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Full Length Research Paper

The Impact 0f Global Financial Crisis on Economic Growth on a Developing Economy. (An Instrumental Variable Regression Approach)

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The recent Global financial crisis went a long way to revalidate the business cycle theory and therefore reminded us of its possible re-occurrence. However to answer the question of whether this crisis affected the Nigerian economy, is the objective of this study. The specific objectives of this study were therefore to investigate the effect of the global financial crisis on economic growth, consumption and investment. With the aid of data from the World Bank indicators and the National Bureau of Statistics the study covered the period 1981 to 2011. To attain therefore mentioned objectives, the study used the Zivot Andrews test to check the strongest point of the structural break and then instrumental variable regression and OLS with dummy effects to test the significance of the crisis. The result suggests that 2009 was the structural break point according to the Zivot Andrews test. And further opine that the Global financial crisis affected Economic growth, consumption and investment negatively, but is significant only on investment and not significant on consumption and Gross Domestic Product.

Keywords: Global Financial Crisis, consumption, investment, Economic Growth, Zivot Andrews, IV, OLS.

INTRODUCTION

The world has come to a general reawakening that a financial crisis in one part of the world might affect us all like the recent 2007-09 global financial crisis. Prior to the global financial crisis most developing countries, were experiencing their best economic decade. Since 2000, the African region has achieved an average growth above 5 per cent per year, inflation declined to single digit and the region also made significant improvements in governance and has reduced armed conflicts, making it more attractive to private capital flows. Between 2002 and 2007, net private capital flows to Africa increased from $17.1 billion to $81 billion (ECA and APF, 2008, as cited by United Nations 2009).

The Global Financial Crisis that originated from the United States of America in February 2007 resulted in significant asset depreciation, closures of companies, rising unemployment and a sharp slowing down of economic growth, with most highly industrialized

countries entering a recession. This financial crisis is believed to have been the worst since the great depression of the 1930's, given the collapse of large financial institutions, the bailout of banks by national governments, and downturns in stock markets around the world. In the United States of America, it caused the values of securities tied to real estate pricing to fall, damaging financial institutions globally (Chitiga et al, 2009).

Developing countries received the weight of this crisis through a second round effect, normally referred to as the contingent effect. This was unavoidable by most of these countries due to the current liberalisation arising from wholesome globalisation of the world. The world's economies are interlinked (Global village) such that any economy could be affected through international trade; nonetheless the developing countries also depend on industrial countries for remittance, official development assistance (ODA) and foreign direct investment (FDI). These make up the transmission mechanisms through which the global financial crisis trickled down to developing countries like Nigeria. The financial crisis has subsided in most of these countries. However its impact is still being felt as its consequences are diverse and country specific.

Nigeria has witnessed some developmental programs such as the Structural Adjustment Program (SAP) 1986, Millennium Development Goals (MDG'S) 2001, National Economic Empowerment and Development Strategy (NEEDS) 2001 amongst other sectorial programs. These programs had targets that were distorted by the 2007 – 2009 crisis. However in 2005 prior to the crisis, Nigeria implemented the bank capitalisation policy of compelling banks to have a minimum capital of ₦25 billion that went a long way to put the financial sector on a good path during the financial crisis. This policy may have salvaged the financial sectors from collapsing totally but its effect could still have been felt in some sectors (Agu and Yuni, 2011). In the wake of the crisis, the government implemented fiscal and monetary stimulus packages as well as capital and banking sector reforms. However, these were not based on empirical evidence and causal inference of the impact (potential) of the crisis following any transmission channel, rather on stylised facts and other analytical exposition of the situation according to Sere-Ejembi (2008).

Following the Aggregate demand theory we understand that consumption and investment are its major components, alongside government spending. However government spending is exogenous thereby not determined within the system. Nevertheless, consumption and investment are determined from within and outside the system and could easily be influenced by forces like the financial crisis. The severity and depth of the financial crisis raised so many questions; how did it happen? Could it happen again? Which sectors did it affect? To what extend did it affect us? How do we prevent it from happening again? How do we rectify the current situation? This study however concentrates on how it affected aggregate consumption, aggregate investment and aggregate output noting that these are key macro indices for economic performance. The broad objective is to investigate the impact of the Global financial crisis on Economic Growth and to determine the structural break point of the Global financial crisis on the Nigerian Economy. The study employed quarterly time series data from 1981-2011 and the data was sourced from CBN statistical bulletin various years.

LITERATURE REVIEW

Literature on financial crisis abounds and their theories are numerous and stems from the arguments of the classical and Keynesian schools of thought of the regular and irregular nature of the economic cycle. Adam smith in his theory of invisible hand and economic crisis opines that the free operation of forces in decentralized markets would lead not to chaos but to order; resources would tend to be allocated to produce goods that society valued most as unvalued goods would not be produced. He likened the operation of these forces to the workings of an "invisible hand". Adam Smith argued that market mechanisms coordinate the actions of companies and households, all serving their own self-interest to produce things that people want in the right quantities (Miles & Scott, 2005). In fact, he was of the opinion that the market would always regulate itself, such that there would never be a situation of recession nor crisis. This theory dismissed the possibility of market failure and suggested that there was no need for government intervention.

In the same school of thought; Joseph Schumpeter emerged with the idea of creative destruction. His conviction was just like that of Adam Smith stating that the market can take care of itself, but he went a step further in recognising that there could be defaulters and the market would always take care not only of itself but even defaulters. This assumption was however proven to be false in this recent global financial crisis that originated from USA. The crisis was actually initiated by greed, selfishness and moral hazard that drove the housing market bubble to unprecedented levels. These defaulters stems from the housing dealers to some bankers and regulators. They were not disciplined according to Schumpeter's assumption and this led to the crisis.

Keynes theory of market clearance and government intervention was the response to the classical view following the great depression of the 1930s. Keyes challenged the classical belief at the time in stating that

the market would not always take care of itself and therefore introduced the need for government intervention each time the market fails. He opines that the market system operates in a function of cycles over time such that there are booms and depressions (recessions) overtime, thereby introducing the concept of the Business cycles. His business cycle theory defines four faces over the long run, made up of boom, depression, recession and recovery periods. The 2007-2009 crisis can be conceived to just another recession that occurred after a decade of boom economic activities as was evident in most developing countries. Keynes's General Theory gave a central role to the investment decision in the determination of the aggregate level of effective demand, which in turn is the primary factor generating the equilibrium level of employment and output. As literature states, investment is the driving variable that operates through a multiplier to establish total income.

Background of the Global Financial Crisis

The global financial crisis originated from the USA in their effort to boost housing owners, they permitted subprime lending to mortgage financing. Ordinarily houses in the US were given out on credit when the individual could deposit 20% worth of this house, but the deregulation made it such that it became possible to get assets on credit without any initial amount. So many private establishments and individuals (driven by greed, surplus profits) bought borrowed houses and sold it in turns to several other individuals at discount rates. "Housing prices had trended upwards for ten consecutive years, up to 2004, enticing speculators, fuelling and prolonging the farce" (Sere-Ejembi, 2008). This went on and on such that the value of houses deviated significantly from its fundamentals, thereby creating the market housing bubble. The banks got stuck because they were equally involved in the housing black market Business. The sudden rush of withdrawals by depositors further incapacitated most of the banking sectors that landed most of them in a credit crunch. In the middle of the crash all other sectors came crumbling down due to their involvements with the financial sector that was already bankrupt. Major industries shut down, banks crumbled and the insurance and pensions were left without hope, and this led to increase in unemployment rate and a decline in the first quarter of 2009 by 32.8%. This therefore affected all other sectors thereby demanding the need for bail outs by the government in order to reinstate the economy especially the banks. USA used 700 billion dollars to bail out the banking sector. Major industrialised countries were pulled into this mud primarily through trade. The huge level of transactions within these countries both in the financial and commercial sectors could not help inviting these effects upon them while developing countries were affected through huge drops in sources of international trade and finance such as remittances, ODA and FDI.

Transmission Mechanisms of Financial Crisis to the Nigerian Economy

The financial crisis that started in the United States of America, later spread to Europe and then to Africa. Nigeria like every other African country was not totally exempted from the epidemic though researchers point to the bank capitalisation of 2004/2005 as a major wedge of the heavy weight of this crisis on Nigeria. However the wedge uplifted Nigeria of the impact in the financial sector but the openness of Nigeria to the external world made her a victim of this epidemic through the external flows. In fact, "No country has been in a position to remain a mere bystander in the fast evolving financial crisis any longer" (United Nations, 2009). Nigeria like most developing countries was insulated from the direct effect of the crisis but was affected through the contagion effect and second round effects Onyukwu (2009). They were affected by large drops in external flows like FDI, ODA, and remittances, due to the diversion of concentration by these developing countries from aid and FDI to bailing out their banks and restoring their economies. For example, remittances to Nigeria was affected due to the increasing unemployment in the developed world which also affected Nigerian migrants. According to Igbatayo, (2011) remittances dropped due to the remitters incapacitated nature to remit income to their home countries, thanks to the loss of jobs created by the shutdown of some mega industries. The trend of flow of these channels is illustrated in the diagram below;

The graph illustrates the stable flow of these sources between 1991 and 2003. However, the country witnessed a sharp increase in all channels from 2004, though this increase was not in the same proportion. ODA records the sharpest rise with its peak at 2006 and then later dwindles down between 2007 and 2009 which could be attributed to the global financial crisis. However remittance increase is in a sigmoid shape as shown by the graph but equally drops in 2009, but recovers in 2010. On the other hand, FDI rises till 2005, remains stable till 2006, and then increases up till 2009 and falls in 2010. The three channels generally witnessed a fall between 2007 and 2009, and the delay of the fall of FDI could be attributed to the fact that, FDI is a sensitive flow that is most at times planned for the medium and long term, such that a sudden downturn in economic activities might not immediately affect it since it is sponsored by

Figure 1. Trend of International Inflows to Nigeria - Remittance, ODA and FDI

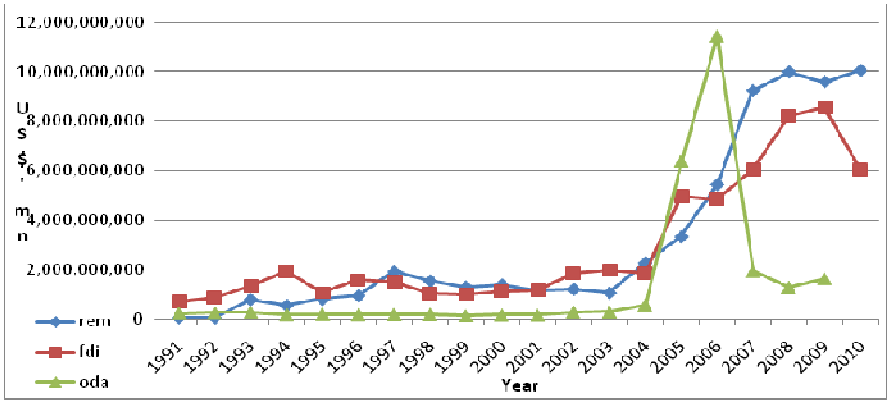

Figure 3. Results for Zivot - Andrews test

Variables	Break Dates
GDP	2009
Remittances	2009
ODA	2009
FDI	2010

Table 1: Unit root on variables and residuals of all the regressions

Variables	Trend/Or not	No of lags	Order of stationarity	Stationary critical value
Gross Domestic Product (gdp)	Trend	0	I(2)	1%
Consumption Expenditure	No trend	3	I(2)	5%
Investment	No trend	0	I(1)	1%
Exchange rate	No trend	1	I(1)	5%
Net export	No trend	0	I(1)	1%
Prime lending rate	No trend	0	I(0)	5%
Inflation rate	No trend	0	I(1)	1%
Money supply	Trend	0	I(1)	1%
exports	Trend	0	I(2)	1%
Capital expenditure	Trend	0	I(1)	1%
Residual for GDP	No trend	0	I(0)	1%
Residual for consumption reg	Trend and No trend	3	Not stationary	
Residual	Trend	0	Not stationary	

already safe guarded funds.

Empirical Literature

Empirical literature on financial crisis abound, varying from country specific to cross country studies. Chitiga et al., (2009), used a dynamic computable general equilibrium model based on the PEP standard model developed by Decaluwé et al. (2009) to evaluate the impacts of the international crisis on the South African economy. Their findings suggest that the huge drop in firms' savings has a dire impact on total investment, while the huge negative impact on government accounts for protracted slow global growth, implying tight public budgets for some time to come. According to them, some gains made by the government prior to the crisis may have been reversed by the economic crisis. Their results therefore suggest that the impact of the crisis will drag into the long run with the situation still below what it would have been in the absence of a crisis until 2015.

Headey et al. (2009) did a study analyzing the impacts

Table 2. Instrumental variable regression results of GDP

Variables	GDP Determinants
Investment (FCF)	0.297
	(0.08)
Exchange rate	-68.93
	(-0.01)
Net exports	0.131
	(1.57)
Consumption expenditure	1.208**
	(2.59)
Financial crisis dummy	-85643.7
	(-0.05)
_cons	-58973.5
	(-0.86)
Number of observations	31
R square	0.9945
Centered R square	0.9912
Uncentered R square	0.9943
Durbin Watson	2.48063
Prob > F of overall test	0.0000
Prob > F of excluded instruments	0.0132
Number of included instruments	5
Number of excluded instruments	1
Wald F- statistic of excluded instruments	6.96
20% maximal size IV size	6.66

t statistics in parentheses
* p<0.05, ** p<0.01, *** p<0.001

of the financial crisis on poor countries. The authors opine that additional people will fall into poverty and become food insecure due to the financial crisis. In the long run, there are strong indications that the global food system is fundamentally changing in a number of dimensions. Trade protection has also resurfaced, but so too have renewed investments in the agricultural sector. These fundamental shifts bring with them opportunities and risks that require internationally coordinated responses with strong national buy-in, as well as timely and relevant research.

Xinshen et al. (2010), used a dynamic computable general equilibrium model to assess the impact of the recent global recession and the Chinese government's stimulus package on China's economic growth. Their results suggest that GDP growth rate in 2009 falls to 2.9 per cent mainly as a result of the sharp drop in exports of manufactured goods, while the agricultural sector is more crisis-resilient. They suggested that it was because export-oriented manufacturing sectors are often import-intensive; the weakened economy is accompanied by a reduction in Chinese firms' import demand for materials, intermediates, and capital goods. Their model also shows that without government intervention, the negative effect of a one-year shock on the Chinese economy would last for many years. Also, over the next five to six years, China is unlikely to replicate its strong economic performance of the past two decades.

Barajas et al., (2010) estimates the impact of the global economic crisis on African GDP via the remittance channel during 2009-2010, with the aid of reduced form equations. Their study used data on the distribution of migrants from Africa, GDP growth forecasts for host countries. The result forecasts that remittance declines in African countries of between 3 and 14 percentage points, with migrants to Europe hardest hit while migrants within Africa relatively unaffected by the crisis. The estimated impact on GDP for relatively remittance-dependent countries is 2 percent for 2009, but will likely be short-lived, as host country income is projected to rise in 2010.

Olaniyi and Olabisi (2011) investigate the causes and implications of the global financial crisis on the performance of Nigerian banks. They used secondary data from the data base of four banks found in Ilorin metropolis. The study employed Ordinary Least Square method of Multiple Regression Analysis to manipulate the time series data into Econometric model of inflation. The study's findings suggest that global financial crisis has a negative impact on the performance of Nigerian banks despite the high liquidity possessed by these banks

Table 3. Instrumental variable regression results of consumption and its determinants

Variables	**Consumption Expenditure Determinants**
Income (gdp)	0.756***
	(26.68)
Prime lending rate	15616.7
	(1.49)
Inflation rate	-3175.7
	(-1.35)
Financial crisis dummy	-245900.2
	(-0.37)
_cons	-106383.2
	(-0.99)
N	31
Centered R square	0.9634
Uncentered R square	0.9767
Durbin Watson	2.48063
Prob > F of overall test	0.0000
Prob > F of excluded instruments	0.0000
Number of included instruments	4
Number of excluded instruments	1
Wald F- statistic of excluded instruments	77.04
10% maximal size IV size	16.38

t statistics in parentheses
* p<0.05, ** p<0.01, *** p<0.001

Table 4. Regression results of Investments and its determinants

Variable	Investment (GFCF) Determinants
Prime lending rate	3257.7
	(0.48)
Inflation rate	-582.6
	(-0.32)
Broad money supply (M2)	0.228***
	(6.01)
Financial crisis dummy	-454567.5*
	(-2.14)
Govt capital expenditure	0.395
	(1.42)
_cons	-7094.5
	(-0.06)
No of Observations	31
R square	0.9637
Prob > F	0.0000
Durbin Watson	2.360601

t statistics in parentheses
* p<0.05, ** p<0.01, *** p<0.001

immediately after the consolidation exercise of 2005. It was recommended that banks should desist from financing other banks' investment in securities to avoid multiplier effect syndrome while the Nigerian government should find alternative ways to fund their budget deficit.

METHODOLOGY

The effects of the financial crisis was mainly gotten by building blocks for consumption, investment and economic growth using econometric equations and

including a dummy variable in each model in order to capture the impact of the crisis on these variables. The dummy variable is denoted with fcdum that represents 0 for the period 1981Q1-2008Q4 representing non crisis effective years and 1 for the period 2009Q1-2011Q4 representing crisis effective years. Instrumental Variable approach was adopted for the first two models since some of the variables were found to be endogenous and ordinary least square (OLS) technique for the last model. Pre-estimation tests carried out are unit root test, co-integration test and Error correction mechanism (ECM) . STATA 11.0 was used for the analysis.

Model Specification for Economic Growth

$rgdp = \beta_o + \beta_1 cons + \beta_2 inv + \beta_3 nx + \beta_4 exc + \beta_5 inf + \beta_6 fcdum + e$..... (1)

Model Specification for Consumption

$Cons = \alpha_0 + \alpha_1 Yt + \alpha_2 int + \alpha_3 inf + \alpha_4 fcdum + e$.....(2)

Model Specification for Investment

$Inv = \lambda_0 + \lambda_1 int + \lambda_2 inf + \lambda_3 M2 + \lambda_4 expcons + \lambda_5 exp + \lambda_6 gcex + \lambda_7 fcdum + e$.....(3)

Where e is the error term, β_o, α_0, λ_0 are the intercepts and β, α, λ's are the coefficients of the variables and fcdum is the financial crisis dummy.

Specification of The Dummy

Dummy variables was used to capture the actual impact of the crisis on the entire model based on the break point dates established by the Zivot and Andrews unit root test. The Zivot-Andrews unit root test used the Perron's three parameterizations strategy to develop theirs but differed from them in that the break point is estimated endogenously. The model is in three categories that include; Model (A) permits an endogenous change in the level of the series, Model (B) allows the endogenous change in the rate of growth, and Model (C) admits both changes. To test for the break the study used the period between 2006 and 2011. They therefore specify its estimations as follows;

Model (A): $Y_t = \mu^A + \theta^A DU_t(\lambda) + \beta^A t + \alpha^A Y_{t-1} + \sum^k_{t=1} C_j^A \Delta Y_{t-j} + \epsilon_t$

Model (B): $Y_t = \mu^B + \beta^B t + \gamma^B DT_t(\lambda) + \alpha^B Y_{t-1} + \sum^k_{t=1} C_j^B \Delta Y_{t-j} + \epsilon_t$

Model (C): $Y_t = \mu^C + \theta^C DU_t(\lambda) + \beta^C t + \gamma^C DT_t(\lambda) + \alpha^C Y_{t-1} + \sum^k_{t=1} C_j^C \Delta Y_{t-j} + \epsilon_t$

Where $DU_t(\lambda) = 1$ if $t > T\lambda$, 0 otherwise; $DT_t(\lambda) = t - T\lambda$ if $t < T\lambda$, 0 otherwise.

And $DU_t(\lambda)$ is the intercept dummy or change in levels and $DT_t(\lambda)$ is the slope dummy or change in the slope. While Y_t is the time series variable to be tested in each case.

Where λ corresponds to estimated values of the break fraction.

PRESENTATION OF RESULTS

The results above show that the strongest points of the financial crisis on the Nigerian economy from these sources of finance is 2009 as GDP, remittances, ODA have shown. Only FDI record a different date. This could be owing to the nature of the funds which are usually tied to specific projects for specific period of time hence making it sluggish in reaction to shocks.

As shown on the table above, GDP and consumption expenditure became stationary only after having differentiated twice. Investment, exchange rate and Net exports are I(1) process at different critical values. The evidence of unit root however calls for co-integration which suggests that the residual is stationary and hence co-integrated. The presence of unit root and the validation of co-integration therefore presents a necessary and sufficient condition for an error correction model to correct the error of a long run relationship among the variables.The result of the error correction model suggests that the error created by the long run relationship will be corrected by 8.79% quarterly.

The general regression results show a very strong contribution of the explanatory variables on the dependent variable as the centered and uncentered R^2 is as high as 99.12% and 99.43% respectively. Also the overall significance of the model is very good as the probability of the F-statistics is as low as 0.0000. The Durbin Watson critical value is 2.48063, and considering the degree of freedom we conclude that there is no positive or negative auto correlation as the critical value falls in a zone of indecision. The results suggest that the financial crisis dummy was not a significant determinant of GDP, which implies that the financial crisis did not significantly affect the economic growth of Nigeria. The above results further suggest that investment and exchange rate do not have significant impacts on GDP. On the other hand, consumption is significant at 99% confidence interval and equally directly related with GDP.

The first stage regression of the two stage instrumental variable regression depicts that the Prob > F of excluded instruments is 0.0000 hence its significant and the Wald F- statistic of excluded instruments is 77.04 which is higher than the IV maximum size even at 10%. This therefore implied that the instrument –broad money

supply used for Income is significant and therefore valid in this regression analysis. The Centred and uncentred R^2 value of 96.34% and 97.67% respectively is very high and therefore suggests that the dependent variable is highly explained by the independent variables. The overall significance of the model is equally very good as the F- probability is as low as 0.0000. Income was instrumented with money supply (M2) and still found to be very significant at 99.9% confidence interval, given that the t- value is up to 26.68 with a p-value as low as 0.000. GDP shows a positive and direct relationship with consumption. This is as expected, given that as the economy blossoms it is only natural for consumption to improve. Prime lending rate registers a t-value that is as low as 1.49 which suggests that prime lending rate does not significantly determine consumption. However, it has a positive relationship with consumption implying that the higher the interest rate the higher the consumption. The financial crisis dummy still shows an inverse relationship with consumption and therefore suggests a negative impact of the financial crisis on consumption, just as is the case with GDP. However we note that it is not significant as it records a t-value of -0.37 wherein its magnitude is lower than 1.96 and hence not statistically significant. This therefore implies that even though the financial crisis had an impact on the consumption level in Nigeria, it was not significant. .

Interest rate is not a significant determinant of investment according to this result with a t-value of 0.48. There exist a positive relationship between lending rate and investment, nevertheless we note that it is not significant. Broad money supply is highly significant and positively related to investment as expected. An increase in money supply should mean high money in circulation and hence the drive to invest. While capital expenditure is positively related as well, but not significant since the t-value is 1.42 which is not up to 1.96. The point of concentration of this study is the financial crisis impact, and its coefficient appears to be significantly affecting investment. Unlike GDP and Consumption the results suggest that investment is significantly affected by the global financial crisis (which is estimated to have a structural break in 2009).

DISCUSSION AND FINDINGS

The Global financial crisis that originated from the United States of America spread to other countries as well as Nigeria through channels like Remittances, Official Development Assistance and Foreign Direct Investment. This study investigated how the 2007-2009 Global Financial Crisis affected Economic Growth, Consumption and Investment in Nigeria. The study therefore employed the Zivot Andrews structural break test to establish the strongest point of the break of the crisis, which was later used as the dummy break period in subsequent analysis. And then to be able to establish the impact of the financial crisis the study used instrumental variable regression and OLS analysis with concentration on the financial crisis dummy to ascertain if this break was significant or not in GDP, investment and Consumption.

The study was able to establish 2009 as the structural break period based on GDP and the channels of flow, though it was equally noted that this was not the optimal break point of the financial crisis for FDI. Also the findings suggest that financial crisis did not significantly affect GDP even though it showed a negative effect of the crisis. However consumption was noted to be a significant determinant of GDP thereby pointing that policies that affects consumption will reflect in the GDP. From the consumption regression it was equally shown that financial crisis was not also significant on consumption. The financial crisis break period was shown to be significant on gross investment, and equally inversely related with investment. This implies that after the period in which the crisis is suggested to have hit Nigeria, investment dropped significantly. This therefore shows that Nigeria's policy stance should be watchful on investment in the advent of any crisis since it appears investment is the most vulnerable of all three sectors tested in this study.Further studies could be extended to ascertain the impact of the crisis on other sectors outside GDP, investment and consumption.

CONCLUSION

The recent Global Financial Crisis went a long way to revalidate the business cycle theory and therefore remind us of its possible re-occurrence. However to answer the question of whether this crisis affected the Nigerian economy, was the objective of this study. The study therefore investigate whether the Global financial crisis affected Economic Growth, Consumption and Investment and found that it affected all three sectors negatively, but was only significant on investment, and not significant on the Gross Domestic Product and Consumption.

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