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Did Global Financial Crisis Worsen Oil Price Volatility and Banking Sector Nexus in Selected ECOWAS and G-7 Member Countries?

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ABSTRACT

This study examined the effects of global financial crisis on oil prices and its relationship with banking sector in selected ECOWAS and G-7 group for the period 2000 to 2018. The data for the study were collected from the WDI (2019). Following the work of Driscoll and Kraay (1998), the study adopted panel fixed effect estimation techniques. Since financial crises affect mostly the banking system and banking reforms is reflected in the lending interest rate which is a positive contributor to the rate of investment growth, we therefore estimated the model using investment as the dependent variable. The results show that the lending interest rates exert positive impact on the rate of investment growth for G7 countries. Furthermore, we observed that 1% drop in interest rate would cause investment to grow by about 0.0378% for the ECOWAS region. The interaction of the international oil prices and the rate of inflation express the cost of production in the regions. Thus, it was found that a 1 percent increase in the cost of production would cause a fall in the level of investment growth by 0.000029% and 0.000058% for the G7 and ECOWAS respectively. This result though was found not to be significant, thus not reliable. In G7 and ECOWAS, growth in output was found to positively and significantly influence the growth rate of investment.

Keywords: Financial Crisis, Oil Price, Banking Sector
JEL Classifications: G01, Q49, G21

1. INTRODUCTION

After the Great Depression of the 1930's, the global financial crisis has been adjudged the worst financial crisis ever since. The wake of 2007 till the duration of 2008 witnessed this economic ill which cut across several nations of the world by differing degrees. Some economies recovered after the implementation of robust stabilization policies, while others just could not. Williams (2010) records that the Global Financial Crisis, henceforth referred to as the GFC began in 2007 with the crash of the US subprime mortgage market which later evolved into being a full-blown international banking crash with the event of the collapse of an investment bank – Lehman Brothers (on 15th September, 2008) (Olowe, 2010; Williams, 2010). He further stated that excessive risks absorbed by the Lehman Brothers amplified the effect to a global one. This endeared the issuing of enormous bail-out funds from financial institutions in tandem with the implementation of monetary and fiscal policies to forestall the collapse. This though yielded the Great Recession. By 2008, 15 banks in the US had failed while according to Letzing (2008), some others received interventions via acquisitions by other banks. The spread of the GFC motivated other Central banks of the world to reduce

interest rates while several governments implemented policies and packages aimed at stimulating economic growth and rebuilding confidence in the financial markets. This also filtered through to the oil markets with a resultant uncertainty in oil world prices. Prior to the creation of OPEC, the United States and British oil companies supplied the world oil at relatively cheap costs (Olowe, 2010). Oil prices have over time become necessary in explaining the changes in the business cycles as with economic growth. This is majorly as a result of the role oil plays in the cost of production and its relation with output. Mckillop (2004) explains that oil price fluctuations are highly considered for their involvement with macroeconomic variables. Unsteady prices could the world all over, cause reduction in economic growth, panic in the stock market, inflation and monetary instability. This could also lead to higher interest rates and an impending recession. This became the case after the incidence of the GFC in 2008.

Englama et al. (2010) opines that oil prices were relatively high and exchange rates for most countries were stable. The advent of the crisis forced oil prices to crash and exchange rate caving in by about 20% in Nigeria. Interest rates in Canada was 5.81% (2006) but rose sharply to 6.1% (2007). But by 2008, lending interest rate in Canada had dropped to 4.72% and 2.4% in 2009 (WBG, 2017). This was as a result of swift monetary reforms in the Canadian economy. Economic output growth was recorded at 2.62% (2006) and experienced a decline to 2.06% (2007). By 2008, output growth had fallen even deeper to 1% and worse in 2009 (-2.95%) (WBG, 2017). The country started recovery by 2010 and has since being fluctuating between 1% and 3%. Lending interest rate in Japan as at 2006 was recorded by the WBG report of 2017 at 1.66% and1.88% in 2007. By 2008, this had risen to 1.91% and started dropping afterwards. Economic growth on the other hand was grossly affected. In 2006, Japan's growth rate was recorded at 1.42% and rose slightly to 1.65% in 2007. By 2008 when the GFC was more pronounced, Japan's growth rate was seen to have fallen deep to −1.14% and −5.41% in 2009. Recovery began for Japan in 2009 when her GDP growth rate rose to 4.19% but this was short lived as it has since fluctuated around 0 and 2% (WBG, 2017).

Lending interest rate in the UK however was as high as 4.64% in 2006 and rose further to 5.51% in 2007. By 2008 it was recorded at 4.68% and 0.64% in 2009. It had since been stable at 0.5%. Economic growth on the hand was recorded to be 2.46% and dropped slightly to 2.37% (2007). By 2008, output growth had dropped to −0.47% and even worse in 2009 (−4.19%). Recovery started the following year, and growth had been between 1% and 3% since then. African economies were hit badly by the GFC. Nigeria for instance had interest rate as high as 16.9% in 2006. This was somewhat constant in 2007 (16.94%). By 2009, the cost of loanable funds in Nigeria had risen to 18.36% thus reflecting very high costs of obtaining funds for investment purposes. Economic growth on the other hand though dropped from 8.21% (2006) to 6.83% (2007), it fluctuated around 4% and 7% till in 2015 when it dropped to 2.65%. The rebasing of the Nigerian economy may have had some influence on the high growth rate. This is plausible as evidence comparatively to other West African countries as Mauritania whose economic growth dropped from 18.87% in 2006 to −1.04% in 2009.

Oil prices on the other hand are observed to have passed various phases. OPEC average annual oil prices as at 2005 was recorded at US$50.59. This rose to US$61 in 2006 and continued till in 2009 when the price dropped to US$60.86. Oil exporting countries enjoyed higher prices between 2011 and 2013 after which oil prices averaged US$61.26 between 2014 and 2018. The higher oil prices would also reflect an increase in the cost of production worldwide for countries dependent on crude for her production process, with countries like Nigeria which still fall in the group of refined oil importers. Whether or not the GFC have been problematic to countries, this would depend on its gravity on the respective countries. Banking reforms in response to the crisis as primarily indicated in the cost of funds for investment is expected to cause some level of stabilization for respective economies and as such, this study investigates the implications of these reforms in the face of oil volatility while conditioned by the global financial crisis. The paper is organized as follows: Section two discusses the review of related literature, while the method for the study is presented in section three. In section four, we present data analysis and interpretation, while conclusion and rrecommendations is presented in section five.

2. REVIEW OF RELATED LITERATURE

2.1. The Financial Intermediation Theory of Banking

Economists have over time had several conceptions of banking. One of such is embedded in its function as a financial intermediary. This also reflects the position that banks may not be so different from their non-banking counterparts, especially in the function of financial intermediation. Economic thinkers like Keynes (1936), Tobin (1963; 1969), Bernanke and Gertler (1995), Kashyap et al. (2002) but to mention a few are some of the authors whose believe rests on the notion that banks are primarily financial intermediaries. As reflected in growth models by Harrod (1939) and Domar (1947), Keynes explains that for investments to occur, savings would have to be precursory to this. Tobin (1963) further explains that the distinction between commercial banks and other financial intermediaries are of degree and not of the kind. Thus, this in his view are as a result of the interest rate ceilings and reserve requirements banks are subjected to unlike other intermediaries, thus other intermediaries if subjected to same conditions as banks would behave in same way. However, the non-existence of either in the UK faults Tobin's (1963) conditions for differences between bank and non-bank financial intermediaries. Kashyap et al. (2002) were of the opinion that banks are pure financial intermediaries such that they acquire assets with funds they had obtained in the form of deposits or alternatively in the issue of securities. It is on this premise that Casu and Girardone (2006) argue that banks as with other financial intermediaries are involved in a pivotal role in the economy in terms of moving funds from surplus units to deficit units, thus closing in of the finance gap. They reconcile the needs of borrowers with those of lenders via the conversion of deposits (best described as low-risk, highly liquid and small-size) into loanable funds which are illiquid, larger in size and with higher risk (Werner, 2016).

2.2. The Fractional Reserve Theory of Banking

This theory postulates that banking systems create money through the process of multiple deposit expansion. Werner (2016) explains

that according to Phillips (1920), what holds for the banking system as an aggregate does not hold for a unit bank. The theory holds that banks may accept deposits, provide for loans or investment, but is also required to hold reserves in proportion of its deposit liabilities which are held in currency or as balances with the Central Bank (Mankiw, 2002). The theory holds that banks are enabled to act as financial intermediaries, closing in on the gap between the borrowers and savers via the provision of long-term loans to borrowers and immediate liquidity to depositors. Mallet (2015) explains that there is the desire by the society to forestall bank failures from yielding nationwide mishaps via their influence on commerce as well as the use of the banking mechanism for the prevention of deliberate fraudulent activities. These inspired the demand for regulation and reforms in the 19th century, which required systemic and comprehensive apprehension of the operation of the system. The fractional reserve banking practices introduced a new form of money within the economy – the entry on a deposit ledger as provider for by an accounting system. This is referred to as deposit creation by Werner (2016).

2.3. The Illusion of the Too-Big-to-Fail Financial Institutions

Financial sectors are most times prone to taking financial risks on the note that they would thrive better, and without economic failure. This is owed to the fact that most financial institutions do not internalise the import of their actions on the possibility of a mishap. Smaller financial institutions are most times more hedged against such risks due to the financial standing in the market. Cukierman (2011) argues that the negative externality for these institutions may be negligible, however, for larger institutions, it remains enormous. The commitment to portfolios with higher risk levels above the socially optimal levels is thus spurred by the intuition that they may bailed out in the event of an economic crisis – thus a behaviour exhibiting moral hazard in banking. This tendency for regulators of the system to lower the standards on monitoring of larger financial institutions as well as curbing the risk loving behaviour of managers of large financial institutions is the too-big-to-fail illusion. Thus, in the presence of a financial crisis, such institutions are grossly affected which in turn amplifies the impact of the crisis since these institutions are key-players in the system (Chuku and Akpan, 2011).

2.4. Empirical Review

Onanuga and Onanuga (2016) investigated the response of the banking sector development to financial and trade openness in the presence of the GFC in Africa. They studied Low-Income (10), Lower-Middle (10), Upper-Middle (6) and High-Income (2) Countries, all in Africa. The result of their Pooled Mean Group estimation shows that the banking sector develops independently of economic growth for lower-income and high-income economies, whereas for low and upper-middle income economies, it develops as there is increment in the demand for finance. In cognisance of the GFC, the trade openness of high and lower-income economies is found to be more effective while financial openness was found to be more effective in low income economies. Neither of these two degrees of openness was found to be effective in the upper-middle income economies. In the long-run, their findings revealed that save for in high income economies, the GFC generally reduced the development of the banking sector in Africa. The lower-middle and low-income economies however, were found to suffer most from the GFC. Andrieș et al. (2016) studied the impact of the international financial crisis on banking performance in Eastern and Central European economies. Their study centred on the determinants of the banking profitability in 10 countries form the aforementioned regions between 2014 and 2013. The profitability of bank was measured using the return on assets (ROA) and selected banking and macroeconomic variables were regressed on the former. They dummied the GFC variable and used the difference-in-difference method to verify if the impact of the crisis was diminished or amplified. Their findings revealed that difference between profits levels of the banks existed, thus conforming to a priori expectations. The GFC variable had a negative impact on the ROA and it was found to be statistically significant. Other findings revealed that factors which amplified and diminished the effect of the GFC included the high capital adequacy of banks, total assets of large banks and the foreign ownership of banks.

Ngowi (2015) contends that there have been substantial impacts of the GFC in the banking sector in the more economically and financially developed and integrated parts of the world. This include places like in North America and Europe, unlike in Africa which is less developed. His study was on the implications and responses of the 2008 economic crisis in the banking sector. Further findings reveal that within Africa, the economies which are considered more economically viable and financially integrated such as South Africa and Nigeria were generally worst hit by the crisis, with particular reference to their financial sector. The author also explains that some of the responses to the GFC could lead to yet more impacts which could be either positive or negative as implications for the banking sector of the African region. Olowe (2010) investigated the month-of-the-year effect of the GFC in the UK Brent crude oil. His GARCH analysis for the Asian financial crisis and the GFC, used daily data from January 4, 1988 to May 27, 2009. The findings of the research were that there was the presence of the month-of-the-year effect on volatility, but not in the returns on oil. His study further shows that the Asian financial crisis had impact on oil price return series, however, the GFC had no impact on oil price returns as the Asian financial crisis was not found to account for the sudden change in variance of oil prices. Allen and Giovannetti (2011) studied the effects financial crisis had on sub-Saharan Africa. The paper analysed the media through which the GFC was transmitted to the SSA region, while focusing on vulnerable countries in the region. They found out that trade was a major channel through, while intra-African remittance was another channel through which the GFC was transmitted. They further found that for many countries with high fragility were characterised by low resilience and ability to absorb shocks. More so, their estimates suggested that in the medium run, OECD economies would likely lower aid and this would impose damaging effects on the recipient economies.

3. METHODOLOGY

3.1. Theoretical Framework

The study follows the McKinnon-Shaw Hypothesis. McKinnon (1973) and Shaw (1973) explain that in a repressed financial

system, interest rates on deposits on pecuniary assets are often negative and highly uncertain. This imposes a fear for persistent inflation in such economy as well as the devaluation of the nation's currency which most likely would lead to capital flight as well as discouraging savings. Resultant policies would thus be the impositions of restrictions on lending as well as compulsory interest rate ceilings which may be far below the market clearing levels. The hypothesis tests the interest rate-savings and interest rate-investment relationship; however, the interest rate-investment relationship would be calibrated in this study. This, in this study would be necessary since the level of investment in any given economy is expected to be affected by the occurrence of the GFC. Oil prices would also be controlled for though interacted with the price level since oil is an essential commodity in the supply side mechanism in terms of production. This is to observe the effects of oil prices in tandem with the price levels in the period of the GFC.

The study theorizes the inclination of unobserved heterogeneity amongst countries in terms of the selective banking reforms. Since banking reforms are not homogeneous across the countries of interest – The G7 and the ECOWAS – as a result of the non-adherence to a uniform monetary policy respectively, the study thus assumes that there may be the presence of the unobserved heterogeneity. The study further assumes that the unobserved heterogeneity which may pose measurement bias, maybe correlated with the random occurrences. This assumption predicates the use of the Fixed Effect model as the requisite estimation technique; however, in the presence of the Cross-Sectional Dependence, Serial Correlation and Heteroscedasticity, the model would adopt a different panel model called the Driscoll and Kraay Fixed Effect Model. This model, according to Driscoll and Kraay (1998) has the advantage of accounting for the aforementioned panel irregularities.

3.2. Model Specification

The model to be estimated is given explicitly below as;

$$lninvs_{it} = \beta_1 + \beta_2 Opr_{it} + \beta_3 intr_{it} + \beta_4 Opr * infl_{it} + \beta_5 lngdp_{it-1} + \beta_6 exch_{it} + \beta_7 depr_{it} + \varepsilon_{it} \quad (3.1)$$

Where *lninvs* is the natural logarithm of investment, *Opr*infl* is the interaction of oil prices and price level, lngdp is the natural logarithm of Gross Domestic Product, *exch* is the nominal exchange rate, *depr* is the consumption of capital proxy for the rate of depreciation, all for the respective countries for data between 2000 and 2018. The choice of the period is informed by cross-sectional availability of data and a period of coverage for the GFC, with care given to intentionally exclude periods of other shock incidences before the GFC.

4. DATA ANALYSIS AND INTERPRETATION

This section presents the regression results obtained from the models for the study. First, we describe the data (Table 1) for the study to ensure that the series do not deviate largely from the mean. Tests such as Levine, Lin and Chun (LLC) and Im, Pessaran and Shin (IPS) unit root test were adopted to ascertain the order of integration. The basic features of the data and the average values of the variables used in the study is described in Table 1, which provide the summaries about the sample and the variables descriptions. The standard deviation of the variables in the model indicates the variations in the sample for the study as shown in Table 1. The data as collected from the WBG (2018) is estimated for the model stated above. The result of the estimation for G7 countries and the ECOWAS is tabulated below in the Table 1.

From Table 1, we observed that the minimum and maximum coefficients were −20.53218 and 31.13205 respectively. The skewness of the distribution and the kurtosis indicates that the series were not distributed normally, and the distribution does not vary largely from the normal distribution as also shown in standard deviation, observed to be very close to the mean of the series on average.

4.1. Unit Root Tests

Since time series data are high frequency data, we adopted Levine, Lin and Chu (LLC) and Im, Pesaran and Shin (IPS) unit root tests to check if the variables have unit root (Table 2). The reason for the choice of LLC and IPS is because LLC allows for heterogeneity of individual deterministic effects and assume homogeneous autoregressive for the variables in the model, while IPS allows for residual serial correlation and heterogeneity of the dynamics and error variances across groups.

The unit root tests results presented in Table 2 show that the variables has no unit root. Hence, the null hypothesis H_0: α=0 is rejected, while the alternative hypothesis H_1: α<0 is accepted. This suggest that all the variables are stationary of order I(0) and I(1). Hence, having established the order of integration of the variables, we further estimate the effects of financial crisis on oil price volatility and establish its relationship with Banking Sector. However, before the estimation, it should be noted that reforms in banking sectors is usually in response to the crisis as primarily indicated in the cost of funds for investment is expected to cause some level of stabilization for respective economies. As such, this study estimates the implications of these reforms in the face of oil volatility while conditioned by the global financial crisis. Hence, since financial crises affect mostly the banking system and banking reforms is reflected in the lending interest rate which is a positive contributor to the rate of investment growth, we therefore estimated the model using investment as the dependent variable. The estimated results of the groups that made up the panel are presented in Table 3.

The result presented above as summarised in the table shows that the banking reforms in the region as culminated and reflected in the lending interest rate is a positive contributor to the rate of investment growth for G7 countries. Lending interest rates though theoretically is expected to negatively spur investment growth since it is the cost of obtaining loanable funds; the occurrence of the GFC is possible explanation for this anomaly in that, the G7 economies had enjoyed lower lending interest rates prior to this period. Reforms in the cost of obtaining funds became a disincentive for investment. This result is significant at the 1% level, thus reliable. The reforms as revealed in the interest rate

Table 1: Summary statistics

Variable	*Opv*	*intr*	*lngdp*	*lnexch*	*depr*	*Opr*Infl*
Mean	−0.041511	1.12651	2.17127	−0.006267	0.000127	4.467122
Median	0.031219	1.23167	2.51817	−0.005365	0.000726	3.156013
Maximum	7.279321	2.31511	11.26134	31.13205	9.761120	7.71308
Minimum	−8.019310	−4.12445	−17.16103	−20.53218	−19.71312	0.173143
SD	1.521611	0.783116	6.41793	1.585151	3.106192	3.212175
Skewness	−2.153727	−1.714143	0.038513	0.203106	−6.138725	1.512910
Kurtosis	9.04112	5.217784	4.115431	10.1032	11.12244	4.185401
Jarque-Bera	88.3142	28.21300	40.41712	75.30412	30.77142	54.16311

Source: Authors' computation

Table 2: Panel unit root tests results

Variable (s)	LLC (t-stat)	Order of Integration		IPS (t-stat)	Order of Integration	
		Level	Difference		Level	Difference
Opv	[−15.211]*** (0.0000)	I (0)	-	[−3.75145]*** (0.0001)	I (0)	-
intr	[−6.0306]*** (0.0000)	I (0)	-	[−19.2113]*** (0.0000)	-	I (1)
lngdp	[−13.716]*** (0.0000)	-	I (1)	[−12.4115]*** (0.0000)	-	I (1)
lnexch	[−9.763]*** (0.0000)	-	I (1)	[−16.1417]*** (0.0000)	I (0)	-
depr	[−8.2761]*** (0.0000)	-	I (1)	[−10.3015]*** (0.0000)	-	I (1)
*Opr*Infl*	[−10.421]*** (0.0000)	-	I (1)	[−11.1124]*** (0.0000)	-	I (1)

Source: Authors' computation. [.] Stands for t-statistics, (.); Probability values, and ln; log. ***, ** and * represent 1%, 5% and 10% percent level of significance respectively

Table 3: Result summary for G7 countries and ECOWAS

Variable	FE_G7	FE_ECOWAS
Constant	−25.190461***	−7.0314814
	[5.1250194]	[6.868821]
	(−4.915212)	(−1.023681)
Opv	−8.023689***	−6.314250**
	[1.345607]	[1.51231]
	(5.962877)	(4.175235)
intr	0.01207258***	−0.03781852
	[0.00312619]	[0.02724762]
	(3.8617550)	(−1.387956)
*Opr*Infl*	−0.00002938	−0.00005785
	[0.00007457]	[0.00003671]
	(−0.3939922)	(−1.575864)
lngdp	1.825883***	1.1298677***
	[0.18288461]	[0.33463395]
	(9.983797)	(3.376428)
lnexch	−0.09117118	0.57884089**
	[0.6450043]	[0.20922229]
	(−1.4134972)	(2.766631)
depr	−0.3671514**	0.494923
	[0.091415]	[1.357118]
	(−4.016315)	(1.4095634)

Source: Authors' Computation. Dependent variable is investment denoted with *lninvs*. [.], standard deviation, (.), t-statistics. *** denotes significance at 1%, ** denotes significance at 5%

for the ECOWAS shows that 1% drop in interest rate would cause investment to grow by about 0.0378% for the entire region. This though follows a priori expectation, is not significant and as such is not reliable. Also, close observation shows that both G7 and ECOWAS member countries were negatively affected by the oil price volatility (Opv).

The interaction of the international oil prices and the rate of inflation express the cost of production in the regions. This is on the premise that oil is a factor for supply and the cost could be hampered by the rate of inflation. For both regions, it was found that a percent point rise in the cost of production would cause a fall in the level of investment growth by 0.000029% and 0.000058% for the G7 and ECOWAS respectively. This result though was found not to be significant, thus not reliable. Growth in output in both regions was found to positively and significantly influence the growth rate of investment. This result is validated at the 1% level of significance.

Other monetary reforms as expressed in the exchange parity of local currency for the dollar reveals that an increase in the exchange rate would cause investment growth in the G7 countries to drop such that 1%-point rise in exchange rate is expected to cause the investment to fall by about 0.0912%. This is though not significant, thus not reliable. In the ECOWAS, depreciation of the local currencies in the region is expected to caused investment grow significantly. This depreciation is an effect in response to the occurrence of the GFC as a banking reform in a bid to save the value of the local currencies by the ECOWAS. Lastly the study evaluates the rate of depreciation for both economies and it was found that for the G7 countries, the rate of depreciation of capital accounts for the level of investment negatively and significantly. This means that for every 1%-point increase in depreciation of capital, investment falls. This is found to be significant at the 5% level of significance. For the ECOWAS, the level of depreciation in capital positively influences the growth of investment. This though was found not to be significant, thus the result is not reliable.

5. CONCLUSION AND RECOMMENDATIONS

The findings throw light to the state of the economies in the face of the GFC. Policy implications are that interest rate adjustments as banking reforms were prompt in ECOWAS region as many of the countries in the region already had higher interest rates compared to the G7 economies. The higher the interest rates however, the higher the level of investment reflects that in the G7 economies, the cost of investment is not as expensive as it is in the ECOWAS region. Growth in output significantly implies

growth in investment in both regions. This has a policy implication of the effect of the accelerator in expanding investment levels. Depreciation of capital negatively hinders investment in G7 while its influence is positive in ECOWAS. The implication of this is that cost of worn out capital is readily accounted for in the G7 economies than in West Africa especially in the period of the GFC. The cost of production in tandem with the price levels as reflected in the interaction of oil prices and the level of inflation has decremental effect on investment in both regions. This though was found to be insignificant. This implies that the GFC occurrence distorted production activities across the globe, making expansion in plant size a disincentive to producing units.

The study recommends that the key agents in the production sector insure part of their production accessories to reduce risks that come with incidences as the GFC. The study further recommends that banking reforms should be periodically done to ascertain the optimal level of change needed to promote private participation in economic activities. Increase in the exchange rate is found to spur investment significantly in ECOWAS. This implies that currency depreciation attracts investment to the region. This study thus advocates that ECOWAS governments redirect investment to suit demand for exports. This would enable the countries take advantage of their depreciated local currencies to grow demand for their commodities.

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