data will be returned unrefereed.

i) Discussion should cover implications and consequences and not just recapitulate the results; conclusions should also be summarized.
j) There should be brief acknowledgments.
k) There ought to be references in the conventional format. Global Journals recommends APA format.

Authors should carefully consider the preparation of papers to ensure that they communicate effectively. Papers are much more likely to be accepted if they are carefully designed and laid out, contain few or no errors, are summarizing, and follow instructions. They will also be published with much fewer delays than those that require much technical and editorial correction.

The Editorial Board reserves the right to make literary corrections and suggestions to improve brevity.



Format Structure

It is necessary that authors take care in submitting a manuscript that is written in simple language and adheres to published guidelines.

All manuscripts submitted to Global Journals should include:

Title

The title page must carry an informative title that reflects the content, a running title (less than 45 characters together with spaces), names of the authors and co-authors, and the place(s) where the work was carried out.

Author details

The full postal address of any related author(s) must be specified.

Abstract

The abstract is the foundation of the research paper. It should be clear and concise and must contain the objective of the paper and inferences drawn. It is advised to not include big mathematical equations or complicated jargon.

Many researchers searching for information online will use search engines such as Google, Yahoo or others. By optimizing your paper for search engines, you will amplify the chance of someone finding it. In turn, this will make it more likely to be viewed and cited in further works. Global Journals has compiled these guidelines to facilitate you to maximize the web-friendliness of the most public part of your paper.

Keywords

A major lynchpin of research work for the writing of research papers is the keyword search, which one will employ to find both library and internet resources. Up to eleven keywords or very brief phrases have to be given to help data retrieval, mining, and indexing.

One must be persistent and creative in using keywords. An effective keyword search requires a strategy: planning of a list of possible keywords and phrases to try.

Choice of the main keywords is the first tool of writing a research paper. Research paper writing is an art. Keyword search should be as strategic as possible.

One should start brainstorming lists of potential keywords before even beginning searching. Think about the most important concepts related to research work. Ask, “What words would a source have to include to be truly valuable in a research paper?” Then consider synonyms for the important words.

It may take the discovery of only one important paper to steer in the right keyword direction because, in most databases, the keywords under which a research paper is abstracted are listed with the paper.

Numerical Methods

Numerical methods used should be transparent and, where appropriate, supported by references.

Abbreviations

Authors must list all the abbreviations used in the paper at the end of the paper or in a separate table before using them.

Formulas and equations

Authors are advised to submit any mathematical equation using either MathJax, KaTeX, or LaTeX, or in a very high-quality image.

Tables, Figures, and Figure Legends

Tables: Tables should be cautiously designed, uncrowned, and include only essential data. Each must have an Arabic number, e.g., Table 4, a self-explanatory caption, and be on a separate sheet. Authors must submit tables in an editable format and not as images. References to these tables (if any) must be mentioned accurately.

Figures

Figures are supposed to be submitted as separate files. Always include a citation in the text for each figure using Arabic numbers, e.g., Fig. 4. Artwork must be submitted online in vector electronic form or by emailing it.

Preparation of Eletronic Figures for Publication

Although low-quality images are sufficient for review purposes, print publication requires high-quality images to prevent the final product being blurred or fuzzy. Submit (possibly by e-mail) EPS (line art) or TIFF (halftone/ photographs) files only. MS PowerPoint and Word Graphics are unsuitable for printed pictures. Avoid using pixel-oriented software. Scans (TIFF only) should have a resolution of at least 350 dpi (halftone) or 700 to 1100 dpi (line drawings). Please give the data for figures in black and white or submit a Color Work Agreement form. EPS files must be saved with fonts embedded (and with a TIFF preview, if possible).

For scanned images, the scanning resolution at final image size ought to be as follows to ensure good reproduction: line art: >650 dpi; halftones (including gel photographs): >350 dpi; figures containing both halftone and line images: >650 dpi.

Color charges: Authors are advised to pay the full cost for the reproduction of their color artwork. Hence, please note that if there is color artwork in your manuscript when it is accepted for publication, we would require you to complete and return a Color Work Agreement form before your paper can be published. Also, you can email your editor to remove the color fee after acceptance of the paper.

Tips for writing a good quality Management Research Paper

Techniques for writing a good quality management and business research paper:

1. Choosing the topic: In most cases, the topic is selected by the interests of the author, but it can also be suggested by the guides. You can have several topics, and then judge which you are most comfortable with. This may be done by asking several questions of yourself, like "Will I be able to carry out a search in this area? Will I find all necessary resources to accomplish the search? Will I be able to find all information in this field area?" If the answer to this type of question is "yes," then you ought to choose that topic. In most cases, you may have to conduct surveys and visit several places. Also, you might have to do a lot of work to find all the rises and falls of the various data on that subject. Sometimes, detailed information plays a vital role, instead of short information. Evaluators are human: The first thing to remember is that evaluators are also human beings. They are not only meant for rejecting a paper. They are here to evaluate your paper. So present your best aspect.

2. Think like evaluators: If you are in confusion or getting demotivated because your paper may not be accepted by the evaluators, then think, and try to evaluate your paper like an evaluator. Try to understand what an evaluator wants in your research paper, and you will automatically have your answer. Make blueprints of paper: The outline is the plan or framework that will help you to arrange your thoughts. It will make your paper logical. But remember that all points of your outline must be related to the topic you have chosen.

3. Ask your guides: If you are having any difficulty with your research, then do not hesitate to share your difficulty with your guide (if you have one). They will surely help you out and resolve your doubts. If you can't clarify what exactly you require for your work, then ask your supervisor to help you with an alternative. He or she might also provide you with a list of essential readings.

4. Use of computer is recommended: As you are doing research in the field of management and business then this point is quite obvious. Use right software: Always use good quality software packages. If you are not capable of judging good software, then you can lose the quality of your paper unknowingly. There are various programs available to help you which you can get through the internet.

5. Use the internet for help: An excellent start for your paper is using Google. It is a wondrous search engine, where you can have your doubts resolved. You may also read some answers for the frequent question of how to write your research paper or find a model research paper. You can download books from the internet. If you have all the required books, place importance on reading, selecting, and analyzing the specified information. Then sketch out your research paper. Use big pictures: You may use encyclopedias like Wikipedia to get pictures with the best resolution. At Global Journals, you should strictly follow here.



6. Bookmarks are useful: When you read any book or magazine, you generally use bookmarks, right? It is a good habit which helps to not lose your continuity. You should always use bookmarks while searching on the internet also, which will make your search easier.

7. Revise what you wrote: When you write anything, always read it, summarize it, and then finalize it.

8. Make every effort: Make every effort to mention what you are going to write in your paper. That means always have a good start. Try to mention everything in the introduction—what is the need for a particular research paper. Polish your work with good writing skills and always give an evaluator what he wants. Make backups: When you are going to do any important thing like making a research paper, you should always have backup copies of it either on your computer or on paper. This protects you from losing any portion of your important data.

9. Produce good diagrams of your own: Always try to include good charts or diagrams in your paper to improve quality. Using several unnecessary diagrams will degrade the quality of your paper by creating a hodgepodge. So always try to include diagrams which were made by you to improve the readability of your paper. Use of direct quotes: When you do research relevant to literature, history, or current affairs, then use of quotes becomes essential, but if the study is relevant to science, use of quotes is not preferable.

10. Use proper verb tense: Use proper verb tenses in your paper. Use past tense to present those events that have happened. Use present tense to indicate events that are going on. Use future tense to indicate events that will happen in the future. Use of wrong tenses will confuse the evaluator. Avoid sentences that are incomplete.

11. Pick a good study spot: Always try to pick a spot for your research which is quiet. Not every spot is good for studying.

12. Know what you know: Always try to know what you know by making objectives, otherwise you will be confused and unable to achieve your target.

13. Use good grammar: Always use good grammar and words that will have a positive impact on the evaluator; use of good vocabulary does not mean using tough words which the evaluator has to find in a dictionary. Do not fragment sentences. Eliminate one-word sentences. Do not ever use a big word when a smaller one would suffice.
Verbs have to be in agreement with their subjects. In a research paper, do not start sentences with conjunctions or finish them with prepositions. When writing formally, it is advisable to never split an infinitive because someone will (wrongly) complain. Avoid clichés like a disease. Always shun irritating alliteration. Use language which is simple and straightforward. Put together a neat summary.

14. Arrangement of information: Each section of the main body should start with an opening sentence, and there should be a changeover at the end of the section. Give only valid and powerful arguments for your topic. You may also maintain your arguments with records.

15. Never start at the last minute: Always allow enough time for research work. Leaving everything to the last minute will degrade your paper and spoil your work.

16. Multitasking in research is not good: Doing several things at the same time is a bad habit in the case of research activity. Research is an area where everything has a particular time slot. Divide your research work into parts, and do a particular part in a particular time slot.

17. Never copy others' work: Never copy others' work and give it your name because if the evaluator has seen it anywhere, you will be in trouble. Take proper rest and food: No matter how many hours you spend on your research activity, if you are not taking care of your health, then all your efforts will have been in vain. For quality research, take proper rest and food.

18. Go to seminars: Attend seminars if the topic is relevant to your research area. Utilize all your resources.

19. Refresh your mind after intervals: Try to give your mind a rest by listening to soft music or sleeping in intervals. This will also improve your memory. Acquire colleagues: Always try to acquire colleagues. No matter how sharp you are, if you acquire colleagues, they can give you ideas which will be helpful to your research.

20. Think technically: Always think technically. If anything happens, search for its reasons, benefits, and demerits. Think and then print: When you go to print your paper, check that tables are not split, headings are not detached from their descriptions, and page sequence is maintained.

21. Adding unnecessary information: Do not add unnecessary information like "I have used MS Excel to draw graphs." Irrelevant and inappropriate material is superfluous. Foreign terminology and phrases are not apropos. One should never take a broad view. Analogy is like feathers on a snake. Use words properly, regardless of how others use them. Remove quotations. Puns are for kids, not grunt readers. Never oversimplify: When adding material to your research paper, never go for oversimplification; this will definitely irritate the evaluator. Be specific. Never use rhythmic redundancies. Contractions shouldn't be used in a research paper. Comparisons are as terrible as clichés. Give up ampersands, abbreviations, and so on. Remove commas that are not necessary. Parenthetical words should be between brackets or commas. Understatement is always the best way to put forward earth-shaking thoughts. Give a detailed literary review.

22. Report concluded results: Use concluded results. From raw data, filter the results, and then conclude your studies based on measurements and observations taken. An appropriate number of decimal places should be used. Parenthetical remarks are prohibited here. Proofread carefully at the final stage. At the end, give an outline to your arguments. Spot perspectives of further study of the subject. Justify your conclusion at the bottom sufficiently, which will probably include examples.

23. Upon conclusion: Once you have concluded your research, the next most important step is to present your findings. Presentation is extremely important as it is the definite medium though which your research is going to be in print for the rest of the crowd. Care should be taken to categorize your thoughts well and present them in a logical and neat manner. A good quality research paper format is essential because it serves to highlight your research paper and bring to light all necessary aspects of your research.

Informal Guidelines of Research Paper Writing

Key points to remember:

- Submit all work in its final form.
- Write your paper in the form which is presented in the guidelines using the template.
- Please note the criteria peer reviewers will use for grading the final paper.

Final points:

One purpose of organizing a research paper is to let people interpret your efforts selectively. The journal requires the following sections, submitted in the order listed, with each section starting on a new page:

The introduction: This will be compiled from reference matter and reflect the design processes or outline of basis that directed you to make a study. As you carry out the process of study, the method and process section will be constructed like that. The results segment will show related statistics in nearly sequential order and direct reviewers to similar intellectual paths throughout the data that you gathered to carry out your study.

The discussion section:

This will provide understanding of the data and projections as to the implications of the results. The use of good quality references throughout the paper will give the effort trustworthiness by representing an alertness to prior workings.

Writing a research paper is not an easy job, no matter how trouble-free the actual research or concept. Practice, excellent preparation, and controlled record-keeping are the only means to make straightforward progression.

General style:

Specific editorial column necessities for compliance of a manuscript will always take over from directions in these general guidelines.

To make a paper clear: Adhere to recommended page limits.

Mistakes to avoid:

- Insertion of a title at the foot of a page with subsequent text on the next page.
- Separating a table, chart, or figure—confine each to a single page.
- Submitting a manuscript with pages out of sequence.
- In every section of your document, use standard writing style, including articles ("a" and "the").
- Keep paying attention to the topic of the paper.



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- Use paragraphs to split each significant point (excluding the abstract).
- Align the primary line of each section.
- Present your points in sound order.
- Use present tense to report well-accepted matters.
- Use past tense to describe specific results.
- Do not use familiar wording; don't address the reviewer directly. Don't use slang or superlatives.
- Avoid use of extra pictures—include only those figures essential to presenting results.

Title page:

Choose a revealing title. It should be short and include the name(s) and address(es) of all authors. It should not have acronyms or abbreviations or exceed two printed lines.

Abstract: This summary should be two hundred words or less. It should clearly and briefly explain the key findings reported in the manuscript and must have precise statistics. It should not have acronyms or abbreviations. It should be logical in itself. Do not cite references at this point.

An abstract is a brief, distinct paragraph summary of finished work or work in development. In a minute or less, a reviewer can be taught the foundation behind the study, common approaches to the problem, relevant results, and significant conclusions or new questions.

Write your summary when your paper is completed because how can you write the summary of anything which is not yet written? Wealth of terminology is very essential in abstract. Use comprehensive sentences, and do not sacrifice readability for brevity; you can maintain it succinctly by phrasing sentences so that they provide more than a lone rationale. The author can at this moment go straight to shortening the outcome. Sum up the study with the subsequent elements in any summary. Try to limit the initial two items to no more than one line each.

Reason for writing the article—theory, overall issue, purpose.

- Fundamental goal.
- To-the-point depiction of the research.
- Consequences, including definite statistics—if the consequences are quantitative in nature, account for this; results of any numerical analysis should be reported. Significant conclusions or questions that emerge from the research.

Approach:

- Single section and succinct.
- An outline of the job done is always written in past tense.
- Concentrate on shortening results—limit background information to a verdict or two.
- Exact spelling, clarity of sentences and phrases, and appropriate reporting of quantities (proper units, important statistics) are just as significant in an abstract as they are anywhere else.

Introduction:

The introduction should "introduce" the manuscript. The reviewer should be presented with sufficient background information to be capable of comprehending and calculating the purpose of your study without having to refer to other works. The basis for the study should be offered. Give the most important references, but avoid making a comprehensive appraisal of the topic. Describe the problem visibly. If the problem is not acknowledged in a logical, reasonable way, the reviewer will give no attention to your results. Speak in common terms about techniques used to explain the problem, if needed, but do not present any particulars about the protocols here.

The following approach can create a valuable beginning:

- Explain the value (significance) of the study.
- Defend the model—why did you employ this particular system or method? What is its compensation? Remark upon its appropriateness from an abstract point of view as well as pointing out sensible reasons for using it.
- Present a justification. State your particular theory(-ies) or aim(s), and describe the logic that led you to choose them.
- Briefly explain the study's tentative purpose and how it meets the declared objectives.

Approach:

Use past tense except for when referring to recognized facts. After all, the manuscript will be submitted after the entire job is done. Sort out your thoughts; manufacture one key point for every section. If you make the four points listed above, you will need at least four paragraphs. Present surrounding information only when it is necessary to support a situation. The reviewer does not desire to read everything you know about a topic. Shape the theory specifically—do not take a broad view.

As always, give awareness to spelling, simplicity, and correctness of sentences and phrases.

Procedures (methods and materials):

This part is supposed to be the easiest to carve if you have good skills. A soundly written procedures segment allows a capable scientist to replicate your results. Present precise information about your supplies. The suppliers and clarity of reagents can be helpful bits of information. Present methods in sequential order, but linked methodologies can be grouped as a segment. Be concise when relating the protocols. Attempt to give the least amount of information that would permit another capable scientist to replicate your outcome, but be cautious that vital information is integrated. The use of subheadings is suggested and ought to be synchronized with the results section.

When a technique is used that has been well-described in another section, mention the specific item describing the way, but draw the basic principle while stating the situation. The purpose is to show all particular resources and broad procedures so that another person may use some or all of the methods in one more study or referee the scientific value of your work. It is not to be a step-by-step report of the whole thing you did, nor is a methods section a set of orders.

Materials:

Materials may be reported in part of a section or else they may be recognized along with your measures.

Methods:

- Report the method and not the particulars of each process that engaged the same methodology.
- Describe the method entirely.
- To be succinct, present methods under headings dedicated to specific dealings or groups of measures.
- Simplify—detail how procedures were completed, not how they were performed on a particular day.
- If well-known procedures were used, account for the procedure by name, possibly with a reference, and that's all.

Approach:

It is embarrassing to use vigorous voice when documenting methods without using first person, which would focus the reviewer's interest on the researcher rather than the job. As a result, when writing up the methods, most authors use third person passive voice.

Use standard style in this and every other part of the paper—avoid familiar lists, and use full sentences.

What to keep away from:

- Resources and methods are not a set of information.
- Skip all descriptive information and surroundings—save it for the argument.
- Leave out information that is immaterial to a third party.

Results:

The principle of a results segment is to present and demonstrate your conclusion. Create this part as entirely objective details of the outcome, and save all understanding for the discussion.

The page length of this segment is set by the sum and types of data to be reported. Use statistics and tables, if suitable, to present consequences most efficiently.

You must clearly differentiate material which would usually be incorporated in a study editorial from any unprocessed data or additional appendix matter that would not be available. In fact, such matters should not be submitted at all except if requested by the instructor.



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Content:

- Sum up your conclusions in text and demonstrate them, if suitable, with figures and tables.
- In the manuscript, explain each of your consequences, and point the reader to remarks that are most appropriate.
- Present a background, such as by describing the question that was addressed by creation of an exacting study.
- Explain results of control experiments and give remarks that are not accessible in a prescribed figure or table, if appropriate.
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- Make a decision as to whether the tentative design sufficiently addressed the theory and whether or not it was correctly restricted. Try to present substitute explanations if they are sensible alternatives.
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References	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring

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