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Governance, Institutional Quality, Growth and Inequality In Africa: A Study of Central Bank of Nigeria

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Abstract:

This paper examined the role of institutional quality on economic growth and reduction of inequality in Nigeria. Survey research design was adopted and data were collected through primary and secondary sources. Population of the study was 600 businesses across Nigeria. Descriptive and inferential statistics were used for data analysis. Findings revealed that the bottlenecks facing businesses in accessing loans have significant effects on business creation in Nigeria. The study concluded that lack of policies and interventions are not the problems for small businesses to obtaining funds from government, but effectiveness and efficiency of these interventions and policies.

Key words: Governance, Institutional Quality, Growth, Inequality & Central Bank of Nigeria

1.0   Introduction

There is an increasing interest on the role of governance and institutional strength and quality on economic growth and development. Making this point clear, Zhuang, De Dios and Lagman-Martin (2010) explicated that the renewed interests globally on how the instrumentalities of good governance and institutions' quality can be appropriated to bring progress to human experience, especially with respect to growth of national economies and income inequalities in development effort is real.

The reason for this attention given to the governance-institution cum growth-inequality paradigm is anchored on the essentiality of the interrelationship that exist among the variables.

The design of governance structures and institutions in any country is in such a way as to afford the country's progress in both human and infrastructural development.

It is on this premise that countries design policies to ensure effective government and human capital optimisation; enthrone political processes that ensure political stability through credible electioneering activities and violence-free polity.

In such political configuration, rule of law

ensures that individual voices are heard and accountability rendered through an effective regulatory framework that guarantees doing the right things. On the bases of the above, strong country's institutions are built that guarantee individual development and rights to opportunities, freedom and welfare that, in the long-term, is expected to bridge income disparities among stakeholders and makes for economic growth and development.

Nigeria has been struggling to leave to its full potential, despite its huge natural and mineral resources. Its huge population and diversity in terms of culture and belief systems, which are meant to be avenues for tremendous competitive advantage to the country, appear to be more of a curse as a result of many ethnic and religious crises over the years. These things could be attributed to humongous level of unemployment and poverty across the country.

Private businesses that are supposed to be contributing immensely to employment creation appear to be struggling in this regard as a result of the seeming lack of support from agencies of government such as the Central Bank of Nigeria (CBN).This institution of government plays huge role in regulating macro and micro-economic activities in Nigeria. It has the mandate to maintain the external reserves of the country, promote monetary stability and sound financial environment, and act as a banker of last resort and financial adviser to the Federal Government (FG).

They also provide funding to the private sectors such as small businesses through other agencies like the Bank of Industries (BOI), Bank of Agriculture (BOA), Federal Mortgage Bank of Nigeria, Nigeria Export Import Bank, Microfinance banks, among others. These other institutions that are under the supervision of the CBN appear to be weak in dispensing their duties of providing fund for the private sectors to thrive. This brings to the fore the question of institutional quality and the roles it plays in economic growth and in mitigating the problem of inequality.

Institutions could be seen as organisations saddled with the responsibility to regulate the activities of businesses or other functions. Corroborating this, Greif (2006) opines that institutions might be defined as a set of social factors, rules, beliefs, values and organisations that jointly motivate regularity in individual and social behaviour. The interest of this work, however, is on institutions as organisations, and the focused institution is the CBN.

There is a growing interest on the relationship existing between institutional quality and growth of an economy.Udah and Ayara (2014) avered that institution and economic performance nexus has attracted considerable attention in economics literature in recent decades. Similarly, Iheonu, Ihedimma and Onwuanaku (2017) posit that the role of institutions has continued to receive attention by researchers in recent times as possibilities exist of economic fundamentals alone not being the only decisive factor of economic performance, but also the level of institutional quality. Evidence abound about the relationship between the quality of institutions and economic growth, poverty and inequality reduction. The positive impact of institutional quality on development has been pointed out by cross section analyses (Hall & Jones, 1999; Acemoglu et al., 2002; Rodrik et al., 2002) as well as case studies (for example, Rodrik, Subramanian &Trebbi,2003).

Kaufmann and Kraay (2008) had argued that there exists a strong positive correlation between quality of institutions and growth across countries. Acemoglu and Robinson (2010) pointed out that institutions are the fundamental determinant of economic growth and cause development differences across countries. This is because institutional structure defines incentives and penalties, shapes social behaviour and articulates collective action, thus conditioning development (Alonso & Garcimartín, n.d). One important constraint that inhibits market interactions and defines the incentive structure, choices agents make, and hence economic performance, is

institutions (Udah & Ayara, 2014).

Institutions like the CBN has the potential of spurring businesses by formulating, implementing and monitoring business friendly policies which will help in generating employment and bridging the gap between the poor and the rich through employment generation, poverty and inequality reduction and growing the economy. However, in a situation where such institutions are weak in formulating, implementing and monitoring these policies, the reverse may be the case. Udah and Ayara (2014) pointed out that in an environment of weak institutions and ineffective governance structures, economic agents behave in a way that could distort the smooth operation of the multiplier process, and government expenditure will not result in the desired outcome.

If the quality of institutions are inadequate and weak, the gains of defaulting on a financial contract can be so prominent that they prevent the achievement of the contract itself. In addition, good institutions are required to ensure the ability of the finance markets to channel resources so as to finance productive activities (Siong & Azman-Saini, 2012). Markets fail to function efficiently if there are perceived short and long-term uncertainties created by unclear and frequent changes in rules and procedures governing the operation of the market (Udah & Ayara, 2014). Therefore, the link between institutional quality and finance and economic growth and development is visibly significant (Siong & Azman-Saini, 2012). It is against this backdrop that this study was necessitated to look at how the CBN has performed in terms of providing adequate guidelines, regulations and policies and interventions that promotes small businesses, access to finance and channeling of resources into productive sectors of the economy.

Nigeria has over the years witnessed alarming rate of inflation, unemployment figures are frightening, poverty is on the rise and the gap between the poor and the rich has increased astronomically over the years and middle class seem to only exist in books

and not in reality any longer. CBN makes policies that help in regulating money in circulation, control lending rate, inflation, exchange rate, interest rate and the rest. These policies however seem not to be working as exchange rate is at its all-time high, interest rates are in double digits and inflation is at a cut throat level. Furthermore, finance is made available to be lent to different sectors of the economy through other financial institutions like microfinance banks and Bank of Industry. It however seem that it is only the ones meant for big corporations that get to them while those meant for small business appear not to be getting to them thereby raising the question of whether these businesses are aware of the loans, whether the conditions are too stringent or whether the money is diverted to other sectors, uses or pockets. All these, questions the governing and institutional quality of CBN and the other financial institutions that aid the CBN.

As a result of lack of funds to the small businesses that will enable them to expand and thrive, most of the businesses die or remain stagnant without fulfilling their potentials of creating employment, reducing poverty and improving economic growth in the country. Thus, if the situation is not handled as quickly and as properly as it should, the situation may continue thereby worsening economic hardship, increasing poverty and inequality in the polity. It is against the backdrop of these consequences that this study is necessitated.

The major objective of this study is therefore to examine the role played by institutional quality on economic growth and reduction of inequality. Specifically, the study seeks: to identify various ways CBN has assisted in creating enabling environment for businesses to thrive; and to explore the various bottlenecks encountered by businesses in getting funding from various agencies and how it affects business creation.

Following the introduction and statement of problem and objectives of the study

captured in section 1, Section 2, gives the review of related literature, Section 3, deals with methodology and data, while Section 4, discusses Data Analysis and Presentation of Result, while Section 5, x-rays the Implications, Recommendations and Conclusions of the Study.

2.0 Review of Related Literature
2.1 Theoretical Literature

Governance can be seen as a system of managing a country's resources. It is like a way of making sure that things are done the right way. This definition is buttressed by the World Bank (1992) that opined that governance is the style of leadership and the method used in the management of a country's human and material resources. It is linked with provision of leadership and direction so as to maximise performance. Udah and Ayara (2014) posited that it links with the ability of a country's leadership to manage its resources optimally.

With effective governance, policies and programmes of government are given the necessary guidance and direction to achieve its purposes. Governance is the channel through which policies are transmitted and enforced. Hence, an effective governance leads to better economic performance as a result of better equipped institutions that provide qualitative services. The effectiveness of existing governance structure determines to a large extent its ability to promote the transition toward a market-oriented economic order that would lead to a better performance of the economy (Udah & Ayara, 2014).

Institutions could be seen in different ways: they could be seen as the rules guiding the actions and inactions in a particular polity; it could also be seen as the bodies saddled with the responsibility to regulate activities and provide direction in a polity. Buttressing this point, Greif (2006) explicated that institutions might be defined as a set of social factors, rules, beliefs, values and organisations that jointly motivate regularity in individual and social behaviour. Thus, institutions can be seen as an inter-

temporary contract that shapes behaviours. Aoki(2000) averred that institutions are systems of shared beliefs about the equilibrium of a game played repeatedly. Therefore, good institutions will be those that stimulate agents' activities with a better social return. The focus of this study, however, is on institutions as a body or agency that helps in regulating and governing activities in a polity.

Osabuohien and Efobi (2013) stated that here are two broad categories of institutions. They are the formal and informal. Formal institutions include rules and framework, documented by specific authorities in the society, to regulate the behaviour of economic agents, while the informal institutions include customs, beliefs, norms and culture that can inform behaviours of economic agents. According to North (2005), informal institutions are usually not written down. The major differentiating factor between these two forms of institutions is the way they enforce and or reward behaviour. While the formal institutions can punish unwanted behaviour with for example prison terms or monetary fines, the informal institutions, on the other hand,can only punish through peer pressure and reputation building (Helgason, 2010).

Researchers and bodies have over the years developed interest in investigating the role played by institutions on economic growth. Laying credence to this assertion, Iheonu, Ihedimma and Onwuanaku (2017) stated that the role of institutions has continued to receive attention by researchers in recent as there are possibilities that it is not economic fundamentals alone that decides economic performance but also the quality of institutions present in a polity. Similarly, Nawaz (2014) posited that studies have empirically investigated the growth effects of institutions at various stages of development. However, these studies have in most cases produced different and sometimes contradicting results, depending on the location and time of the study. Valeriani and Peluso (2011) wrote that studies have shown that the impact of

institutions on economic growth is different across countries.Similarly, Saima, Nasir and Muhammad(2014) opined that existing literature primarily reveals that a positive relationship exists between institutions and growth but sometimes, institutions with the same characteristics yields tremendously dissimilar results across diverse groups, regions and societies.

Role of Institutional Quality

To understand the forces influencing Africa's economic performance, many researchers have delved into the area of institutions in relation to growth and have discovered various roles it plays (Acemoglu, Johnson & Robinson, 2001, 2002). Good institutions have been documented to be critical in providing an enabling environment for economic prosperity to trickle down to the poorer segments of the population in sub-Saharan Africa (Thorbecke, 2013).Iqbal and Daly (2014) argued that weak institutions diverts scarce resources from productive sector to unproductive sector and therefore promotes rent-seeking activities, whereas strong institutions reduce the chances of rent-seeking activities and accelerate economic growth process and productivity of the growth inducing factors.

Ndulu,O'Connel, Bates, Collier and Soludo (2008) stated that a major research project undertaken by the African Economic Research Consortium (AERC) revealed that institutions are accorded considerable attention in explaining the growth of African economies.Chong and Calderon (2001) used a more rigorous approach to show a strong evidence of bi-directional causality, running from institutions and economic growth, and from economic growth to institutional quality. Their findings indicated that the poorer a country is, the stronger the influence of institutional quality on economic growth. Acemoglu, Cutler, Finkelstein and Linn (2006) concluded that private property right institutions are the main drivers of long-run economic growth, investment and financial development.

Predictors of Governance and Institutional Quality

Much writing has sought to measure the expected governance/institutions–growth nexus involved in cross-country regression studies linking per capita income growth with measures of governance/institutional quality with some control variables that may also affect per capita income growth and this kind of empirical study has methodological weakness (Zhuang, De Dios & Lagman-Martin, 2010).Therefore, a more growing importance is being attached to measuring good governance and institutions by think-tanks and other multilateral agencies, leading to the publication of a large number of governance indicators series as exemplified by Worldwide Governance Indicators (WGIs) and the Global Competitiveness Index (GCI) produced by the World Bank and World Economic Forum, respectively. This study adopted the Worldwide Governance Indicators (WGIs).

The Worldwide Governance Indicators are based on the Following Measures.

• Voice and Accountability, measured by the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, association, and the press.

• Political Stability and Absence of Violence, measured by the likelihood that the government will not be destabilised by unconstitutional or violent means, including terrorism.

• Government Effectiveness, measured by the quality of public services, the capacity of the civil service and its independence from political pressures, and the quality of policy formulation.

• Regulatory Quality, measured by the ability of the government to provide sound policies and regulations that enable and promote private sector development.

• Rule of Law, measured by the extent to which agents have confidence in and abide

by the rules of society, including the quality of property rights, the police, and the courts, as well as the risk of crime.

● Control of Corruption, measured by the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as elite "capture" of the state.

2.2 Empirical Reviews

While Constantinos, Persefoni and Hashim (2014) had studied the role of institutions on economic performance, Oluwatobi, Efobi, Olurinola and Alege (2013) studied the role of institutions on innovations in Africa and Demetriades and Law (2006) examined the effect of institutions on financial development. Nabila, Shazia and Muhammad (2015) studied the impact of institutional quality on economic growth in developing economies of Asia with a panel data for the period 1990-2013. The result reveals that institutional quality has positive impact on economic growth. Also, Klomp and Haan (2009) examined the relation between institutions and volatility of economic growth for 116 countries for the period 1960 to 2005, using different indicators for political administration like political stability, regime types and uncertainty of policy. The study employed specific to general approach and found out that uncertainty and instability, democratic regime and economic growth volatility are negatively related to each other. Le (2009) investigated the relationship among institutions, remittances, trade and economic growth for the period 1970 to 2005 for 67 developing economies. Using different estimation techniques, the study finds that better quality of institutions leads to higher economic growth in the long run as well as in the short run.

Ulubasoglu and Doucouliagos (2004) explored the relationship between institutions and economic performance for the period 1990 to 1999. Using a sample of 119 countries, they used simultaneous model for econometric analysis, using two proxies for institutional quality, one for political freedom and second for economic freedom. They found that political freedom has positive impact on human capital and total factor productivity (TFP) and physical capital. Ali and Crain (2002) explained the interconnections among economic freedom, institutional distortion and economic growth. Using a sample of 119 countries for the period from 1975 to 1998, they concluded that civil liberties and political administration have no significant impact on economic growth. However, economic freedom plays significant role in enhancing economic growth.

Vijayaraghavan and Ward (2001) tested the empirical relation between institutions and economic growth for the period 1975 to 1990 for 43 countries. For analysis purpose, they used different proxies of institutional quality like property rights, structure of governance, size of the government and the political freedom. The results showed that well defined property right and the size of the government are significant determinants of institutional quality which enhance economic performance. This result was supported by Knack and Keefer (1995) who also examined the association between institutions and economic progress. They found that property rights are significant determinant of economic growth as Campos and Nugent (1999) also revealed in their empirical study that the institutions of governance improve the development performance.

3.0 Methodology and Data

The authors employed a survey research design given that data for the study was collected through interviews, questionnaire and publications from relevant agencies. The data collected from firms were from the owners of the firms who are responsible for looking for funds for their businesses, while data from the CBN was collected from the website and from the Development Finance Office (DFO) of CBN in Anambra State. The study covered twelve (12) states in Nigeria selected using Stratified Random Sampling Technique; the six zones in the country were used as strata so that the study will have a

national spread where each of the geopolitical zones are represented in the study with two (2) states. The states selected through this process are Kogi and Nasarawa (North Central), Bauchi and Gombe (North East), Sokoto and Kebbi (North West). Others are Anambra and Enugu (South East), Cross River and Edo (South South), and Ekiti and Ondo (South West). The population of the study consist of 600 businesses, 50 each from the states. The firms selected were based on their years of existence (not less than 5 years), number of employees (not less than 5), registration status (must be a registered company under the Corporate Affairs Commission) and openness to the study (must be willing to participate in the study). There were also elements of randomness in the selection process of the firms. This means that a mixture of purposive and random sampling techniques were used in the selection of firms that participated in the study. The data were analysed with a combination of descriptive and inferential statistics.

The descriptive statistics are mean, frequencies and percentages. The threshold of acceptance for the mean is 3. The inferential statistics used is a parametric chi-square and the level of significance adopted was 5 per cent. Thus, if the probability value (p-value) obtained is less than the level of significance used, the hypothesis (null) will be rejected, otherwise, it will be accepted.

4.0 Data Presentation and Analysis

a)To identify various ways CBN has assisted in creating enabling environment for businesses to thrive.

Table 1: CBN Intervention on SMEs between 2009-2019

S/N	Some Interventions by CBN aimed at helping Small Businesses/Farmers	Amount	Year of Esta.
1	Commercial Agriculture Credit Scheme (CACS)	200 Billion	2009
2	SME Restructuring and Refinancing Facility (SMERRF)	200 Billion	2010
3	SME Credit Guarantee Scheme (SMECGS)	200 Billion	2010
4	Nigeria Incentive-based Risk Sharing System for Agricultural Lending (NIRSAL)	75 Billion	2011
5	Entrepreneurship Development Centres		2013
6	Micro Small and Medium Enterprises Development Fund (MSMEDF)	220 Billion	2013
7	Anchor Borrowers' Programme (ABP)		2015
8	Textile Sector Intervention Facility	50 Billion	2015
9	Non-oil Export Stimulation Facility	500 Billion	2015
10	Export Rediscounting and Refinancing Facility (ERRF)	50 Billion	2016
11	Youth Entrepreneurship Development Programme (YEDP)		2016
12	Paddy Aggregation Scheme (PAS)		2017
13	Accelerated Agriculture Development Scheme (AADS)		2017
14	Export Development Facility (EDF)	50 Billion	2017
15	Agribusiness/Small and Medium Enterprises Investment Scheme (AGSMEIS)		2017
16	National Collateral Registry (NCR)		2017
17	CBN-BOI Industrial Facility (CBIF)	50 Billion	2018
18	Shared Agent Network Expansion Facility (SANEF)	25 Billion	2018

Source: CBN Circulars 2019, CBN Publication, www.cbn.gov.ng

Table 1 shows list of CBN initiated programmes between the year 2009 to 2019 arranged chronologically based on the year of establishment. The table shows the year of establishment of such programmes and how much were mapped out for the purpose. However, it is pertinent to note that not all the programmes are in form of loans. Some are in the form of training centres and facilitation centres like the Entrepreneurship Development Centres, National Collateral Registry (NCR), Youth Entrepreneurship Development Programme (YEDP) and Accelerated Agriculture Development Scheme (AADS). There is also a programmeon the pipeline for the establishment of National Microfinance Banks, which will leverage the facilities of NIPOST in the 774 L.G. As in the country to distribute the over N60 billion gotten from the compulsory five per cent (5%) taxed on the banks' profits and set aside for lending to the SMEs, but which have been unused and sitting in the CBN's vaults. Also, part of the vision to establish the bank is the need to ensure that another N26 billion CBN set aside to finance small-holder agriculture and other small, informal ventures under the Agribusiness/Small and Medium Enterprises Investment Scheme is properly harnessed.

From the list above, it is obvious that the issue of support to SMEs, which will help in reducing the gap and inequality in the polity is not as a result of lack of initiative or interventions, but that of implementations and the will to follow through the programme without bias, sentiment and corruption.

Table 2: List of Development Institutions set up by CBN between 2009-2019

S/N	Name of Institution	Date of Esta.	Head Office
1	Bank of Agriculture	2007	Kaduna
2	Bank of Industry	2007	Lagos
3	Federal Mortgage Bank of Nigeria	2007	Abuja
4	Nigeria Export Import Bank	2007	Abuja
5	The Infrastructure Bank	2007	Abuja

Source: CBN, 2019

Table 2 shows the list of Development Finance Institutions set up to assist in getting funds mapped out for SMEs to get to them between 2009-2019. This list also buttresses the point that want of initiatives, interventions and institutions are not the major issues facing businesses in accessing funds that will help in establishing and expanding their business to bridge the gaps between the haves and the have nots. The issues appear to be that of the quality of the institutional framework and implementation of the somewhat laudable programs and initiatives.

b)   To explore the various bottlenecks encountered by businesses in getting funding from various agencies and how it affects business creation.

Table 3: Issues faced by Businesses in the Northern Region

S/N	Bottleneck Smiltating against access to finance	VGE (5)	GE (4)	NI (3)	LE (2)	VLE (1)	Mean
1	Processes involved in accessing the funds	121	122	24	21	12	4.06
2	Awareness about the availability of such funds.	202	86	12	-	-	4.63
3	Too high interest rate.	63	86	24	61	47	3.19
4	Distance of the loan giving bodies from the businesses.	63	86	24	61	47	3.19
5	Too many forms and other requirements.	221	68	-	11	-	4.66
6	Bad previous experience from such agencies.	78	103	59	60	-	3.66
7	Sincerity on the part of the agencies.	50	33	19	109	89	2.49
8	Corruption of personnel of the agencies.	50	33	19	109	89	2.49

Source: Field Survey, 2019

Where:
VGE = Very Great Extent, GE = Great Extent, NI = No Idea, LE = Little Extent and VLE = Very Little Extent

Table 3 shows the descriptive statistics and frequencies for bottlenecks facing businesses in obtaining loan in the Northern part of the country. Judging from the mean of the questionnaire items whose benchmark for acceptance is 3, it showed that the bottleneck that poses the greatest challenge to these group of businesses is that of forms and other requirements with a mean of 4.66. This is closely followed by awareness about the availability of such funds with a mean of 4.63. Sincerity on the part of the agencies was the least problem as the mean showed with a value of 2.49, which falls below the acceptance region of 3. The next least challenge facing businesses in the Northern region with respect to obtaining finance to grow their businesses is high interest rate with a mean of 3.19, which is marginally higher than the threshold of acceptance which is 3.

Table 4: Loan access stands in the North

S/N	Others	Yes	No
1	Have you ever accessed funds from any of the agencies of government?	62 (21%)	238 (79%)
2	If yes, will you apply again when the opportunity comes.	29 (47%)	33 (53%)
3	Would you like to get loans from government to expand your business if given the opportunity?	29 (47%)	33 (53%)

Source: Field Survey, 2019

Table 4 shows the stands of loan access and the perception in the Northern region. From the table, it shows that only 21 per cent (62) of the respondents have accessed loans from any of the government agencies before, while 79 per cent (238) of the respondents have not. Out of the 62 firms that have accessed loans before, 47 per cent said that they will apply for loans again, while 53 per cent said they will not apply again. This may be due to the processes, procedures and requirement they passed through in the first loan process.

Table 5: Issues faced by Business in the Southern Region

S/N	Bottlenecks militating against access to finance	VGE (5)	GE (4)	NI (3)	LE (2)	VLE (1)	Mean
1	Processes involved in accessing the funds	99	106	-	25	70	3.46
2	Awareness about the availability of such funds.	39	79	-	80	102	2.58
3	Too high interest rate.	56	119	20	16	89	3.12
4	Distance of the loan giving bodies from the businesses.	119	80	-	56	45	3.57
5	Too many forms and other requirements.	89	129	17	63	2	3.80
6	Bad previous experience from such agencies.	70	187	21	12	10	3.98
7	Sincerity on the part of the agencies.	69	90	54	70	17	3.41
8	Corruption of personnel of the agencies.	89	121	12	69	-	3.76

Source: Field Survey, 2019

Table 5 shows the challenges facing businesses in the Southern part of the country. From the table, it shows that the major albatross facing them is bad previous experience from the agencies judging from the mean of 3.98 obtained. This is followed by too many forms and requirements with a mean of 3.80. The less issue faced by the businesses in this region is that of awareness for the availability of such funds or programmes. This is closely followed by interest rates charged by the agencies of governments.

Table 6: Loan access stands in the South

S/N	Others	Yes	No
1	Have you ever accessed funds from any of the agencies of government?	73 (24%)	227 (76%)
2	If yes, will you apply again when the opportunity comes	40 (55%)	33 (45%)
3	Would you like to get loans from government to expand your business if given the opportunity?	269 (90%)	31 (10%)

Source: Field Survey, 2019

Table 6 shows the stands of loan access in the Southern part of Nigeria. From the table, 73 of the 300 respondents that participated in the study stated that they have received one form of loan or the other from government, while 227 said they have not. Out of the 73 that have accessed loans, 40 of them, stated that they will apply again if given the opportunity, while 33 will turn down the opportunity if it presents its self again. However, 269 of the respondents said they would like to get loans from government to expand their businesses, while 31 said they will decline the opportunity if presented with it.

Table 7: Issues faced by Businesses Cumulatively

S/N	Bottlenecks militating against access to finance	VGE (5)	GE (4)	NI (3)	LE (2)	VLE (1)	Mean
1	Processes involved in accessing the funds	220	228	24	46	82	3.76
2	Awareness about the availability of such funds.	241	165	12	80	102	3.61
3	Too high interest rate.	119	205	63	77	136	3.16
4	Distance of the loan giving bodies from the businesses.	228	176	10	87	99	3.58
5	Too many forms and other requirements.	310	197	17	74	2	4.23
6	Bad previous experience from such agencies.	148	290	80	72	10	3.82
7	Sincerity on the part of the agencies.	119	123	73	179	106	2.95
8	Corruption of personnel of the agencies.	200	199	32	139	30	3.67

Source: Field Survey, 2019

Table 7 shows the cumulative responses of the respondents and the mean for the questionnaire items. Cumulatively, the table shows that all the issues pointed out as being bottlenecks to accessing loans are relevant except sincerity on the part of the agencies judging from the mean whose benchmark of acceptance is 3. The major challenge the respondents faces in accessing loans is excess forms to be filled and other requirements needed to qualify to be given the loan facility with a mean of 4.23. This is followed by bad previous experience from such agencies with a mean of 3.82 and then the processes involved in accessing the loan with a mean of 3.76. The least significant problem or challenge they face is sincerity on the part of the agencies with a mean of 2.95, which is lesser than the threshold of acceptance which is 3. This is followed by high interest rate with a mean of 3.16, which was marginally greater than the benchmark of acceptance of 3.

Table 8: Cumulative loan access stands in the Country

Table 8 shows the cumulative loan access in the country as sampled. The table shows that out of the 600 firms that participated in the study, only 135, representing 22 per cent have accessed one form of loan or the other from any government agency, while 465 representing 78 per cent have never accessed loans to grow their businesses before. Out of the 135 that have accessed loans before, only 69 agreed that they will apply again when the opportunity comes, while 49 per cent of the 135 said they will decline the opportunity to apply again. This may be attributed to the processes and procedures and other requirements like collateral to qualify for the loan. 500 out of the 600 respondents said they will like to get loans from any of the government agencies, while 100 said they will not like to receive any loan from government.

4.1 Test of hypothesis

Bottlenecks faced by businesses in getting funding from various agencies of government in Nigeria has no effect on business creation.

Table 9: Chi-Square output

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	771.146[a]	28	.000
Likelihood Ratio	836.988	28	.000
Linear-by-Linear Association	3.128	1	.077
N of Valid Cases	4800		

a.   0 cells (0.0%) have expected count less than 5. The minimum expected count is 38.88.

Table 9 shows the output of chi-square test of the effect of the bottlenecks facing businesses in accessing funds on business creation in Nigeria. Looking at the result, the Pearson Chi-Square Coefficient is 771.146 and the Asymptomatic Significance is .000, which is less than .05 level of significance. This shows that the bottlenecks facing businesses in accessing loans have statistically significant effects on business creation in Nigeria.

Table 10: Test of Effect Size

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.401	.000
	Cramer's	.200	.000
N of Valid Cases		4800	

a.   Not assuming the null hypothesis.

b.   Using the asymptotic standard error assuming the null hypothesis.

Table 10 shows the effect size of the bottlenecks facing businesses in accessing funds from various agencies of government in Nigeria. From the Phi and Cramer's V coefficient as shown in the table, at .402, it indicates that cumulatively, the effect of the challenges businesses face is significant in establishing and expanding their business and reducing inequality at 40 per cent.

5.0   Policy Implication, Recommendations and Conclusions
5.1   Policy Implication

The findings of this study has some policy implications; it will help the CBN to focus more on implementing already established policies and programmes rather that spend so much on formulating new ones while the old ones are left to die off. Also, having seen from the analysis that one major challenge people face in assessing fund is the cumbersomeness of the processes and procedures, the CBN could do well to reduce these requirements needed to qualify for loans. Similarly, the agency needs to work with the National Orientation Agency (NOA) to reorient the perception of people about such loans because from the result, it is seen that people hold wrong impression about the policies.

5.2 Recommendation
Sequel to the findings of this study, it is recommended that:

•   CBN needs to effectively monitor the already existing agencies so as to be on the know about their dealing with businesses to make sure that the funds are channeled to the right people and not diverted into private pockets or uses.

•   More needs to be done in terms of creating awareness for the creation of agencies that are established to provide support for businesses and the availability of funds for businesses. This could be done

•through the use of local means like town criers where they still exist, village heads, religious houses and meetings and other local meeting points.

•   The agencies need to be located closer to the businesses and so more branches need to be established for this purpose.

•   There is need for reorientation of businesses as their perception of these agencies and their sincerity appear to be in question; and

•   There needs to be a way to reduce the cumbersome processes and stringent requirements to qualify for such funding so as to make the processes a smooth sailing experience.

5.3 Conclusion

The study concludes that it is not the lack of policies and interventions that are bedeviling businesses from obtaining funding from various government agencies, but the effectiveness and efficiency of these agencies, and the will to following through these interventions and policies so as to get to the targets (small businesses). Some of the agencies as pointed out by the respondents are far away from the businesses and the requirement in terms of collateral and the number of forms to be filled and brought to the agencies before qualifying for such funding appear to stringent and cumbersome.

References

Acemoglu, D., Johnson, S., and Robinson, J. A. (2001). "The colonial origins of comparative development: An empirical investigation". *American Economic Review, 91*(5), pp. 1369-401.

Acemoglu, D., Johnson, S., and Robinson, J. A. (2002). "Reversal of fortunes: Geography and institutions in the making of the modern world income distribution". *Quarterly Journal of Economics, 117*(4), pp. 1231-94.

Ajayi, S. I. (2002). Institutions: The Missing Link in the Growth Process? Presidential Address Delivered at the 43rd Annual Conference of the Nigerian Economic Society, held in Lagos, from 7-8 August 2002.

Ali, A., and Crain, W. M. (2002). Institutional Distortions, Economics Freedom, and Growth. *Cato Journal, 21*(3), pp. 415-426.

Campos, N. F., and Nugent, J. B. (1999). "Development Performance and the Institutions of Governance: Evidence from East Asia and Latin America". *World Development, 27*(3), pp. 439-452.

Chong, A., and Calderon, C. (2001). 'Causality and Feedback between Institutional Measures and Economic Growth'. *Economics and Politics, 12* (1), pp. 69-81.

Constantinos, A., Persefoni, T., and Hashim R. O. (2014). Institutional Quality and Economic Growth: Empirical Evidence from the Sudanese Economy. *Economic Annals, 59*(203).

Demetriades, P. O., and Law, S.H. (2006). Openness, Institutions and Financial Development. WEF Working Papers 12, Birkbeck, University of London.

Greif (2006). Institutions and the Path to Modern Economy. Lessons from Medieval Trade, Cambridge, Cambridge University Press.

Hall, R. E., and Jones, C. I. (1999). "Why do Some Countries Produce So Much More Output per Worker Than Others?" *Quarterly Journal of Economics, 114*, pp. 83- 116.

Helgason, M. (2010). *Institutional Quality and Economic Growth, A Comparison Across Development Stages*. Macro Economics Bachelor Thesis in the Department of Economics, Lund University.

Iheonu, C. O., Ihedimma, G. I., and Onwuanaku, C. S. (2017). Institutional Quality and Economic Performance in West Africa. Munich Personal RePEc Archive (MPRA) Paper No. 82212, posted 7 November 2017 14:45 UTC. Online at https://mpra.ub.uni-muenchen.de/82212/

Iqbal, N. & Daly, V. (2014) Rent Seeking Opportunities and Economic Growth in Transitional Economies. *Economic Modelling 37*(0), 16–22.

Kaufmann, D., & Kraay, A. (2008). Governance Indicators: Where Are We, Where Should We Be Going? World Bank Research Working Paper No. 4370, World Bank, Washington, DC.

Klomp, J., and de Haan, J., (2009). Political Institutions and Economic Volatility. *European Journal of Political Economy, 25*(3), pp. 311-326.

Knack, S., and Keefer, P. (1995). 'Institutions and Economic Performance: Cross Country Tests Using Alternative Institutional Measures', Economics and Politics, 7, pp. 207-227.

Le, T. (2009). Trade, Remittances, Institutions, and Economic Growth. *International Economic Journal, 23*(3), pp. 391-408.

Nabila, A., Shazia, Q., and Muhammad, N. (2015). Institutional Quality and Economic Growth: Panel ARDL Analysis for selected Developing Economies of Asia. *South Asian Studies, 30* (2), pp. 381-403.

Nawaz, S. (2014) Growth Effects of Institutions: A Disaggregated Analysis. Islamabad: COMSATS Institute of Information Technology.

Ndulu, B.J., O'Connel, S.A., Bates, R. H., Collier, P., and Soludo C. (Eds). (2008). *The Political Economy of Economic Growth in Africa, 1960-2000*. New York: Cambridge University Press.

North, D.C. (2005). *Understanding the Process of Economic Change*. New Jersey: Princeton University Press.

Oluwatobi S., Efobi U., Olurinola I., and Alege P. (2013). Innovation in Africa: Why Institutions Matter. *South African Journal of Economics, 83*(3), pp. 1369-1401.

Osabuohien, E. S., and Efobi U. R. (2013). Africa's Money in Africa. *South African Journal of Economics. 81*(2), pp. 292-306.

Rodrik, D. (2003). "What do We Learn from Country Narratives?" en D. Rodrik (ed), In search of prosperity. Analytic narratives on economic growth, Princeton, Princeton University Press.

Rodrik, D., Subramanian, A., and Trebbi, F. (2002). "Institutions Rule: The Primacy of Institutions over Geography and Integration in Economic Development", IMF Working Paper 02/189, Washington.

Saima, N., Nasir, I., and Mohammed, A.K. (2014). The impact of Institutional Quality on Economic Growth: Panel Evidence. *The Pakistan Development Review, 53*(1), pp. 15-31.

Siong, H. L., and Azman-Saini, W. M. W. (2012). Institutional quality, governance, and ?nancial development.

Thorbecke, E. (2013). Institutions for Inclusive Growth and Development in Sub-Saharan Africa. A paper presented at the JICA Conference, SOAS, University of London.

Udah, E. B., and Ayara, N. (2014). Institutions, Governance Structure and Economic Performance Nexus in Nigeria. *Journal of Economics and Sustainable Development,*

5(3), pp. 8-20.

Ulubasoglu M. A., and Doucouliagos, C. (2004). Institutions and Economic Growth: A Systems Approach. In Econometric Society 2004, Australasian Meetings Paper No (Vol. 63).

Valeriani, E. & Peluso, S. (2011) The Impact of Institutional Quality on Economic Growth and Development: An Empirical Study. *The Journal of Knowledge Management, Economics and Information Technology 1*(6), 274–299.

Vijayaraghavan, M., and Ward, W. A. (2001). Institutions and Economic Growth: Empirical Evidence from a Cross-national Analysis. Clemson University.

World Bank (1992). *Governance and Development*. Washington, D.C.

Zhuang, J., De Dios, E., & Lagman-Martin, A. (2010). Governance and Institutional Quality and the Links with Economic Growth and Income Inequality: With Special Reference to Developing Asia. ADB Economics Working Paper Series, ISSN 1655-5252.

Pension Fund, Financial Development and Output Growth in Nigeria.

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Abstract

This study examines the indirect effect of pension fund on economic growth in Nigeria through the financial system. Using Autoregressive Distributive Lag (ARDL) model, the study found out that pension fund contribution is effective in stimulating growth through investment in portfolios that yield short term returns; this implies that pension fund contribution cannot on its own without a credible financial system impact on economic growth. The policy implication of this study is for Pension Fund Administrators (PFAs) to invest in portfolios with short-term returns; thus, a large chunk of funds invested in federal government securities should be unbundled to other portfolios that yield short-term returns.

1. Introduction

International labour law makes provision for an employee who has rendered his services for a stipulated amount of time to be compensated immediately after retirement and, afterward, receive a sum on monthly basis till death. These are the concepts of gratuity and pensions respectively. The pension is a monthly benefit payable to a retiree until death, who has served the organization during his productive age and stopped service either due to an agreed period of service, age or disability. The payment of pension is both applicable largely to retirees of government-owned organizations as well as the privately owned organization. The pension paid serves as a source of income to the retiree immediately after service and can thus be used as a source of life sustenance.

Prior to the reform of the pension act in 2004, the money paid as a pension in Nigeria was usually a hundred percent funded by the organization (government or shareholders of private enterprises) thereby transferring zero burden to the workers. The pension scheme practiced in Nigeria up to this time took the fashion of the British system (Athley, 1980; Ubhenin, 2012) as introduced by the colonial government in 1951, called the Pensions Ordinance of 1951. This scheme provided a pension fund for African staff engaged by the government. Subsequently, the private sector followed suit by providing a pension scheme for their employees, notably the Nigerian Breweries Pension Scheme of 1954. Several amendments to the existing pension scheme were made, such as Pension Reform Act 102 and 103 of 1979 and the Nigeria Social Insurance Trust Fund of 1993 (Abdulazeez, 2015).

The old pension scheme in Nigeria was marred by poor funding as it was initially funded from budgetary allocation and as funds were released at the start of the fiscal year, it was usually not sufficient to finance the entire pensioners' liability. This led to frequent delays in payment of pensions or even outright denial of its payment; this was

peculiar to both the federal, state and local governments. The pension act was overhauled and reformed in 2004 and this was designed to ensure that both the worker and the employer contributes a certain fixed percentage that is reviewed thereafter to a pension fund administrator who will on behalf of the retiree, invest the fund and provide the funds cum returns upon retirement as a pension. The Pension Reform Act of 2004 ensures that the fund is made available for the pensioner as and when due. However, in 2014 the Act was amended by reviewing the penalties and then making the employer contribute 10% while the employee contributes 8%. Despite this innovation, the pension fund administrators (PFAs) face lots of challenges, among which is the limited array of investment opportunities. The pension fund portfolio is only limited to thirteen channels namely quoted ordinary shares, federal government securities, state government securities, corporate debt instruments, money market instruments, mutual fund, supranational bonds, private equity funds, infrastructure funds, real estate properties, foreign equities, foreign money market securities and cash & other assets (PenCom, 2017). These investment portfolios provide funds to the financial sector and have the tendency to affect financial development and thus growth.

The pension scheme also suffers from a low coverage in terms of participation as only 13.2% of the entire labour force was in the scheme as at first quarter, 2018 (PenCom, 2018; WDI, 2018). Scepticism about the credibility of pension fund administrators abound despite regulation; there also remains a large portion of workers in the informal sector who are excluded from the system and this spells untold hardship and poverty for them after retirement as they will likely have no funds to fall on. There is the mismanagement and allegations of embezzlement of pension funds in the public service. Moreover, there is even a large number of workers whose organizations are yet to remit their own share of the contributions (Akinkuotu et al., 2017, October 26). The pensions fund contribution

by the government and the private sector has experienced a considerable increase over the period. Figure 1 shows that in 2006, pensions fund contributed in the public sector was ?37.38 billion, 62.3% higher than private contribution and this grew till 2012 to a whopping ?302.24 billion, representing 89.5% higher than the private sector fund. This dwindled till 2015, declining by 33.8% of the 2012 all-time high level. However, it gained momentum in 2017, increasing to ?257.11 billion while the private sector pension contribution experienced its peak in 2015 of ?358.91 billion.

Figure 1: Public and Private Sector Contribution
Source: National Pension Commission 2017 Annual Report

Despite the fact that thirteen investment portfolios are available to pension funds, a large portion of these are restricted to federal government securities.

Figure 2: 2017 Pension Fund Portfolio
Source: National Pension Commission 2017 Annual Report

Figure 2 reveals that over 70.43% of the pension fund is invested in federal government securities while money market instruments attract only 9.07%; this is followed by quoted ordinary shares of 8.94% and the remaining ten investment portfolios hovered around 0.08% to 3.57%. The PFAs' overwhelmingly investment into the federal

government securities is because of the almost risk-free nature of such securities as the government in perpetuity and is thus under obligation to honour such securities irrespective of the administration in place.

Further implication drawn is that the pensions fund has largely been narrowed down to federal government securities and this has not given an opportunity for other productive sectors to benefit from the fund. It is also important to note that the pension fund investments which go into growth-enhancing sectors were a meager 20.17% and 3.68% for industrial and agricultural sectors, respectively (figure 3). This low investment levels limit the tendency of the fund to stimulate real growth.
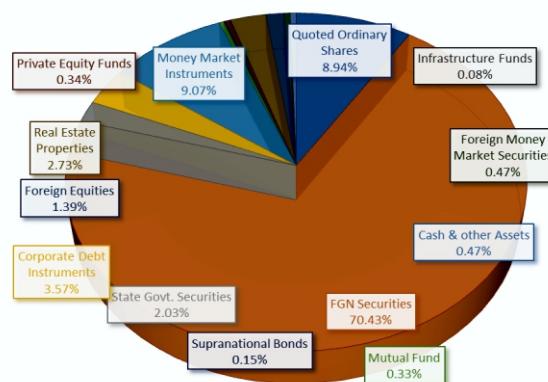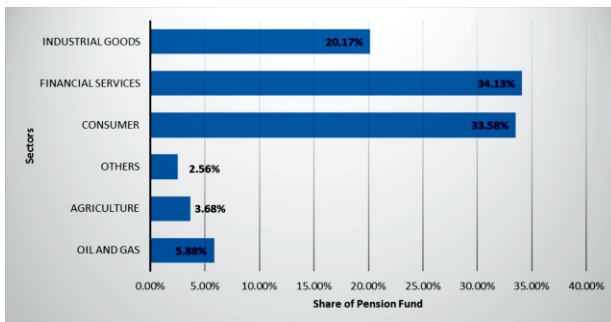

Figure 3: 2017 Pension Fund Sectoral Investments
Source: National Pension Commission 2017 Annual Report

The dwindling pension fund contribution, static investment channels of pension funds and narrow sectoral investments is alarming and thus raises important questions such as, does the pension fund have a significant effect on Nigeria's economic growth? And, does the pension fund increase the potency of financial system development to influence economic growth in Nigeria? The crux of this study, therefore, is to examine the impact of pension funds on economic growth in Nigeria and also investigate its effect on economic growth in Nigeria while interacting with the level of financial deepening. Several studies have examined the effect of pensions fund on economic growth (Farayibi, 2016; Gunu & Tsado, 2012) while others have examined how pension fund affects poverty level (Dagauda & Adeyinka, 2013; Ikeanyibe & Osadebe, 2014), however, few studies have examined how pension fund will actively interact with the level of financial deepening in affecting

growth. This study, amongst others, expands the frontier of knowledge by examining these objectives with reference to the Nigerian economy.

The study spans 2008 to 2018 second Quarter using data extracted from Central Bank of Nigeria's Statistical Bulletin for the third quarter, 2018 and the National Pension Commission 2017 Annual Report. The remaining part of this study is divided into five sections. Section two is the literature review while section three examines the theoretical framework, then section four focuses on research methodology. Section five presents the analysis of data. Section six summarizes and provides the policy implications.

2. Review of Literature

Theories abound that provide a link between pension funds and economic growth. The life cycle theory of retirement provides the development stages in which pension fund administrators passes through; these are the start-up phase, the growth stage, and the maturity stage, these stages explain the development path through which pension fund administrators face. At the start-up stage, the ability of pension funds to impact on economic growth is very unlikely as the PFAs are still struggling to mobilize some pool of funds. At the the growth stage, pension funds become more effective in stimulating growth both for the pension fund administrators and the economy at large; this is because there is already substantial pool of funds which can be thus mobilized in form of credit to key priority sectors (Farayibi, 2016). The intermediation theory as developed by Diamond and Dybvig (1983) emphasizes that pension funds can effectively intermediate with the financial system to spur growth. Allen and Santomero (1998) propose that the traditional theory of financial intermediation is focused on the real-world market features of transactions costs and asymmetric information. These are central to the activity of banks, insurance firms and related financial institutions. Diamond and Dybvig (1983) suggests that

financial intermediaries act as delegated monitors to overcome asymmetric information, whereby diversification reduces monitoring costs. A corollary is that market finance is only available to borrowers with a reputation.

Several studies have examined the contribution of pension funds to economic growth in Nigeria, other developing countries and cross-country analysis. The findings of Kibet and Simiyu (2016) using content analysis revealed that pension fund played a major role in economic growth and economic development in Singapore but unfortunately performed below expectation in Kenya and thus, recommended that Kenya needed to expand the scope of pension fund contribution to cover every sector for it to have meaningful impact and achieve her vision 2030. This study failed to establish the link between pension funds and economic growth and development in Kenya. This paper extends the frontier of knowledge on the contribution of Dagauda and Adeyinka (2013); Chlon-Dominezak and Mora (2003) who used questionnaires and simple random technique to find that pension scheme in Nigeria improves the welfare of the citizenry only if the corruption cankerworm and poor budgetary allocation is eliminated to its barest minimum. This paper takes a new dimension by examining how another mediating factor - financial development - can play a significant role in causing pension funds to have a positive impact on economic growth.

Elechi, Kasie, and Chijindu (2017) investigated whether the Nigerian Pension scheme affected poverty reduction in the rural and urban poverty setting. Their findings revealed that the pension scheme had no contribution to poverty reduction. The reason for this result was likely the paucity of data as the sample size of 12 data points was not robust in providing a reliable result; this is the strong argument for this paper employing quarterly data of 44 data points in order to ensure that a reliable result was achieved after estimation.

This paper shifts focus and attention from

the works of Bijlsma, Ewijk, and Haaijen (2014) that examined how pension fund can have an impact on the performance of firms that depended heavily on external financing in OECD countries. The study found that pension savings had a significant effect on the performance of these firms. This paper, however, differs in terms of scope as it focuses on a developing country with a still fragile financial sector; furthermore, attention is on the whole economy and not on firms. Madukwe (2015) examined the effects of contributory pension scheme on the capital market in Nigeria from 2006 till 2012. The study concluded that the pension funds do not by any means have a significant impact on the capital market performance. This result was attributed to the global financial meltdown and economic crisis within that period.

Meng and Pfan (2010) focused their attention on identifying the effect of pension funds on developed economies and their results revealed, among others, that pension funds will only have a significant impact on capital market development for those countries with high financial development. This study re-focuses the attention of Meng and Pfan (2010) by examining the attendant consequences of pension funds on economic growth in a developing economy - Nigeria. Gunu and Tsado (2012) only employed descriptive statistics to determine the trend and pattern of pension funds and the components invested in the capital market. The findings suggested that pension funds were pro-cyclical with investments in the capital market; however, this approach was not sufficient to establish a cause and effect relationship. Also, Mesike and Ibiwoye (2012) examined the effect of pension schemes on the capital market without providing a link to the attendant consequences on growth; this study extends such frontier of knowledge by examining how pension fund can interact with financial development in spurring economic growth.

3.   Theoretical Framework

Following the financial intermediation theory, Diamond and Dybvig (1983); Allen

and Santomero (1998) proposes that the traditional theory of financial intermediation is focused on the real-world market features of transactions costs and asymmetric information. These are central to the activity of banks, insurance firms and other related financial institutions. Allocations of resources are not Pareto optimal and thus, there is a role for intermediaries to help in providing funds needed to stimulate growth.

Considering the Diamond and Dybvig (1983) model, the investors tend to be risk averse and are unsure about the timing of their future consumption needs. Without an intermediary such as the pension fund administrators and the pension funds contributed, all investors are locked into illiquid long-term investments that yield high payoffs only to those who consume late. Those who must consume early receive low payoffs because early consumption requires premature liquidation of the available long-term investments. Pension fund administrators can thus improve on a competitive market by providing better risk sharing among agents (future pensioners) who need to consume at different (random) times-retirement.

The crux of this theory is that the operation of pension funds act as agents to economic growth by empowering the functions of financial systems more efficiently in credit creation. The flow chat through which the pension fund can translate into growth through financial development is presented in figure 4. Pension fund takes up different investment portfolios such as investment in government (federal and state) securities, investment in money markets, real estate properties, infrastructure, foreign equities, and foreign money market securities and investment in private equities and mutual funds. The core sectors that investment in quoted ordinary shares of firms can take form are agriculture, industry, oil and gas, financial services and consumer goods. All these channels affect financial development which then leads to economic growth.

Figure 4: Pension Fund Transmission Mechanism
Source: Authors' Construct

4.   Research Methodology

This study follows the work of Farayibi (2016) as stated in equation (1).

$$RGDP_t = \beta_0 + \beta_1 PUPF_t + \beta_2 PRPF_t + \beta_3 MC_t + \mu_t \qquad (1)$$

The variables of equation (1) are Real Gross Domestic Product (RGDP), Public Sector Pension Fund Contribution (PUPF), Private Sector Pension Fund Contribution (PRPF) and Market Capitalization (MC). Following the argument of the intermediation theory that pension fund creates credit and becomes effective through the financial development channel, equation (1) is thus modified so that the public and private sector pensions fund contribution is merged together; also, the new model includes financial development and the interaction between financial development and pension fund. The equation is then built to include the model without financial development (equation 2), a model having financial development (equation 3) and then the model with the interaction of financial development and pension fund (equation 4).

$$RGDP_t = \beta_0 + \beta_1 PFC_t + \beta_2 MC_t + \beta_3 EXCH_t + \beta_4 INF_t + \mu_t \qquad (2)$$

$$RGDP_t = \alpha_0 + \alpha_1 PFC_t + \alpha_2 FD_t + \alpha_3 MC_t + \alpha_4 EXCH_t + \alpha_5 INF_t + \varepsilon_t \qquad (3)$$

$$RGDP_t = \delta_0 + \delta_1 PFC_t + \delta_2 FD_t + \delta_3 FD_t * PFC_t + \delta_4 MC_t + \delta_5 EXCH_t + \delta_6 INF_t + \nu_t \qquad (4)$$

The description, a priori expectations and sources of the data are in table i.

In order to estimate equations (2) to (4), the study uses autoregressive distributed lag (ARDL) model. The ARDL estimation technique estimates short-run and long-run components of the model. More so, it is very much applicable in estimating models that have a different order of integration of variables, I(0) and I(1) variables. When variables are found to be non-stationary at level, one option in order to get the short-run dynamics is to estimate the model by differencing the variables if these differences are stationary. However, this method will lead to a considerable loss of long-run properties of the data. Alternatively, economic variables may be combined together in levels provided that they are cointegrated. The issue of cointegration then applies when two or more series are integrated, but a linear combination of them is stationary at level I(0). In this case, the regression of one on the other is not spurious; instead, it tells us something about the long-run relationship between them (Wooldridge, 2004). The study uses the Kwiatkowski-Phillips-Schmidt-Shin test (KPSS) and Elliott-Rothenberg-Stock-ERSS (1996) unit root test techniques because they not only directly test the stationarity, but, most importantly, they are suitable for shorter time series (Arltova & Fedorova, 2016).

List of Tables

Table i: Measures, Sources and a priori Expectations of Variables

Variable	Definition	Measures	Apriori Expectation
$RGDP_t$	Real Gross Domestic Product at time t	Gross domestic product at 2010 constant basic prices (in billions of naira).	Dependent Variable
PFC_t	Pension Fund Contribution at time t	Amount in Naira	(+)
Mc_t	Market Capitalization at time t.	Amount in Naira	(+)
$EXCH_t$	Exchange Rate at time t.	Official rate of the naira to the dollar	(+)
FD_t	Financial Development at time t	A ratio of broad money supply to GDP	(+)
INF_t	Inflation rate at time t.	The rate of price change in the economy as a whole.	(+, -)

Data are all sourced from Third Quarter, CBN 2018 Statistical Bulletin

5. Presentation and Analysis of Result
Descriptive Statistics

Table ii: Descriptive Statistics

	EXCH	FD	INF (%)	MC	PFC	RGDP
Mean	187.2877	0.949308	11.92619	9.48 trillion	2.72 trillion	16.2 trillion
Median	159.3854	0.936847	11.95948	9.46 trillion	2.55 trillion	16.1 trillion
Maximum	305.9474	1.501038	18.45093	15.5 trillion	6.20 trillion	21.1 trillion
Minimum	117.3387	0.441282	7.822323	4.86 trillion	0.19 trillion	12.6 trillion
Std. Dev.	61.36795	0.290289	3.056825	2.78 trillion	1.71 trillion	1.89 trillion
Jarque-Bera	9.947666	0.808877	2.260672	1.662221	1.940991	1.059901
Probability	0.006917	0.667352	0.322925	0.435565	0.378895	0.588634
Observations	42	42	42	42	42	42

Source: Author's Computation

From table ii, it can be seen that the mean pension fund contributions received for the period under study (2008: Q1 to 2018: Q2) was ?2.72 trillion; it considerably increased over the period from a minimum of ?0.19 trillion to extent maximum of ?6.20 trillion. Moreover, real output on average was ?16.2 trillion while it ranged between ?12.6 trillion and ?21.1 trillion. Inflation throughout the period rallied between 7.8% and 18.5% and on average maintained 11.9%. The Jarque-Bera statistics tested for the null hypothesis of normality against the alternative of the distribution not being normally distributed. It is better interpreted by considering the probability value and it can be concluded that only the exchange rate was not normally distributed as its probability of 0% led to the rejection of the null of normality. However, the statistic fails to reject the null hypothesis of normal distribution for financial development, inflation rate, market capitalization, pension fund contributions and real output as their probability values were all greater than the 5% level of significance.

Table iii: Correlation Test Result

	EXCH	FD	INF	MC	PFC	RGDP
EXCH	1.00	0.83	0.57	0.41	0.79	0.26
FD		1.00	0.27	0.51	0.75	-0.04
INF			1.00	-0.30	0.23	0.08
MC				1.00	0.63	0.18
PFC					1.00	0.20
RGDP						1.00

Source: Author's Computation

It was important that the relationship between the explanatory variables were examined to ensure that there was no

perfect or near-perfect relationship between them. Table iii revealed no perfect multicollinearity between these variables (exchange rate, pension fund contribution, inflation rate, financial development, and market capitalization) as no set of correlations was greater than 0.9. Indeed, the highest was 0.79 between PFC and EXCH. It was, therefore, safe to proceed with estimation of the model.

Table iv: Unit Root Test Result

Variable	Method						Order
	ERSS (1996) Null Hyp: Series has a unit root			KPSS (1992) Null Hyp: Series is Stationary			
	5% C.V	Statistic At I(0)	Statistic At I(1)	5% C.V	Statistic At I(0)	Statistic At I(1)	
EXCH	2.97	41.22374*	-	0.463	0.652578*	0.168068	I(1)
FD	2.97	241.8538*	-	0.463	0.782142*	0.215076	I(1)
INF	2.97	2.272336	3.501194*	0.463	0.153411	-	I(1)
MC	2.97	8.726130*	-	0.463	0.456340	-	I(0)
PFC	2.97	270.7 308*	-	0.463	0.755420*	0.457163	I(1)
RGDP	2.97	2.412027	11.22977*	0.463	0.361167	-	I(1)

Implies Statistically significant at 5%; C.V. implies Critical Value
Source: *Author's Computation*

However, before estimating the model, it is important that the study examines the stationarity of the variables employed; this will help to ensure that the regression estimated will not be spurious. To test for stationarity, the study employed the Elliott-Rothenberg-Stock-ERSS (1996) unit root test technique and the Kwiatkowski-Phillips-Schmidt-Shin test (KPSS) test technique. The ERSS unit root technique follows the null hypothesis that the series has a unit root against the alternative hypothesis of stationary values while the KPSS technique follows the null hypothesis that series are stationary against the alternative hypothesis of series being a unit root process. The results, from table iv, revealed that of the six variables employed, only market capitalization was stationary at level following the ERSS and the KPSS method. Other variables such as exchange rate, financial development, and pension fund were stationary at levels using ERSS method but not stationary using the KPSS method while the inflation rate was stationary at level using KPSS method but not stationary at level using ERSS method. By and large, the two methods were employed to ensure the robustness of the unit root test procedure and thus it was concluded that only market capitalization was stationary at level while others were integrated of order one.

Table V: Autoregressive Distributed Lag Model Cointegration Bound Test

Critical Value	I(0) Bound	I(1) Bound	Model 1 F - Stat	Model 1 F-Stat	Model 1 F-Stat	D.F
At 5%	2.86	4.01	6.959711			4
At 5%	2.62	3.79		4.226094		5
At 5%	2.45	3.61			4.051877	6

Source: *Author's Computation*

Having verified that the variables from table iv are stationary at level and also integrated of order one, it was required, as demonstrated by Pesaran, Shin and Smith (2001), that the Autoregressive Distributed Lag Model (ARDL) bound test be employed in investigating the cointegration of models for variables that are integrated at different orders. This assertion prompted this study to investigate the bound cointegrating test for the three models specified in the preceding section. In interpreting table v results, the study followed the recommendation of Pesaran et. al. (2001) that if the ARDL F-statistic is lower than the I(0) lower bound critical value, the model is concluded to be cointegrated at level. However, if the ARDL bound F-statistic is greater than the upper bound of I(1), the model is concluded to be co-integrated at first difference and if the ARDL bound F-statistic falls in between the I(0) and the I(1), the result is inclusive. Following this argument, it can, therefore, be concluded from table v that the three models are cointegrated and stationary at first difference. With this conclusion, the appropriate method to employ is the Autoregressive Distributed Lag Model (ARDL) estimation technique as presented in table vi.

Table vi: Autoregressive Distributed Lag Result
Dependent Variable: Real Gross Domestic Product (RGDP)

Variable	Model								
	Pension Fund and Growth			Pension Fund, Financial Development, and Growth			Pension Fund interacting with Financial Development and Growth		
	Coefficient	t-stat	Prob	Coefficient	t-stat	Prob	Coefficient	t-stat	Prob
	Short Run								
ΔLOG(PFC)$_t$	0.438420**	-5.17	0.0000	-0.202551**	-3.225	0.0030	-0.363600**	-8.874	0.0000
ΔLOG(MC)$_t$	0.047652	0.72	0.4792	0.041836	0.981	0.3342	-0.008446	-0.304	0.7632
Δ(EXCH)$_t$	0.002003**	3.13	0.0037	0.001528**	2.817	0.0084	0.000535	1.486	0.1480
Δ(INF)$_t$	0.002377	0.24	0.8097	0.005001	0.798	0.4308	0.007754*	2.216	0.0347
Δ(FD)$_t$	-	-	-	-0.739157**	-7.188	0.0000	-14.27935**	-8.547	0.0000
Δ(FD*PFC)$_t$	-	-	-	-	-	-	0.468589**	8.116	0.0000
LG(RGDP)$_{t-1}$	0.359840**	2.78	0.0089	0.655684**	5.52	0.0000	0.774708**	8.164	0.0000
CointEq$_{t-1}$	-0.64016**	-4.95	0.0000	-0.344316**	-2.899	0.0068	-0.225292*	-2.374	0.0244
	Long Run								
LOG(PFC)$_t$	-0.20115**	-3.74	0.0007	-0.082561	-0.741	0.4644	-0.216499	-1.755	0.0899
LOG(MC)$_t$	0.074438	0.69	0.4980	0.121504	0.923	0.3633	-0.037491	-0.314	0.7555
EXCH$_t$	0.003129**	3.46	0.0015	0.004437**	3.696	0.0008	0.002376	1.355	0.1860
INF$_t$	-0.034634*	-2.49	0.0178	-0.038928*	-2.222	0.0337	-0.030756	-1.702	0.0994
FD$_t$	-	-	-	-0.633440	-1.733	0.0930	-14.520523	-1.985	0.0567
FD*PFC$_t$	-	-	-	-	-	-	0.472922	1.868	0.0719
C	33.766830*	10.43	0.0000	29.450397**	6.107	0.0000	38.637610**	6.794	0.0000
	Result Properties								
R^2	0.628			0.863			0.969		
Adj. R^2	0.549			0.823			0.945		
F-Stat	7.953**			21.638**			63.694**		
D.W.	2.180			2.056			1.732		
Ramsey RESET F-stat	0.745 (0.3945)			0.764 (0.3889)			0.695 (0.4114)		
Glejser F-stat	1.837 (0.1130)			0.639 (0.4214)			0.772 (0.6642)		
B.G. Higher Serial F-stat	1.015 (0.3138)			0.048 (0.8289)			0.711 (0.5002)		
J-B Stat	0.716			0.588			2.921		

and ** imply statistically significant at 5% and 1%
Source: Author's Computation

From table vi, the results indicated that

pension fund growth had a negative impact on economic growth both in the short-run and in the long run although they are statistically significant at 1%. The implication of this result is that pension fund contribution cannot have a direct impact on economic growth as their impact factors were -0.438 and -0.201 in the short- and long-run, respectively. The results also suggested that without financial development, the exchange rate had a significant and positive impact on economic growth while market capitalization had a positive impact on growth but was statistically insignificant in the short-run and the long-run.

Adjusting the model by including financial development, the results do not change much with respect to pension fund. The results maintained that pension fund contribution had a negative impact on economic growth both in the short-run and in the long-run, although this was statistically significant in the short-run but not in the long-run. However, his negative impact factor declined with the introduction of financial development. Introducing financial development did not change the impact of market capitalization on economic growth both in the short- run and he long-run. The results also revealed that financial development on its own had a negative and significant impact on economic growth both in the short-run and in the long-run.

Modifying the model by interacting pension fund contribution and financial development presented a different result than the previous two models. The pension fund contribution interacting with financial development had a positive impact on economic growth both in the short-run and in the long-run. This was statistically significant at 1% in the short-run but statistically insignificant at 5% in the long-run. The results showed that pension fund contribution can have an effect on economic growth through financial development. Pension fund contribution leads to better performance of the financial sector in the investment process, which will contribute to a higher economic growth rate. The result further showed that pension fund does not directly spur economic growth but

indirectly emits positive effect on economic growth through a well-developed financial system. This, however, is effective in the short-run, implying that pension fund contribution is effective in stimulating growth through investment in portfolios that yield short term returns. The absence of interaction with financial development explains why Nwanne (2015) and Kibet and Simiyu (2016) found a negative impact of pension funds contribution to economic growth. It strengthens the argument that pension fund contribution is effective in investment in portfolios that yield short term returns. It was also noted that the effect of financial development on economic growth did not change significantly with the introduction of the interaction variable.

On the post-diagnostic analysis, the results suggested that the variations in the dependent variable ere well explained by the variations in the independent variable for the three models as 62.8%, 86.3% and 96.9% were explained for the first, second and third models, respectively. The results also showed that the model best fits the regression line as the F-statistics was statistically significant at 1% for the three equations. Also, from table iv, there was no serial correlation of Autoregressive of order one AR(1) associated with the regression result for the three models using Durbin-Watson statistics as they are all approximately 2. It was also important to subject the models to serial correlation test of higher order and this was examined by using the B.G. test. The B.G. test failed to reject the null hypothesis of no serial correlation of higher order associated with the regression result. Following this argument, it can, therefore, be concluded that there was no serial correlation of higher order associated with the regression results. The model is further subjected to heteroscedasticity test using the Glejser test that assumes the null hypothesis of homoscedasticity. It failed to reject the null hypothesis of homoscedasticity, meaning that the result was free from heteroscedasticity majorly associated with time series analysis. The results also

showed that errors likely to occur in between the short-run and the long-run were corrected for the three models and the speed of adjustment for such errors were 64.02%, 34.43% and 22.53% for models 1, 2 and 3, respectively.

6.   Conclusion and Policy Implication

This study examined the effect of pension fund contribution on economic growth through the financial system. The results led to the conclusion that pension fund contribution cannot, on its own, without a credible financial system, impact economic growth. Moreover, the current level of financial development was not growth-enhancing. However, the study further concluded that pension fund contribution was effective in stimulating growth through investment in portfolios that yielded short term returns.   In other words, a well-developed financial system would enhance the pension fund contributions to economic growth.

In view of these, pension fund administrators should invest the funds contributed in portfolio investments that have short-term returns. This implies that 70.43% of the pension fund contribution invested in federal government securities can be unbundled to other investment portfolios such as money market instruments that will yield short-term returns. This paper can also serve to guide newly-incorporated pension fund administrators such as the Nigerian University Pension Management Company (NUPEMCO) on the type of portfolio that funds can be invested in, so as to yield maximum growth impact on the economy. The government, at its best, also needs to ensure close supervision to ensure that the funds contributed as pension is effectively invested and returns made to the potential pensioner's accounts.

References

Abdulazeez, N. (2015). "Pension Scheme in Nigeria: History, Problems, and Prospects", *Arabian Journal of Business and Management Review*. Vol. 5 No. 2, pp. 1-6.

Akinkuotu, E., Affe, M. and Nwogu, S. (2017, October 26). **"**N2bn pension fraud: Is FG's handling of Maina's case appropriate?", *Punch Newspaper*. Retrieved from https://punchng.com/n2bn-pension-fraud-is-fgs-handling-of-mainas-case-appropriate/

Allen, F. and Santomero, A.M. (1998). "The theory of financial intermediation", *Journal of Banking & Finance*. Vol. 21, pp. 1461 – 1485.

Arltova, M. and Fedorova, D. (2016). "Selection of Unit Root Test on the Basis of Length of the Time Series and Value of AR(1) Parameter", *Statistika*. Vol. 96 No 3, pp. 47 – 64.

Athley, R.C. (1980). "*The Sociology of Retirement"*, Cambridge Mass, Schenkman Publishing Company Inc.

Bijlsma, M., Ewijk, C.V. and Haaijen, F. (2014). "Economic Growth and Funded Pension Systems", *CPB Netherlands Bureau for Economic Policy Analysis Discussion Paper 279*.

Chlon-Dominczak, A. and Mora, M. (2003). "Commitment and Consensus in Pension Reform". In R. Holzmann, M. Orenstein & M. Rutkowski (Eds., pp. 131 – 156), *Pension Reform in Europe: Process and Progress.* Washington DC: The World Bank.

Dagauda, A.T. and Adeyinka, O.P. (2013). "An Analysis of the Impact of the 2004 Pension Policy on the Welfare of the Nigerian Civil Servants: A Case Study of Selected Federal Ministries", *Global Journal of Human Resource Management*. Vol. 20, pp. 55.

Diamond, E. and Dybvig, P. (1983). "Bank Runs, Deposit Insurance, and Liquidity", *Journal of Political Economy*. Vol. 4, pp. 1-19.

Elechi, J.S., Kasie, E.G. and Chijindu, A.A. (2017). "Nigerian Pension Scheme and Poverty Reduction in Nigeria: An Empirical Assessment (2004-2015)", *Asian Research Journal of Arts & Social Sciences*. Vol. 2, No. 2, pp. 1 – 25.

Elliot, G., Rothenberg, T.J. and Stock, J.H. (1996). "Efficient Tests for an Autoregressive Unit

Root", *Econometrica*. Vol. 64, pp. 813-836.

Farabiyi, A.O. (2016). "The Funded Pension Scheme and Economic Growth in Nigeria", *Pension Risk Management E-Journal*. Vol. 10, No. 49, pp. 87 – 102. https:// DOI: 10.2139/ssrn.2836965.

Gunu, U. and Tsado, E. (2012). "Contributory Pension System as a Tool for Economic Growth in Nigeria", *International Journal of Business and Behavioural Sciences.* Vol. 2, No. 8, pp. 6 -13.

Ikeanyibe, O.M. and Osadebe, N.O. (2014). "A Review of the Promises and Challenges of the 2004 Pension Reform in Nigeria, *Mediterranean Journal of Social Sciences*. Vol. 5, No. 15, pp. 472-482.

Kibet, A.K. and Simiyu, R.S. (2016). "The Role of Pension Schemes in Economic Development: Comparing Kenya and Singapore", *Research Journal of Finance and Accounting*. Vol. 7, No. 16, pp. 161 – 176.

Kwiatkowski, D., Phillips, P.C.B., Schmidt, P. and Shin, Y. (1992). "Testing the Null Hypothesis of Stationarity Against the Alternative of a Unit Root", *Journal of Econometrics*. Vol. 54, pp. 159-178.

Madukwe, O.D. (2015). "Effects of Contributory Pension Scheme on Capital Market in Nigeria", *International Journal of Management and Commerce Innovations*. Vol. 2, No. 2, pp. 202 – 211.

Meng, C. and Pfan, W.D. (2010). "The Role of Pension Funds in Capital Market Development", *GRIPS Discussion Paper* 10 – 17.

Mesike, G. and Ibiwoye, A. (2012). "Pension Reform and Financial Market Development Nexus: Evidence from Nigeria, *International Journal of Academic Research in Business and Social Sciences*. Vol. 2, No. 6, pp. 574 – 586.

Nwanne, T.F.I. (2015). "Impact of Contributory Pension Scheme on Economic Growth in Nigeria", *Journal of Management and Business Studies*. Vol. 4, No. 9, pp. 333 – 337.

National Pension Commission, (2017). *"Annual Report"*. Retrieved from https://www.pencom.gov.ng/wp-content/uploads/2018/12/2017-Annual-Report_1.pdf

PenCom, (2010). "*Regulation on Investment of Pension Fund Assets*. Abuja: National Pension Commission".

Pesaran, M.H., Shin, Y. and Smith, R.J. (2001). "Bounds testing approaches to the analysis of level relationships", *Journal of Applied Econometrics*. Vol. 16, pp. 289–326.

Ubhenin, O.S. (2012). "An assessment of the effectiveness of the Nigerian 2004 pension reform policy", *Pensions*. Vol. 17, No. 1, pp. 289-304.

WDI, (2018). World Development Indicators for Nigeria. Retrieved from https://databank.worldbank.org/source/world-development-indicators#

Portfolio Capital Inflows and Banking Crisis in Emerging Market and Developing Economies (EMDEs): Bank-level Evidence from Nigeria.

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Abstract

The objective of the paper is to assess the effects of foreign portfolio capital surge on the banking sector in Nigeria from 2005 - 2018. Using a simple trend analysisin a static general equilibrium framework, the paper reveals that portfolio capital inflows, in the wake of monetary policy independence in Nigeria, led to portfolio capital surge which resulted to credit boom and speculative transactions in the Nigerian Stock Exchange (NSE) leading to assets price bubble. When the bubble burst during the global financial crisis (GFC) in 2007, and thereafter in 2014, portfolio capital inflows reversed and banking stocks prices declined sharply. This contributed to the high level of banks' non-performing loans (NPLs). The rise in NPLs resulted to poor assets quality of the banks which contributed significantly to banking crisis in Nigeria. Based on these findings, the paper recommends that CBN should review upward the existing macro-prudential regulationsin addition to taking someportfolio capital inflowscontrol measures toreduce banking crisis and promote banking stability in Nigeria.

1.0   Introduction

The theoretical debate on the prospectsofforeign capital flows one conomic growth for emerging market and developing economies (EMDEs)is a long-standing one in the literature. According to the neo-classical theory, allowing the free flow of capital across countries would lead to a more efficient allocation of financial resources and welfare that is beneficial to both borrowers and lenders, in a manner similar to the liberalization of trade (BIS 2009). This argument is centered on the belief that free capital flows bring in capital investment, technology spillover and intense competition in financial markets for economic growth and enhanced welfare of the people. The contending view is based on the premise that free capital flows in the presence of other distortions that exist in emerging market and developing economies (market rigidities, asymmetries and imperfections) may not enhance welfare of the people (Stiglitz 2004).In practice, however, foreign portfolio capital flows appear to have been accompanied by increased vulnerability to crises particularly in EMDEs where portfolio capital surgehas put most of the EMDEs that liberalized their capital accounts and received large portfolio capital inflows in major financial difficulty. A number of studies like Li and Su (2016), Gupta and Manjhi (2011), Kamisky and Schmuklar (2003), among others, found evidence of multiple financial and banking crises in EMDEs that liberalized their capital accounts and received large capital flows.

Nigeria, like many other EMDEs that liberalized their capital account, experienced large portfolio capital inflows

since 2005. The trend in portfolio capital flows shows that it flowed gradually into the country to reach US$ 16.15billion in 2018 from US$ 883 million in 2005 (see Table 1 in appendix 1). Between 2005 and 2018, there had been unstable trend in the portfolio capital flows. The equity-based capital flows component was the most unstable, particularly during the Global Financial Crisis (GFC) in March 2008 when net equity in flows reversed to -959.79 million US$. In2012, portfolio capital and the equity-based component surged to reach US$ 17.20billion and US$ 10.03billion respectively. However, in 2015, net equity flows reversed and nose-dived to negative position, US$. -476.62 million

Since 2005, there are serious concerns about the weak assets quality of commercial banks in Nigeria (known as Deposit Money Banks (DMBs) as demonstrated by high proportion of the Non-Performing Loans (NPLs) to total loans. In 2009,the DMBs were exposed to the tune of N1.6 trillion margin loans in capital market and oil and gas sectors and the proportion of the NPLs to total loans was 33%(Sanusi 2010). After the purchase of the NPLs by Assets Management Corporation (AMCON) in 2012, which brought down the ratio of NPLs to 2.88% in 2014, the rising trend in NPLs continued in the post-AMCOM purchase period as the proportion of the NPLs to total loans escalated to 14.81% in 2017 and subsequently, 11.67% in 2018 (CBN Statistical Bulletin, Dec., 2018). According to Demirguc-kunt and Detragiache (1998), banking crisis exists when the ratio of NPLs to total loans exceeds 10% and the cost of rescue bailout is at least, 2% of the Gross Domestic Products (GDP). The implications of the banking sector crises could manifest in decline in GDP, escalating cost of banks restructuring and bailouts as well as bank failures which could retard the rate of growth of the Nigerian economy.

The phenomenal rise in NPLs and the corresponding fall in assets quality of the DMBs between 2005 and 2018 are suspected to be linked to portfolio capital surge and reversal in Nigeria. Given the swings in portfolio capital flows and the implications of the persistent banking crises in Nigeria, it is pertinent to investigate the relationship between the portfolio capital inflows, particularly the equity inflows and banking crises in the period under review, using static general equilibrium framework that links the banking sector with developments in the capital market, the Nigerian Stock Exchange (NSE) Market. Therefore, the main objective of the paper is to assess the effect of portfolio capital inflows on the banking sector in Nigeria using trend analysis in the period 2005 - 2018.The choice of this study is justified by the fact that most studies on capital flows in Nigeria are based on the total capital flows with little attention paid to the desegregated components like the portfolio component which has gained importance in terms of size, pattern and character in most EMDEs in the last 2 decades. This paper is also different from previous studies because it focuses on equity-based capital flows as the most unstable component of portfolio inflows that is potentially destructive to the stability of the banking sector in particular.

The paper is structured into 5, sections. Section 2, presents the literature review. Section 3, is the methodology while Section 4, analyses the effects of portfolio capital inflows on the banking sector. Section 5, concludes the paper.

2.0 Literature Review
2.1 Conceptual Review
(i) Portfolio Capital Inflows:

According to Eichengreen, Mussa, Dell'Ariccia, Detragiache, Milesi-Ferretti, and Tweedie (1999), international capital flows are divided into portfolio capital flows, foreign direct investment (FDI) and real estate investment between one country and other countries, which are recorded in the capital account of the balance of payments. Components of capital inflows include; foreign investments in home-country financial markets and property and loans to home-country residents. Capital outflows include; purchases of foreign assets and repayment of foreign loans by residents.The

composition of capital flows is important for monetary policy, management of liquidity as well as financial stability.

Obadan (2004) explained international capital flows in terms of movement of money or financial resources from one country to another for the purpose of investment in financial or real assets. The term includes different kinds of financial transactions; lending by foreign government and international financial institutions like the International Monetary Fund (IMF), commercial banks' lending, investment in equities, bonds (short term) and direct investment of productive capacity (FDI).

Portfolio capital inflows are purchases of domestic stocks, bonds, short term securities or notes. The instruments traded are liquid in the sense that investors can quickly change the investment in tandem with the perceived market risk. Portfolio investments are more volatile than other components of the capital flows because it is possible for a country that records high portfolio investment in one year to experience reversal of same investment the following year, if investors' expectations change adversely. The different types of securities traded under the portfolio capital inflows are important to the analysis of financial and banking instability in an open EMDE, like Nigeria. There are 2 major types of portfolio inflows; equity-based inflows and debt-based inflows (consisting of bonds, treasury bills and other money market instruments). Equity-based capital inflows typically involves proceeds from foreign investors buying equity from domestic investors by simply changing the composition of ownership of the company or foreign investors participating in the initial public offer (IPO) of a domestic company.

Equity- based capital flows are typically very volatile and sensitive to monetary policy rate of the central bank. For this reason, the study of portfolio capital inflows to EMDEs may find the equity-based flows more important and sensitive variable in analyzing financial and banking stability in those countries.

(ii) Banking Crises

Banking crisis is a financial crisis that can manifest largely from the various risks that exists in the banking system, which poses a great challenge to the banking institutions operations and survival. Banks are susceptible towide range of risks which include: credit risk, liquidity risk, operational risk, market risk and contagion or systemic risk. Banking crisis can be caused by bank runs. A bank run occurs when many bank account customers try to withdraw their deposits simultaneously in a manner that reflects fear of insolvency on the part of the customers.

Banking crisis can also be triggered by credit risk when value of banks assets significantly drops against its liabilities because borrowers are unable or unwilling to service their debt obligations. If loan losses exceed bank's capital requirement and reserves, the bank is said to be insolvent. When a large number of banks in the banking system experiences loan losses in excess of their capital, a systemic crisis occurs (Demirguc-kunt and Detragiache 1998). Therefore, a systemic banking crisis occurs when a large number of banks in a country face solvency issues simultaneously due to a common adverse effect of economic performance or a common external shock like the GFC of 2007-2009, or because distress in one bank spreads to other banks in the system.

According to the World Bank Global Financial Development Report (2016), a systemic banking crisis is a situation that reflects a country's corporate financial institutions experiencing a large number of financial problems that pose great difficulties in repaying financial agreements on time. This leads to sharp increase in NPLs which could reverse capital flows. One of the important causes of systemic banking crisis is large capital flows.

Demirguc-Kunt and Detragiache (1998) submit that banking crisis exists when the ratio of NPLs to total loans exceeds 10% and the cost of rescue or bailouts is at least, 2% of GDP. Banking crises have negative effects on the economy, resulting in financial

and economic crises in the economic system. Persistent banking crisis can lead to bank failures which disrupt the flow of credits to households and businesses, increasing unemployment and reducing consumption and investment which are the major components of aggregate demand (GDP).

2.2 Theoretical Literature Review

Mundell-Fleming (M-F 1963) theory is an important static general equilibrium approach that portrays the short-run relationship between nominal exchange rate, interest rate, and output in open EMDEs. The trilemma or impossible trinity asserts that in open EMDEs central banks can only pursue 2 of the 3 good objectives of macroeconomic policies simultaneously. These are: (i) Fixed (stable) Exchange Rate (ii) Independent (sovereign) Monetary Policy to address inflation and recession to achieve growth and stability in the economy (iii) Capital account deregulation, which makes country's economy open to international capital flows and encourages foreign investors to bring resources and expertise into the country for investment and growth. Under capital account deregulation, the domestic interest rate equals the world interest rate and so there is no possibility for independent monetary policy.The theory warns countries, particularly EMDEs that implement capital account deregulation policy to be cautious of the contradiction in pursuing the 3 macroeconomic objectives by choosing between potential stability provided by managed exchange rates and the advantagesoffered byan independent monetary policy.

Fischer (1997) contends that capital account liberalization is an inevitable step in development and thus cannot be avoided. It can bring major benefits to countries and government and generally, it leads to global economic efficiency, allocation of world savings to those who are able to use them most productively, and would thereby increase social welfare. Economic agents in countries with free capital movements could diversify their portfolios and increase their risk-adjusted rates of return. Likewise,

business units in the private sector of these countries could raise capital in international markets at a lower cost. Based on these, liberalization leads to further development of a country's financial system which, in turn, enhances productivity in the real economy by facilitating transactions and by better allocation of resources. Critics of the efficient markets hypothesis like Stiglitz (2004) argued that liberalized financial markets are distorted by information asymmetry problems that transactions hardly yield outcomes that are generally beneficial to the welfare of all economic agents.

Grenville (1998: 1) articulated that:
open capital markets are part of the widely accepted Washington Consensus (i e deregulate and open the economy to outside world), which are endorsed by the IMF. The author contends that: "there is a strong *a priori* case that international capital flows are a Good Thing. The obvious analogy is with international trade………… Financial flows supplement domestic saving, allowing more investment to be done in those countries where returns are highest; ……..and, to complete the case for free capital flows, we should record the argument that even speculative capital flows can serve a beneficial purpose.

Prasad and Rajan (2008), Rajan and Subramanian (2005), Johnston, Darbar and Echeverria (1997), Prasad, Rajan and Subramanian (2007)and Singh (2002) submitted that in developing economies, where the financial system is underdeveloped, foreign capital flows are directed to easily investment areas like real estate, leading to asset price booms, with subsequent bursts thereby disrupting the economy. Similarly, in the foreign portfolio component of the flows, foreign investors are likely to patronize the shallow equity markets. This can also cause sharp increases in equities prices with the effect that assets price bubble would likely form and when there is any observed risk, divestment would follow which can lead to sharp decline in equities prices, spreading losses to domestic investors while increasing banks NPLs. In most cases,

massive unintended capital inflows could result in exchange rate appreciation, which can decrease exports. This problem becomes more glaring when the central bank sterilizes the inflows to check the exchange rate appreciation. Sterilization of foreign exchange inflows increases money supply, which leads to inflationary pressures.

According to Haberer and Lux (2012); Rajan and Subramanian (2005), the potential problems to free capital mobility are clustered around four issues. These are; (i) fear of currency appreciation in terms of currency exports competitiveness, causing decline in exports. Where the currency is defended by central bank to prevent appreciation, excess money supply can cause inflationary pressure, (ii) the 'hot money'. Sudden injection of capital, portfolio flows into small markets can cause initial dislocation. There is also the fear of sudden withdrawal which depreciates currency and destabilizes markets (iii) Fear of large inflows. Large volumes of capital inflows in search for higher yields cause dislocation of the financial system. It can also fuel assets price bubbles, encourage excess risk taking by commercial banks. (iv) The fear of loss of monetary policy. Exchange rate stability, monetary policy autonomy and capital account deregulation are not possible (Mundell-Fleming 1963). Giving up capital mobility might be attractive than surrendering monetary policy.

2.3 Empirical Literature Review

There is a vast empirical literature on portfolio capital flows to EMDEsand this can be grouped into 2 major contending views. One view contends that portfolio capital flows to EMDEs are associated with banking and financial crises. A number of country and cross-country studies using different methodological approaches published empirical findings that support thisview. For instance, Li and Su (2016) examined the influence of capital account liberalization on bank risks using bank-level data of 2,330 banks in 75 countries over the time period 1995-2013. The results of the study showed

both bank individual risk and systemic risk tend to go up as a result of liberalized international capital transactions. The study concluded that capital account liberalization increases banks' individual risk-taking, systemic risk as well as leverage, return volatility and impaired loan ratio. Similarly, Gupta and Manjhi (2011) analyzed the control and management of foreign capital flows with respect to 'impossible trinity' in India over 3 decades. The study observed sharp reversal of net capital outflows in the emerging economies where private capital flows dropped from $1.3trillion in 2007 to $530 billion in 2009 and subsequently $746 billion in 2011.

The paper noted that capital inflows into developing countries after the global financial crisis were driven by high interest rate differential due to extremely low interest rates prevailing in most industrialized countries like the US, UK, Japan and Germany. These flows are likely to be reversed once monetary easing in industrialized countries is reversed. Kamisky and Schmukler (2003) examined the dynamic effects of domestic and external financial liberalization on financial markets of 28 mature and emerging market economies. The study using event study framework found that while financial liberalization may trigger financial excesses in the short-run, it also triggers changes in institutions, supporting a better functioning of financial markets. Garba and Garba (2002) examined the options for globalization of capital for Nigeria.

The study noted that capital account deregulation reform in a fragile economy like Nigeria must address certain fundamental requirements before implementation. These requirements are: sound domestic financial systems, adequate supervision and prudential regulation, good risk management capacities in banks and businesses, greater transparency and market discipline. In Nigeria, none of these requirements is available.

The study drew lessons from Thailand, Indonesia, Malaysia, Philippines, South

Korea, Russia and Brazil that regulators need to take adequate care and plan well before delving into globalization of capital and warned government and regulatory authorities that free capital flows can plant financial crises, regardless of the Nigeria's economic fundamentals.

Demirgue-Kunt and Detragiache (2001, 1998) investigated 53 countries during 1980-1995 and 65 market economies with annual data from 1980 – 1994 across the world using multivariate logiteconometric models. The studies found that banking crises are likely to occur in countries that liberalized their financial system and also financial crisis is more likely to occur where the financial system is liberalized. In EMDEs, where the banking systems are not sufficiently developed, capital account liberalization is likely to make banks vulnerable to external economic shocks. Kaminsky and Reinhart (1999) explored the links between banking crises, exchange rate crises and financial liberalization. In a sample of 24, of which 14 are developing countries, the study found a sharp increase in banking and currency crises since 1980.

Studies likePill and Pradhan (1997); Singh (2002); Mohan and Kapur (2009); Gupta (2011); Gupta and Majhi (2011) and Milne (2014)also found that portfolio capital flows played a major role in the East Asian banking and currency crises of 1997-1998 (countries involved are: Thailand, Indonesia, Malaysia, Philippines, South Korea and Hog Kong) as well as many developing countries in African and Latin America(countries involved include; Ghana, Tanzania, Chile, Argentina etc). The impact of these crises manifested in bank failures and escalated cost of banks restructuring and bailouts. For instance, in some developing countries in Africa and Latin America, cost of restructuring failed banks exceeds 5% of gross domestic products (GDP).

The second view on the impact of portfolio capital inflows to EMDEs is based on the argument that foreign portfolio capital flows to EMDEs stimulate domestic financial sector development by increasing the liquidity of domestic stock markets as well as more diversification that improves risk-sharing which enhances soundness of financial institutions, thereby enhancing economic growth and reducing the probability of crisis. The empirical literature supporting this view is rather scanty; very few studies established this link. For instance, the work of Minshkin(2005), among others, established that financial globalization is beneficial to developing countries and financial development is indeed a key element in promoting economic growth. More importantly, the study articulated that financial globalization (capital inflows) can play an important role in encouraging development of institutions and financial markets for allotting capital to its most productive uses. Other studies like Quinn (1997) and Bekaert, Harvey, and Lundblad(2001) also found positive outcomes in respect of capital inflows to EMDEs. Recent studies on Nigeria like: Williams and Titilayo (2018) found financial system stability affected capital flows; Ifeakachukwu (2015) found stock market development not significant in promoting capital inflows in Nigeria and; Okpanachi (2012) found monetary policy (sterilization) effective in reducing the effects of capital flows volatilities in Nigeria. In contrast, the works of Hamdi and Jlassi (2014) and Rodrik (1998) found that capital flows did not have any effects on growth or banking crisis in EMDEs.

A critical review of the empirical literature that found portfolio capital flows beneficial to EMDEs in the post global financial crisis (GFC) period suggests the effective role of unconventional monetary policies of the developed economies like the US, UK, Europe and Japan in realizing such outcome. In the wake of monetary normalization which has started in those developed economies, portfolio capital inflows to EMDEs would reverse and are most likely to cause banking crises and financial crises in EMDEs, owing to systemic risk or contagion risk. On the other hand, studies that found portfolio capital inflows positive to economic growth in EMDEs before the GFC were likely confined to the

traditional framework of micro prudential analysis. In the post GFC period, when stakeholders became more informed about the role macro prudentialrisk, the influence of systemic risk on capital flows to EMDEs cannot simply be ignored.

This paper contributes to the existing literature by introducing the equity-based capital inflows as a proxy for portfolio capital flows in the study of the effects of portfolio capital flows on banking sector in Nigeria. The paper also explored the role of interconnection of financial risks and hence the relevance of macro-prudential regulations in promoting banking stability in Nigeria.

2.4 Theoretical Framework

This paper adopts the Mundell-Fleming (M-F1963)as its theoretical framework. We situate the Nigerian economy in the context of macroeconomic policy framework under the trilemma. The CBN pursues the 3 basic macroeconomic policy objectives simultaneously, contrary to Mundell-Fleming (1963). First, the CBN maintains an independent monetary policy committee (MPC) to address inflation and recession. Second, the CBN pursues exchange rate stability objective (by maintaining 2 or more foreign exchange market rates to keep the naira exchange rate stable(rate for official transactions and the Nafex rate, for investors and exporters, called I & E window). These rates are being managed with regular CBN interventions to ensure exchange rate stability. Third, the capital account deregulation policy which opened up the Nigeria capital market and money markets for foreign investors without any restriction.

The basic argument advanced by Mundell-Fleming theory is that policy makers *must* face a tradeoff on the 3 macroeconomic objectives along the trilemma triangle. While it is justifiable to pursue multiple exchange rate regimes with some interventions in an EMDE, the free capital flows policy inbuilt in the capital account deregulation does not support monetary policy independence because domestic interest rate in open economies would be equal globally. According to the MF framework, If the central bank chooses exchange rate stability and monetary policy independence through the Monetary Policy Committee (MPC) (tightening and loosening) as it is in Nigeria today, it must control capital inflows (particularly portfolio equity and debt capital inflows) to avoid excessive inflows that would comprise financial stability. Sterilization of capital inflows, does not effectively address excess capital inflows in the capital market equity and debts trading on the floor of the NSE.

3.0 Methodology and Data Sources

The study used trend analysis to analyze macroeconomic variables of interest listed in table 1.The analysis is based on the *static general equilibrium (The static general equilibrium framework is graphical and tabular exposition of macroeconomic aggregates behavior linked to different sectors and markets in the economy) framework over the period 2005-2018.*The following are the variables of interest; their proxies and sources are indicated in the table below.

Table 1: Data and Sources

Variables	Proxies (Measurement)	Sources
Interest rate*	Monetary Policy rate (MPR)	CBN statistical bulletin (2005-2018 issues)
Portfolio Capital Flows**	Net Equity Inflows	World Bank Data, Dev. Indicators @ https://data.worldbank.org/indicator/BX.PEF.TOTL.CD.WD?page=2CBN statistical bulletin (2005 2018 issues)
NSE BKSI	Banking Share Index (BKSI)	CBN statistical bulletin (2005-2018 issues)
Banks NPLs	Ratio of Banks NPLs to Total Loans	CBN statistical bulletin (2005-2018 issues); CBN Financial Stability Report, Dec., 2018

*MPR = Monetary Policy Rate captures monetary independence
*Portfolio capital flows capture capital account deregulation (free capital flows)

In this analysis, Banking crisis, proxied by the ratio of banks NPLs to total loan is the dependent variable while Portfolio capital flows proxied by net equity inflows is the explanatory variable.

4.0 Analysis of Effects of Portfolio Capital Flows on Banking Sector in Nigeria.

The most important component of capital inflows that affects banking stability is the portfolio inflows (hot money). Portfolio Capital inflows to Nigeria, between 2005 and 2018, showed massive inflows in some years following CBN persistent *monetary tightening* as depicted by the MPR variable. The instability in the portfolio capital is clearly shown by the trend in ***net equity flows***, which had escalated to negative position in some years. The table 2 below gives the actual trend, reflecting capital surge and withdrawal.

Table 2: MPR, Trends in Net Portfolio Equity Investment and NPLs 2005 – 2018.

Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
MPR %	13	10	9.5	9.75	6	6.25	12	12	12	13	11	14	14	14
*Net Equity (M $)	750.	1,769	1,447	-953	487	2,161	2,571	10,002	5,532	1,037	-486	325	2,924	na
Ratio of NPLs/TL	24.17	10.67	10.21	7.5	33	15.49	4.95	3.47	3.23	2.88	4.87	12.8	14.81	11.67

Sources: data.worldbank.org/indicator/BX.PEF.TOTL.CD.WD?page =2;
CBN Statistical Bulletin 2018; Financial Stability Report Dec., 2018
*Net Equity Flows

Effects of Capital Surge and Withdrawal on Banks NPLs:

Capital flows, particularly, portfolio inflows in Nigeria, was driven by CBN monetary policy (tightening) against the rest of the world from 2010 to 2014. The CBN increased the MPR by 100%, from 6.25% to 13% between 2010 and 2013 when the US Federal Reserve Bank (FED) pursued accommodative monetary policy with interest rate at 0%. At the same time, the Bank of England (BOE) and European Central Bank (UCB) pegged their rates at 0.5% and 0.05% respectively,

in response to the global financial crisis. These developments attracted *hot money* inflows to Nigeria, leading to *capital surge.*

Capital Surge: There is evidence of capital surge between 2010 and 2012 in response to the CBN monetary tightening and exchange rate stability policy. 'Hot money' increased from net inflows of US$ -953 million in 2008 (following the global financial crisis) to an all-time high net inflows of US$ 10 billion in 2012. Figure 1 below shows the portfolio equity capital surge from 2010 to 2012.
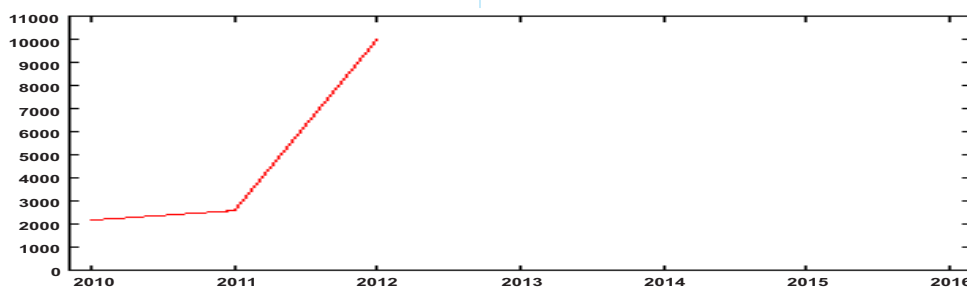

Fig.1: Portfolio capital surge

The surge in portfolio equity investment capital by foreign investors particularly in favour of banks stocks increased liquidity and the share price of the banking stocks which led to appreciation of the Bank Share Index (BKSI) by 61% from 272.86 in December 2011 to 439.03 in May, 2013 to support the booming market.

Capital Reversal:

In 2012, the domestic security challenges particularly in the South-South and North East geo-political zones became tensed. And, developments in the external sector revealed a sharp drop in the price of crude oil at the international oil market from $114.49 per barrel in December, 2012 to $37.80 per barrel in December, 2015. Furthermore, in the last quarter of 2015, the US Federal Reserve monetary policy committee's decision raised the FED interest rate from 0% to 0.25%, with the BOE and UCB maintaining their short-term interest rates at 0.5% and 0.05 % respectively. These domestic and external shocks increased uncertainty and market risk significantly rose

to the extent that foreign investors felt unsafe and tilted their decision in favour of divesting their stake in the NSE to safer and more lucrative markets in the USA, Britain and Europe. This led to net outflow of portfolio equity capital totaling US$ - 477 million in 2015.

This downward trend in net equity flows is demonstrated in figure 2 below. This was accompanied with demand for foreign exchange that put pressure on the naira which depreciated consistently in the FOREX, in the wake of weak foreign exchange inflows from the massive decline in crude oil price per barrel (from $114.49 - $37.80).
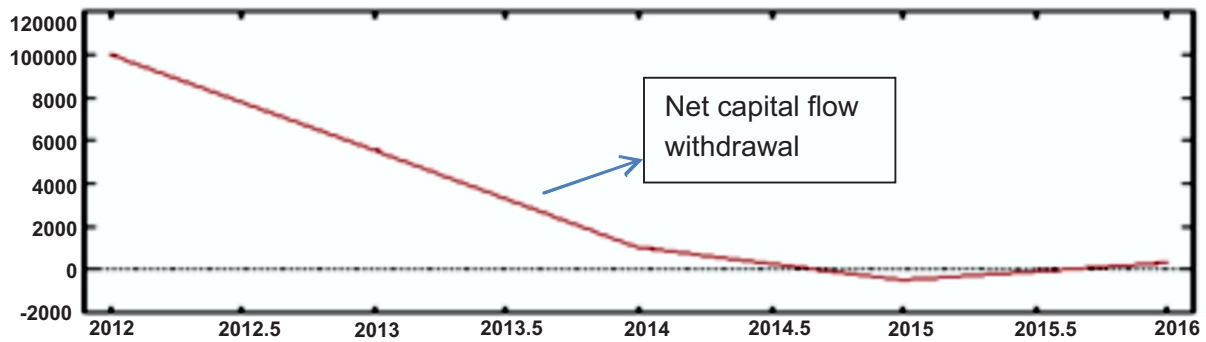
Fig. 2: Portfolio Equity Net Inflows Reversal

The swing shown in figure 2 also led to the sharp but gradual drop in stocks prices in the NSE particularly, the banking stocks which decreased the BKSI by 51% from 439.03 in May, 2013 to 215.47 in March, 2016. These valuation swings (capital surge and withdrawal) aptly describe the boom-bust cycle character of the BKSI in the NSE market in the period under reference. Figure 3 below shows the boom-burst trend of the BKSI in the NSE graphically.
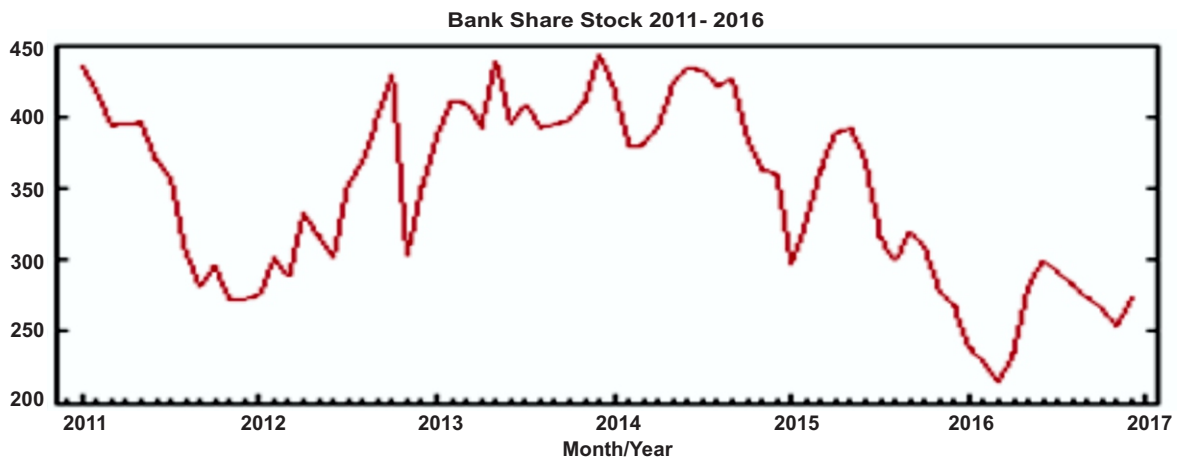

Fig.3. Boom-Burst Cycle Trend in BKSI

The sharp reversal of 'hot money' (net portfolio equity inflows), the sharp drop in crude oil prices and quantity, as well as speculative attacks of the naira in the FOREX led to massive depreciation of the naira exchange rate in the FOREX market (N 455.26 =$ @ BDC rate as at December, 2016). This, in turn, caused serious inflation in the import dependent economy (all items year on year 18.55% as at December 2016) and eventually economic recession (-1.51% decline in real GDP for the year 2016, see CBN Statistical Bulletin, 2018). These developments which compelled the CBN in 2016 to deregulate FOREX market initially, impacted negatively on assets quality of banks and contributed significantly to banking crisis money' created bullish trading in the market that led to a boom in the banking sub sector. The NSE, BKSI increased significantly as banks share prices appreciated well between 2012 and 2014. When foreign investors divested their interest following some internal and external shocks, the market experienced a burst and prices of banks shares crashed, leading to massive default in margin loans as well as banks loans that are secured by bank share certificates.

Figure 4 reveals the sharp decline in NPLs due to AMCONs intervention up to 2014. From 2014 to 2017, NPLs rose phenomenally. The rapid increase in NPLs was always preceded by ***portfolio equity net outflows (first in 2008 when net***

outflow was $-953 million and in 2015 when net outflow was $-486 million) as revealed by table 3 below. Figure 5 illustrates graphically the relationship

between equity net inflows and the rise in NPLs.

Fig: 4. Rise in NPLs

Table 3: Equity Net Inflows and Rise in NPLs (2005 – 2018)

Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Net Equity (M$)	750.	1,769	1,447	-953	487	2,161	2,571	10,002	5,532	1,037	-486	325	2,924	na
Ratio of NPLs/TL	24.17	10.67	10.21	7.5	33	15.49	4.95	3.47	3.23	2.88	4.87	12.8	14.81	11.67

Sources: data.worldbank.org/indicator/BX.PEF.TOTL.CD.WD?page =2; *CBN Statistical Bulletin 2018; Financial Stability Report Dec., 2018 *Net Equity Flows*

Fig. 5: Portfolio Equity Net inflows and Rise in NPLs (2010 – 2018)

The second link between capital withdrawal and rise in NPLs in Nigeria is through *currency depreciation*. The primary impact of *portfolio capital withdrawal* is on *currency depreciation*. Domestic currency depreciation affects banks directly in two ways: private domestic loans denominated in foreign currency and banks foreign borrowing. When currency depreciates, domestic loans denominated in foreign currency are extremely difficult to repay because more domestic currency is needed to repay the loan. This increases credit risk and defau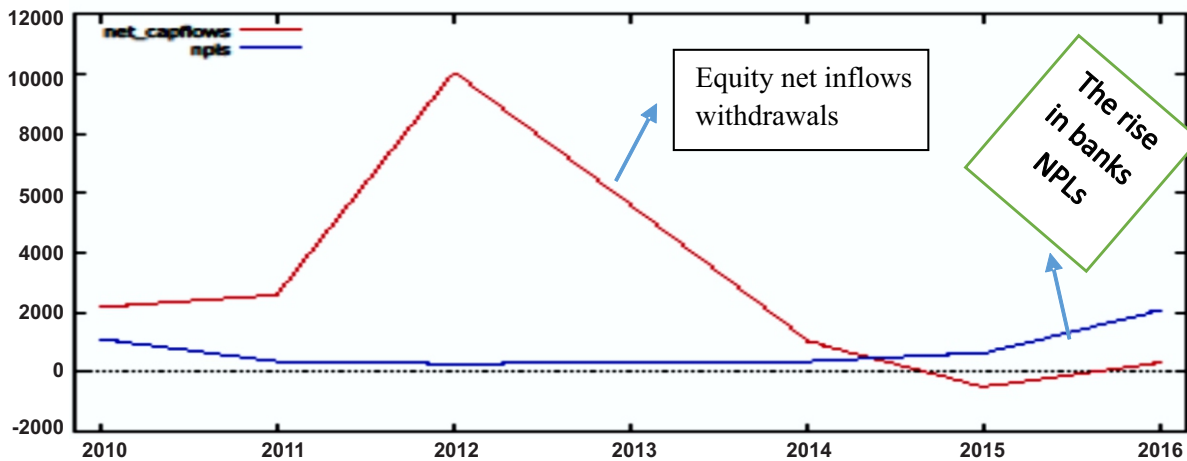lts leading to deterioration in assets quality of banks. Currency depreciation also makes banks repayment of foreign loans difficult as banks have to raise more domestic currency in their balance sheet to repay the foreign loans in foreign exchange. This affects banks' balance sheet and can lead to insolvency. From these two ways, there is evidence that the depreciation of the Naira as a result of *capital withdrawal* as well as the CBN's introduction of flexible exchange rate have affected banks that utilized foreign loans and bonds. For example, Bloomberg (7/ 2016), reported that seven Nigerian banks were *undercapitalized* because of this problem.

In summary, Nigeria and EMDEs that liberalized their capital accounts and pursued monetary policy independence are prone to banking instability due to short-term portfolio inflows which cause *capital surge* and capital *reversal.*

The banking crises that resulted from portfolio capital surge and withdrawal led to high cost of banks restructuring and distress in Nigeria. For instance, between 1986 and 2004, 37 banks failed and CBN revoked their licenses. The losses incurred by depositors and shareholders have adverse consequences on consumption and investment through *wealth effect*. When failed banks were rescued by the CBN in 2009, there were high cost of bank rescue operations in Nigeria. For instance, the CBN spent N620 billion to bail out 6 'problem banks' that failed. The AMCON's purchase of NPLs engulfed an estimated cost of N3 trillion. Significant part of this amount is still outstanding in AMCON's balance sheet as at 2018. This has implications for the Nigerian economy which stakeholders are yet to understand. Table 4 depicts history of bank distress and failure in Nigeria since independence.

Table 4: Analysis of Bank Failures and Distress in Nigeria (1952-2018).

Phases of Banking Sector Reform	Banks Taken Over (*F*ailed/)/*Liquidated)*	Total No. of **B**anks
(1952 -1959): Unregulated(free banking)	21	25
(1960 -1985): Regulated period with government Indigenization Policy	-	28
(1986 - 1998): Deregulation and re -regulation period*	32	54
(1999 – 2004): *Return of liberalization in full with Universal Banking Model*	5	89
(2005 – 2018): Consolidation/Capital Account Liberalization	29 ** 7***	23
Total	94	

Re-regulation was a temporary control in interest and credit when bank distress was more pronounced in Nigeria. In this case, re-regulation is used specially to mean reversal of deregulation policy.
*** 14 banks out of 29 failed as CBN revoked their licenses as a result of consolidation.*
**** 7 banks failed in 2011 and 2018 after portfolio capital inflows reversal.*
Sources: CBN Bulletins 2015-2018, NDIC Annual Reports (various issues); NDIC (2015) Closed Financial Institution.

From table 4, it is evident that there were widespread bank failures in Nigeria. This trend is likely to continue if it is not addressed. For instance, a number of banks are still harboring rising NPLs which deteriorated their assets quality in the last quarter of 2018. In addition, the CBN in June, 2016 took over the Skye bank and appointed new management team to address the rising level of NPLs and poor assets quality of the bank. By September, 2018, Skye bank failed and the CBN replaced it with Providence bank.

5.0 Conclusion

The paper examined the relationship between portfolio capital inflows and banking crises in Nigeria from 2005-2018 using trend analysis. The analysis showed that the pursuit of capital account liberalization, in the wake of monetary independence and exchange rate stability policies in Nigeria, had attracted large portfolio capital inflows particularly the equity flows from global investors.

The surge in equity capital inflows intensified market risk in the Nigerian Stock exchange Market (NSE), resulting to massive crash in banking stocks prices in the NSE. This led to the rise in banks NPLs and weak assets quality of the banks, connecting market risk in the NSE with credit risk in the banking system, and culminating to banking sector crises in 2009 and 2016.

These periods of banking crises were preceded by the net equity flows which were US $ -953 million and US $ -486 million in 2008 and 2015 respectively. The tendency for crisis in the banking system to persist looms high in the Nigerian economy with continued surge in portfolio capital inflows.

Policy Recommendations

The paper recommends that policy makers in Nigeria and indeed in other EMDEs that pursued free capital flows (capital account deregulation) policy should reflect quickly on the Mundell-Fleming Theory to reduce the risk of banking and financial crises. One effective way to achieve this is to introduce some equity capital flows control measures in the NSE. In fact, after the global financial crisis of 2007-2009, the IMF had publically shifted position in favor of regulating capital flows in EMDEs (Gallagher and Tian 2017).

The point is that the NSE, like other stock exchange markets in EMDEs, is still a shallow market, which may not absorb external shocks from large portfolio inflows (given monetary tightening and the risk of reversal of unconventional monetary policies in advanced market economies like the US, UK, Europe and Japan,).

It is also true that the NSE's capacity to absorb shocks from sudden capital reversal is limited and this stimulates market risk to rise significantly and interact with credit risk in the banking system. Going forward, the CBN should review the current macro-prudential policy with a view to reducing systemic risk (contagion risk) in the banking system. This will reduce banking crises in Nigeria.

References

Bekaert, G., Harvey, C. R&Lundblad C.(2001) "Does Financial Liberalization
Spur Growth?"NBER Working Paper No. 8245. Cambridge, Massachusetts: Na-tional
Bureau of Economic Research.

BIS (2009)"Capital Flows and Emerging Market Economies". Report by the
Committee on Global Financial System. CGFS Papers No. 33
BIS (2011)"The Transmission Channels Between the Financial and Real Sectors:

A CriticalSurvey of The Literature" Basel Committee on Banking Supervision BCBS Working
Paper No. 18http://www.bis.org/publ/bcbs_wp18.htm
Bloomberg (10/6/2014) "What If the Fed Has Created a Bubble?"

https://www.bloomberg.com/view/articles/2014-06-10/what-if-the-fed-has-created-a-bubble
Bloomberg (10/10/ 2016) "Nigerian Banking Industry Seen in 'Full-Blown' Credit
Crisis"https://www.bloomberg.com/news/articles/2016-10-10/nigerian-banking-industry-
seen-in-full-blown-financial-crisis
Caprio, G. Jr., &KlingebielD. (1996) "Bank Insolvencies: Cross-country Expe-rience". The
World Bank, Policy Research Working Paper 1620. Washington, DC:
CBN (2012; 2013;2014; 2015Dec., ;Dec., 2016, 2017Dec. and Dec., 2018) Finan-cial
Stability Reports.
www.cenbank.org
CBN (2015) Annual Report.

Demirguc-Kunt, A., (1989) "Modeling Large Commercial Bank Failures: A simul-taneous
Equation Analysis: IMF Working Papers 8905 Federal Reserve Bank of Cleveland.

Demirguc-Kunt, A., &Detragiache,E. (1998) "The Determinants of Banking Crisis
in Developing and Developed economies". IMF Staff Papers Vol. 45 No. 1
Demirguc-Kunt, A., & E. Detragiache (2001) "Financial Liberalization and Financial
Fragility"in G. Caprio, P. Honohan, and J. E. Stiglitz (eds) Financial Liberalization: How Far,
How Fast ?Cambridge University Press, PP 96-122.

Eichengreen, B., M., Mussa, Dell'Ariccia, G., Detragiache, E., Milesi-Ferretti, G. M.,
&Tweedie, A. (1999) 'Liberalizing Capital Movements: Some Analytical Issues'
https://www.researchgate.net/publication/233667486/download
Fischer, S. (1997) "Capital Account Liberalization and the Role of the IMF",PaperPresented
at the seminar Asia and the IMF, held in Hong Kong, China, on September 19, 1997. IMF,
September 1997.
Frydl, E. J. (1999) The Length and Cost of Banking Crises.IMF WP/99/30
Gallagher, K. P &Tian Y. (2017)"Regulating Capital Flows in Emerging Markets: The IMF and
the Global Financial Crisis". Review of Development Finance 7 (2017) pp. 95-106.

Garba A. G.&GarbaP. K. (2002)"The globalization of finance: policy challenges and options
for Nigeria".An unpublished written paper presented at staff seminar series.
Grenville S. (1998). Speech: "The Asia Crisis, Capital Flows and the International
Financial Architecture". A Talk to Monash University Law School Foundation Mel-bourne – 21
May 1998. Online access @ https://rba.gov.au/speeches/1998/sp-dg-210598.html
Gupta, A. S., &Manjhi G.(2011)"Capital Flows and the Impossible Trinity: The In-dian
Experience". Centre for International Trade and Development School of International Studies
Jawaharlal Nehru University Discussion Paper No. 11-02, April.

Haberer, L. S.,&. Lux N (2012)"The Pros and Cons of Capital Controls". Group 4
Economic Policy Paper. Online access @http://www.parisschoolofeconomics.com/benassy-
quere agnes/Enseignement/Poleco2013-presentation7.pdf

Hamdi, H.&. JlassiN. B (2014) "Financial Liberalization, Disaggregated Capital Flows and
Banking Crisis: Evidence from Developing Countries". MPRA Paper NO. 55779 May,
2014.pp 1-19

IMF (2012) "Liberalizing Capital Flows and Managing Capital Outflows – Back-ground Paper
IMF, Washington D C March 16, 2012.

IMF(2016) "International capital flows and financial vulnerabilities in emerging market
economies:analysis and data gaps. Note submitted to the G20 International Financial
Architecture Working Group by Nikola Tarashev, Stefan Avdjiev and Ben Cohen. IMF

Johnston, R. B.,Darbar, S. M. and. Echeverria C, (1997) "Sequencing Capital Ac-count
Liberalization: Lessons from the Experiences in Chile, Indonesia, Korea and Thailand"IMF
Working Paper WP/97/157. Online access @
https://www.imf.org/en/Publications/WP/Issues/2016/12/30/Sequencing-Capital-Account-
Liberalization-Lessons-From-the-Experiences-in-Chile-Indonesia-2413

Joseph, M. T., G., Edson, F., Manuere, M., Clifford& Michael K. (2012) "Non-
Performing Loans in Commercial banks: A case Study of CBZ Bank Limited in
Zimbabwe".Interdisciplinary Journal of Contemporary Research in Business.Vol. 4, No. 7,
November.

Kaminsky, G. L.&ReinhartC M (1999) "The Twin Crises: The Causes of Banking and Balance-
of-Payments Problems."American Economic Review, 89(3):473-500.

Kaminsky, G.L,&. Schmukler S. L (2003) "Short- run Pain, Long- run Gain: The Effects of
Financial Liberalization."IMF WorkingPaper.WP/03/34.https://www.imf.org/external/
pubs/ft/wp/2003/wp0334.pdfL i, X. & Su D. (2016) "Capital Account Liberalization and Bank
Risk: Bank-level Evidences" On-line access @ https://editorialexpress.com/cgibin/
conference/download.
cgi?db_name=RESConf2017&paper_id=956 on 6th December, 2018

McKinnon, R. (1973) Money and Capital in Economic Development.Washington:

The Brookings Institute Mishkin F. S. (2005) "Is Financial Globalization Beneficial"? NBER
Working Paper No. 11891 December 2005 Mohan, R. &KapurM. (2009) "Managing the
Impossible Trinity: Volatile Capital Flows and Indian Monetary Policy".Stanford Center for
International Development Working Paper No. 401.

Mundell, R.A. (1963) "Capital Mobility and Stabilization Policy Under Fixed and Flexible
Exchange Rates". Canadian Journal of Economics and Political Science, 29, pp.475–485

Ifeakachukwu, N. P (2015) "Financial Market Development and Capital Inflows in Nigeria:
The Role of Stock Market Development"Journal of Investment and Man-agement2015; 4(6):
pp. 369-376

Obadan, M. I. (2004) Foreign Capital Flows and External Debt:Perspectives on Ni-geria and
the LDCs Group. Broadway Press Limited, Lagos.

Obiechina, M. E., (2010) "Capital Flows and Financial Crises: Policy issues and
Challenges".CBN Economic and Financial Review Vol. 48/1 March 2010

Okpanachi U. M (2012) "An Assessment of Monetary Policy Response to Capital Inflows in
Nigeria.CBN Journal of Applied Statistics Vol.3 No.2. pp. 75-98

Prasad, E, K.Rogoff,S-J Wei&KoseM. A (2003) "Effects of Financial Globalization on Developing Courtiers: Some Empirical Evidence. IMF Occasional Papers No. 220

Prasad, E. S., R. Rajan, & Subramanian A. (2007) "Foreign Capital and Economic Growth."Brookings Papers on Economic Activity, 2007(1): 153-230.

Prasad, E S. &Rajan R. (2008) "A Pragmatic Approach to Capital Account Literali-zation" NBER Working Paper No. 14051Available http://www.nber.org/papers/w14051.pdfZ

Quinn, D (1997) "The correlates of change in international financial regulation", American Political Science Review, vol. 91(3), pp 531–551.

Rajan, R. G., & Subramanian A. (2005)"What Undermines Aids Impact onGrowth?" IMF Working Paper 05/126.

Rapp, D. (2014)Bubbles, Booms, and Busts: The Rise and Fall of Financial Assets Second Edition. Springer New York, Heidelberg ordrecht London

Rodrik, D, (1998) "Who Needs Capital-Account Convertibility?," Essays in Interna-tional Finance, No. 207 .Princeton: Princeton University.

Sanusi, S. L. (2010). "Global Financial Meltdown and the Reforms In The Nige-rianBanking Sector. Being The Full Text of a Public Lecture Delivered at the Con-vocation Square, AbubakarTafawaBalewa University, Bauchi, Friday, 10th Decem-ber, 2010.
Singh, A. (2002)"Capital Account Liberalization, Free Long-Term Capital Flows,
Financial Crises and Economic Development"

Stiglitz, J. E. (1998) "Knowledge for Development, Economic Science, Economic Policy, and Economic Advice" in Boris Pleskovic and Joseph E. Stiglitz (Eds), An-nual World Bank Conference on Development Economics. Washington DC: The World Bank. PP9-58.
Stiglitz, J. E. (2004) "Capital- Market Liberalization, Globalization and the IMF"
Oxford Review of Economic Policy Vol. 20 No. 1 pp 57-71.

Waweru, N. M., and KalaniV. M. (2009) "Commercial Banking Crises in Kenya: Causes and Remedies". African Journal of Accounting, Economics, Finance and Banking Research Vol. 4 No. 4. Williams, H. T., &TitilayoA. A., (2018) "The Impact of Capital Flows on Financial SystemStability In Nigeria" African Journal of Accounting and Financial Research Vol.1, No.1, pp.1-8, 2018

World Bank (2016) Global Financial Development Report https://www.worldbank. org/en/publication/gfdr/gfdr-2016/background/key-terms-explained

Appendix 1

Table 1:   Capital Flows in million US$ 2005 to 2018

Year	Total Portfolio
2018	16150.77
2017	8530.77
2016	1887.69
2015	2535.20
2014	5292.77
2013	13652.16
2012	17200.49
2011	5192.80
2010	3747.90
2009	481.69
2008	1334.30
2007	2665.50
2006	2825.59
2005	883.00

Bank Loan Loss Provisioning During Election Years In Nigeria

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Abstract

The paper investigates the behavior of loan loss provisions during election years in Nigeria. Election events create uncertainties in the business environment. Election and post-election events may amplify credit risks for banks, requiring banks to keep higher loan loss provisions. Using country-level data, it was revealed that the election year did not have a significant effect on the level of loan loss provisions in the Nigerian banking sector. However, the banking sector had high provisions when it is undercapitalized during election years.

Keywords: loan loss provisions; income smoothing; election; Nigerian banks,
JEL Classification: G21, G28.

1. Introduction

The objective of this paper is to investigate the behaviour of loan loss provisions in the Nigerian banking. Loan loss provisions (LLPs) are used to mitigate expected losses arising from banklending (Curcio and Hasan, 2015; Leventis et.al., 2011). LLPs when reported in financial statements have a signaling effect on the financial statements of banks in that they convey valuable information on the quality of banks' loan portfolio. The size of LLP can have significant effects on the size of reported earnings and regulatory capital (Ozili and Outa, 2018). In Nigeria, the loan loss provisions of banks are significantly influenced by credit risk considerations, prudential regulation requirements and accounting standards (Ozili and Outa, 2019).

Apart from credit risk, there are other risk factors that banks take into account. One of such risk factor is the impact of elections on banks' ability to recover loans from politically-connected obligors as well as the effect of elections on banks' ability to conduct business in the election year. This is tagged the "election year" effect. The 'election-year effect' is a country risk factor which banks take into account if banks believe that a change in the current government following general elections may affect their ability to recover loans from politically-connected obligors. Such banks will keep additional provisions to mitigate credit risk arising from the 'election year' effect. Surprisingly, the extant literature has not examined the characteristics of bank financial reporting during the election year despite the fact that banks are often the largest borrowers to fund election campaigns in most countries and in Nigeria, and there is the risk that the loans issued to election campaigners may not be repaid in full, or at worst, will be written off.

The empirical results show that, although there was no significant direct impact of election year on bank provisioning, however, there is a strong negative and significant association between LLP and bank capital during election years which implies that loan loss provisions are higher when the banking

sector is undercapitalised especially during election years. This finding supports the capital management hypothesis. The capital management hypothesis states that banks will increase loan loss provisions when they have low capital in order to compensate for their low capital levels, and banks will keep fewer loan loss provisions when they have sufficient (or high) capital.

This study makes two contributions to the literature. Firstly, this study contributes to the literature that investigate the influence of external and institutional factors on bank financial reporting behaviour (e.g., Ozili, 2019; Bikker and Metze makers, 2005; Laeven and Majnoni, 2003). By controlling for election year effect, political stability and level of corruption, insights were provided to understand how unique factors in a country can influence the behaviour of loan loss provisions in banks.

Secondly, this study examines loan loss provisioning behaviour in the banking sector of a country that, arguably, has non-transparent general elections, and a country that is prone to economic fluctuations (i.e., booms and recessions) due to exposure to crude oil prices. This therefore provides a natural setting to test for the effect of a peculiar country's risk factor on banks' financial reporting, focusing on loan loss provision in this study.

The remainder of the paper is organised as follows. Section 2 provides an overview of the relevant literature. Section 2 develops the hypotheses. Section 3 presents the data, model specification and empirical methods. Section 4 discuss the empirical results. Section 5 concludes the paper.

2. Literature review

In the literature, country-specific studies report some determinants of the level of loan loss provisions. For instance, in the United States, Morris et.al., (2016) examine the economic determinants and value relevance of US banks' loan loss provisions during the global financial crisis. They find that discretionary provisions are used for income

smoothing and signaling when the two incentives reinforce each other, but income smoothing occurs more frequently. Kanagaretnam et.al., (2005) show that US banks use loan loss provisions to signal information about banks future prospects but the propensity to use provisions for signaling purposes is greater among smaller banks. In Italy, Caporale et.al., (2018) examine the determinants of loan loss provisions among 400 Italian banks during 2001 to 2015. They find that loan loss provisions in Italian banks were significantly influenced by the non-discretionary components of loan loss provisions.

However, the procyclicality of loan loss provisions was less pronounced for local banks because their loans were well collateralised and their behaviour was more strongly affected by supervisory activity. In China, Wang et.al., (2019) examine whether bank loan loss provisions affect credit fluctuation in China's banking system, and find that non-discretionary loan loss provisions have a significant impact on credit fluctuation whereas discretionary loan loss provisions have no significant impact on credit fluctuation for Chinese banks.

In South Africa, Ozili and Outa (2018) show that South African banks do not use LLPs to smooth income when they are: under-capitalised, have large non-performing loans and have a moderate ownership concentration; however, using LLP to smooth income is pronounced when South African banks are more profitable during economic boom years, when they are well-capitalised and is pronounced among banks that adopt International Financial Reporting System (IFRS) and have a Big 4 auditor. In Poland, Borsuk (2019) conducted a set of stress test scenario to determine how different economic scenarios would affect loan loss provisions among other financial ratios. Borsuk find that economic growth, the labour market, and market interest rates have a significant influence on the loan loss provision ratio of banks in Poland. Although the literature has examined the behavior of LLP in several contexts, the extant literature has not examined the behaviour of bank

financial reporting during election years, particularly the behaviour of loan loss provisions in election years.

3. Data and Methodology
3.1 Data

Financial data for Nigeria was obtained from the World Bank database. The sample period is from 2003 to 2016 and is sufficient to cover at least 4 general election cycles. Data for real grossdomestic product growth rate was collected from the World Economic Forum archived in the World Bank database, while institutional data was collected from the World Governance Indicators database of the World Bank's database. See Appendices A1 & A2 for descriptive statistics of the sample data and the variable descriptions.

3.2. Methodology
The baseline model is specified below: The model is adapted from the models used in Curcio and Hasan (2015) and Ozili (2019).

$$LLP_t = c + CAR_t + NPL_t + Cc_t + Ps_t + ELECT_t + GDP_t + e$$

Where, LLP = loan loss provisioning; NPL = ratio of nonperforming loans to gross loans; CAR = ratio of total regulatory capital to total risk-weighted assets (%); ELECT = a binary variable that equal one in election year and zero in non-election year; ?GDP = real domestic product growth rate; CC = control of corruption index; PS = political stability/ absence of terrorism index; t = year. See Appendix for detail variable description.

A positive sign for the ELECT coefficient is expected if banks anticipate that a change in the current government following general elections will make it difficult to recover their loans from politically-connected obligors, and banks would respond to this by keeping higher provisions in the election year. Prior studies control for other determinants of loan loss provisions (see Ahmed et.al, 1999; Ozili and Outa, 2017). The first variable is nonperforming loan (NPL). Banks will keep higher provisions when they expect high loan defaults (Laeven and Majnoni, 2003; Bikker and Metzemakers, 2005).Hence, a positive sign is predicted for NPL coefficient. The

second variable is the capital management (CAR) variable. CAR controls for capital management incentive to influence provisions estimates. Banks with low capital levels tend keep higher provisions to compensate for their low capital levels and vice versa, and this describes the capital management hypothesis (Ozili and Outa, 2017); thus, a negative relationship is predicted for CAR coefficient. The third variable is the real gross domestic product growth rate (?GDP) which control for bank provisioning behaviour that depends on the state of the economic cycle. Bank provisions are generally higher during recessionary periods and relatively lower during economic booms (Laeven and Majnoni, 2003, Ozili, 2018); implying a negative relationship between ?GDP and LLP. Next,two institutional factorswere introduced (the corruption control (CC) indicator and the political stability (PS) indicator) that play a significant role during elections in Nigeria.

High corruption levels and political instability are considered to be detrimental to general elections (Dupas and Robinson, 2012; Callen and Long, 2015). For the PS variable, a negative relationship between LLP and PS was expected because banks in politically unstable environments will keep higher provisions especially higher general provisions to mitigate credit risk in the environment. For the CC variable, a positive relationship between LLP and CC was expected because banks in less corrupt environments tend to keep fewer general provisions (where general provisions are the smaller component of total provisions).

4. Results
4.1. Regression Results
The results are reported in Table 1 and the variables of interest are the ELECT coefficient and the coefficient of interaction variables. The ELECT coefficient is not statistically significant in all models (1) to (6).The ELECT*CAR coefficient is negative and statistically significant, indicating that bank provisions are higher when the banking sector is undercapitalised during election years. Also, ELECT*NPL, ELECT*PS, ELECT*CC and ELECT*?GDP coefficients are not statistically significant, hence no meaningful conclusion can be drawn.

	Table 1					
	Provisioning during election years					
Variables	Coefficient (t-statistic)	Coefficient	Coefficient (t-statistic)	Coefficient	Coefficient	Coefficient (t-statistic)
c	0.554	0.269	-15.871	-1.425	0.109	-1.49
NPL	-2.281	0.675***	0.779***	0.667***	0.668***	0.694***
CAR	-0.208*	-0.202*	0.016	-0.190	-0.203	-0.175*
ELECT	0.688	0.866	12.093*	7.318	-0.532	1.446
?GDP	0.205***	0.199**	0.231***	0.226**	0.210*	0.191**
CC	-2.281	-2.681	-0.924	-0.937	-1.910	-3.398
PS	0.543	0.692	-6.044*	-0.998	0.166	0.495
ELECT*NPL		-0.024				
ELECT*CAR			-0.593*			
ELECT*PS				3.428		
ELECT*CC					-1.083	
ELECT*?GDP						0.939
Adjusted R-	99.02	99.79	99.40	98.86	98.78	98.88
Akaike info	2.85	3.34	2.31	2.95	3.02	2.93

Estimations are based on ordinary least squares (OLS) regression. 'White heteroscedasticity-consistent standard errors & covariance' is applied to correct for autocorrelation and heteroscedasticity. NPL = ratio of non performing loans to gross loans: the lower the better; CAR = ratio of total regulatory capital to total risk-weighted assets (%); ELECT = a binary variable that equal one in election year and zero in non-election year. ?GDP = real gross domestic product growth rate; CC = control of corruption index: the higher the better; PS = political stability/ absence of terrorism index: the higher the better; t-statistics is reported in parenthesis. *,**, *** denotes significance at the 10%, 5% and 1% levels .

4.2. Correlation analysis

In the Pearson correlation results in Table 2, the focus is on the correlation between the loan loss provisions (LLPs) and the election year (ELECT) variable which tells us whether election years are characterised with higher (or fewer) provisions in the Nigerian banking sector. The correlation analysis shows that the correlation between LLP and the ELECT is statistically insignificant, indicating that there is no significant correlation between bank provisions and election years. As can be observed, loan loss provisions (LLP) is significantly correlated with regulatory capital ratio (CAR) and business cycle (?GDP). However, CAR is negatively correlated with LLP while ?GDP is positively correlation with LLP. This indicates that lower regulatory capital levels are associated with higher loan loss provisions in the Nigerian banking sector, while higher loan loss provisions are associated with periods of economic prosperity (i.e., positive GDP growth).However, loan loss provisions (LLP) is not significantlycorrelated with corruption control (CC) and political stability (PS) variable although PS is positively correlated with LLP while CC is negatively correlated with LLP.

Table 2: Correlation Matrix

Variables	NPL	LLP	CAR	CC	PS	ELECT	? GDP
NPL	1.000 ----- -----						
LLP	0.977 *** (14.51) ((0.00))	1.000 ----- -----					
CAR	-0.710*** (-3.19) ((0.01))	-0.712*** (-3.21) ((0.01))	1.000 ----- -----				
CC	0.0 05 (0.014) ((0.99))	-0.131 (-0.41) ((0.68))	-0.103 (-0.32) ((0.74))	1.0 00 ----- -----			
PS	0.240 (0.782) ((0.45))	0.251 (0.82) ((0.43))	0.348 (1.17) ((0.26))	-0.293 (-0.97) ((0.35))	1.000 ----- -----		
ELECT	-0.157 (-0.50) ((0.62))	-0.170 (-0.54) ((0.59))	0.421 (1.46) ((0.172))	-0.145 (-0.46) ((0.65))	0.345 (1.16) ((0.27))	1.000 ----- -----	
?GDP	0.368 (1.25) ((0.23))	0.526 * (1.95) ((0.07))	- 0.083 (-0.26) ((0.79))	-0.524* (-1.94) ((0.08))	0.389 (1.33) ((0.21))	-0.139 (-0.44) ((0.66))	1.000 ----- -----

Estimations are based on Pearson correlation analysis. T-statistics are reported in single parenthesis. P-values are reported in double parenthesis.

4.3. Descriptive statistics

The mean values of the variables are reported in Table 3. The mean value of the LLP ratio is 8.02 which is much lower than the NPL ratio and indicates that bank provisions is lower than the level of nonperforming loans (NPLs) during the period of analysis. The standard deviation of NPL and LLP shows that the NPLs had higher variability than LLPs in the Nigerian banking sector. Also, the mean of the regulatory capital ratio (CAR) is higher than the means of LLP and NPL which suggest that the Nigerian banking sector has sufficient regulatory capital to mitigate expected losses. The CAR variable has lower variability than NPL and LLP which indicate the regulatory capital ratio of the Nigerian banking sector is relatively stable

Table 3: Descriptive statistics for all variables from 2003 to 2016							
	NPL	LLP	CAR	CC	PS	ELECT	GDP
Mean	12.16	8.02	15.55	-1.14	-1.94	0.28	7.53
Median	9.30	4.20	17.47	-1.14	-1.97	0.00	6.28
Maximum	37.30	27.90	23.40	-0.89	-1.63	1.00	33.73
Minimum	2.95	0.00	1.75	-1.36	-2.21	0.00	-1.61
Std. Dev.	10.13	8.51	6.41	0.13	0.16	0.46	8.06
Observations	13	14	12	14	14	14	14

5. Conclusion

The bank provisioning behaviour during election years in Nigeria was examined.The main message of this paper is that, although there was no significant direct impact of election year on bank provisioning, loan loss provisions are higher when the banking sector is undercapitalised, especially during election years. One implication of the findings is that political events,such as elections, may affect other accounting numbers in banks other than loan loss provisions which was insignificant in this case. Secondly, bank supervisors should understand how election events might affect banks' loan portfolio in their assessment of the appropriate level of regulatory provisions that banks should keep. One idea is to require banks to increase its stock of 'general provisions' in election years to act as a cushion to mitigate expected and unexpected losses arising from election and post-election events. It is recommended that future research should investigate other national eventsthat can affect the stability of the Nigerian banking sector. Future research may also focus on the effect of elections on bank provisioning in microfinance banks.

Appendix

A2: Variable Description		
Indicator	Short definition	Source
?GDP	Change in Gross Domestic Product in percentage	World Bank national accounts data, and OECD National Accounts data files.
CAR	The capital adequacy of deposit takers. It is a ratio of total regulatory capital to its assets held, weighted according to risk of those assets.	Financial Soundness Indicators Database (fsi.imf.org), International Monetary Fund (IMF)
NPL	Ratio of defaulting loans (payments of interest and principal past due by 90 days or more) to total gross loans (total value of loan portfolio). The loan amount recorded as nonperforming includes the gross value of the loan as recorded on the balance sheet, not just the amount that is overdue.	Financial Soundness Indicators Database (fsi.imf.org), International Monetary Fund (IMF)
PS	Political stability and absence of terrorism index	World Governance Indicator database
CC	Control of corruption index	World Governance Indicator database

References

Ahmed, A. S., Takeda, C., andThomas, S. (1999). Bank loan loss provisions: a reexamination of capital management, earnings management and signaling effects, Journal of Accounting and Economics, 28(1), 1-25.

Bikker, J. A., and Metzemakers, P. A. (2005). Bank provisioning behaviour and procyclicality, Journal of International Financial Markets, Institutions and Money, 15(2), 141-157.

Borsuk, M. (2019). Forecasting the Net Interest Margin and Loan Loss Provision Ratio of Banks in Various Economic Scenarios: Evidence from Poland, Russian Journal of Money and Finance, 78(1), 89-106.

Callen, M., and Long, J. D. (2015). Institutional corruption and election fraud: Evidence from a field experiment in Afghanistan, American Economic Review, 105(1), 354-81.

Caporale, G. M., Alessi, M., Di Colli, S., and Lopez, J. S. (2018). Loan loss provisions and macroeconomic shocks: Some empirical evidence for Italian banks during the crisis, Finance Research Letters, 25, 239-243.

Dupas, P. and J. Robinson (2012). The (hidden) costs of political instability: Evidence from Kenya's 2007 election crisis,Journal of Development Economics 99 (2), 314–329.

Kanagaretnam, K., Lobo, G. J., and Yang, D. H. (2005). Determinants of signaling by banks through loan loss provisions, Journal of Business Research, 58(3), 312-320.

Laeven, L., and Majnoni, G. (2003). Loan loss provisioning and economic slowdowns: too much, too late?, Journal of Financial Intermediation, 12(2), 178-197.

Leventis, S., Dimitropoulos, P. E., and Anandarajan, A. (2011). Loan loss provisions, earnings management and capital management under IFRS: The case of EU commercial banks, Journal of Financial Services Research, 40(1-2), 103-122.

Morris, R. D., Kang, H., and Jie, J. (2016). The determinants and value relevance of banks' discretionary loan loss provisions during the financial crisis, Journal of Contemporary Accounting & Economics, 12(2), 176-190

Ozili, P. K., and Outa, E. (2017). Bank loan loss provisions research: a review, Borsa Istanbul Review, 17(3), 144-163.

Ozili, P. K., and Outa, E. R. (2018). Bank income smoothing in South Africa: role of ownership, IFRS and economic fluctuation, International Journal of Emerging Markets, 13(5), 1372-1394.

Ozili, P. K., and Outa, E. R. (2019). Bank earnings smoothing during mandatory IFRS adoption in Nigeria, African Journal of Economic and Management Studies, 10(1), 32-47.

 [Repetition]Ozili, P. K. (2019). Bank income smoothing, institutions and corruption. Research in International Business and Finance, 49, 82-99.

(Place in the appropriate position alphabetically. It does not belong here) Curcio, D., and Hasan, I. (2015). Earnings and capital management and signaling: the use of loan-loss provisions by European banks, The European Journal of Finance, 21(1), 26-50.

Ozili, P. K., and Outa, E. R. (2018). Bank income smoothing in South Africa: role of ownership, IFRS and economic fluctuation International Journal of Emerging Markets, 13(5), 1372-1394.

Wang, Z., Xie, N., and Jin, Y. (2019). Do Loan Loss Provisions Affect the Credit Fluctuations in China's Banking System? Emerging Markets Finance and Trade, 55(11), 2425-2436.

Traffic Congestion in F.C.T: Demand and Supply Approach

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Abstract

This study examined traffic congestion in Abuja metropolis, F.C.T.- Nigeria using demand and supply approach. The study adopted survey research design. Primary data was collected using questionnaires. Descriptive statistics was used to analysed the data with the aid of tables and graphs. It was discovered that as a road reaches its capacity, each additional vehicle imposes more total delay on others than they bear, resulting in excessive traffic volumes. Congestion is mainly due to the intensive use of automobiles, whose ownership has spread massively in the F.C.T. in recent decades. The study revealed that traffic congestion causes serious consequences in the F.C.T. by increasing travel time, arrival unreliability particularly, during peak hours, fuel consumption, pollution emissions and driver stress, and reduce life satisfaction. The study recommends the need to expand road capacity and greater utilization of modes of transportation with a high occupancy coefficient, including carpooling and rationalization of on-street parking.

Key words: Traffic Congestion, Demand, Supply.
JEL: R4, R40 and R41

1. Introduction

Traffic congestion refers to the way the movement of vehicles is delayed by one another because of limited road capacity (Rahane & Saharkar, 2014). In simpler terms, as cited in Vencataya et al. (2018), road congestion occurs when the demand for traffic nears or surpasses the capacity of the road network (Raheem et al., 2015). Each transport mode shares the common goal of fulfilling a derived transport demand, and each transport mode thus fills the purpose of supporting mobility.

Transportation is a service that must be utilized immediately since unlike the resources it often carries, the transport service itself cannot be stored. Mobility must occur over transport infrastructure having a fixed capacity, providing a transport supply. In several instances, transport demand is answered in the simplest means possible, notably by walking over a landscape that has received little or no modifications. However, in some cases elaborate and expensive

infrastructure and modes are required to provide mobility, such as for air transportation.

Transportation is a market composed of suppliers of transport services and users of these services. Well-functioning transport markets should allow transport supply to meet transport demand so that transport needs for mobility are satisfied.

An economic system including numerous activities located in different areas generates mobility that must be supported by the transport system. Without mobility infrastructures would be useless and without infrastructures mobility could not occur or would not occur in a cost-efficient manner. This interdependency can be considered according to two concepts, which are transport supply and demand. Transport supply and demand have a reciprocal but asymmetric relation.

While a realized transport demand cannot take place without a corresponding level of transport supply, a transport supply can exist without a corresponding transport demand. This is common in infrastructure projects that are designed with a capacity fulfilling an expected demand level, which may or may not materialize, or may take several years to do so. Scheduled transport services, such a public transit or airlines, are offering a transport supply that runs even if the demand is insufficient.

Infrastructures also tend to be designed at a capacity level higher than the expected base scenario in case that demand turns out to be is higher than anticipated. In other cases, the demand does not materialize, often due to improper planning or unexpected socioeconomic changes.

Transport demand that is met by a supply of transport services generates traffic (trucks, trains, ships, airplanes, buses, bicycles, etc.) on the corresponding transport infrastructure networks. The traffic capacity is generally larger than the actual transport demand since the average utilization level of vehicles rarely reaches 100 percent.

For instance, empty hauls of trucks, an underutilized container ship capacity sailing on a shipping route characterized by imbalanced container flows, an underutilized off-peak bus service and the one person per car situation in commuter traffic.

Traffic congestion is a problem that faces all countries, especially in large cities like Abuja metropolis and at certain peak times. This problem has grown at an alarming rate as our lives have become increasingly dominated by the car. Sitting in a traffic jam is both time wasting and frustrating and it is not motorist that suffers. Congested streets make life less pleasant for the pedestrians and increased traffic leads to accidents and significant problems of pollution in the F.C.T. Traffic congestion tends to increase travel time, arrival unreliability, fuel consumption, pollution emissions and driver stress, and reduce life satisfaction.

Numerous studies have demonstrated that traffic congestion has unfavorable impacts upon the society and economy of Nigeria. However, F.C.T. has experienced major developments in recent years, leading to an increase in the need for advanced transportation systems.

Consequently, the road is believed to be incapable of handling the amount of traffic on the roads during peak hours. Hence, the objective of this paper is to provide an in-depth understanding of the key factors directing the occurrence of traffic congestion in the Federal Capital Territory, Abuja.

To date, most of the studies conducted by transport economists such as (Vickrey (1954). Roth (1965), Gillen (1977-1978), Shoup (1982, 1987),Shoup and Willson (1992), Glazer and Niskanen (1992), Verhoef, Nijkamp, and Rietveld (1995), Calthrop, Proost, and van Dender (2000)). But their approaches ignores the microscopic of demand and supply related traffic congestion approach. However, a

simple economic concepts or approach of demand and supply was used to understand traffic congestion and this will fill the gap.

2. Conceptual and Theoretical Review

2.1 Traffic Congestion

Rodrique et al, (2009) states that congestion can be perceived as unavoidable consequences of scarce transport facilities such as road space, parking area, road signals and effective traffic management. They argue that urban congestion mainly concerns two domains of circulation, passengers and freight which share the same infrastructure. Thus, traffic congestion condition on road networks occurs as a result of excessive use of road infrastructure beyond capacity, and it is characterized by slower speeds, longer trip hours and increased vehicular queuing.

Rodnique et al. (2009), note that congestion in urban areas is dominantly caused by commuting patterns and little by truck movement. This mean that traffic congestion are caused due to rise in population densities, road incidents and broken vehicles on the roads which restrict capacity of roads and impair smooth traffic flows. Another contributing factor to congestion as suggested by Herman (2001).

Broadstock (2011) and Pacione (2005), state that increasing wealth and high population, and availability of vehicle loan facility result in more car ownership than current transportation network can handle. It could be inferred from the above statement that there is a relationship between income level and car ownership and that the dominance of private car usage, particularly within cities, is likely to increase even further as a result of rise in household income with its attendant traffic congestion and high consumption of fuel.

2.1.1 Transport Demand and Urban Congestion

The demand for transport is a derived demand, an economic term, which refers to demand for one good or service in one sector occurring as a result of demand from another. Users of transport are primarily consuming the service not because of its direct benefits, but because they wish to access other services. Transport needs, even if those needs are satisfied, fully, partially or not at all. Similar to transport supply, it is expressed in terms of number of people, volume, or tons per unit of time and distance.

Transport demand is about the movement of people and goods and in order to satisfy a need (work, education, recreation etc) and we transport goods as part of the overall economic activity.

So for example, work-related activities commonly involve commuting between the place of residence and the workplace. There is a supply of work in one location (residence) and a demand of labour in another (workplace), transport (commuting) being directly derived from this relationship, hence a derived demand. Transport can also be perceived as an induced or latent demand, that is a demand response to the addition of transport infrastructure results in traffic volume increases.

Although the essence of this demand is the mobilization of persons or things, it also has a traffic dimension, in terms of volumes of vehicles moving along the public roadways to carry out these objectives. The aforementioned concentrations of trips in the morning and afternoon generate an increase in the volume of traffic, known as peak times or rush hour, which translates into congestion on different streets and during different periods.

Urban transport demand tends to be expressed at specific times that are related to economic and social activity patterns. In many cases, urban transport demand is stable and recurrent, which allows a good approximation in planning services. In other cases, transport demand is unstable and uncertain, which makes it difficult to offer an adequate level of service. For instance,

commuting is a recurring and predictable pattern of movements, while emergency response vehicles such as ambulances are dealing with an unpredictable demand that can be expressed as a probability.
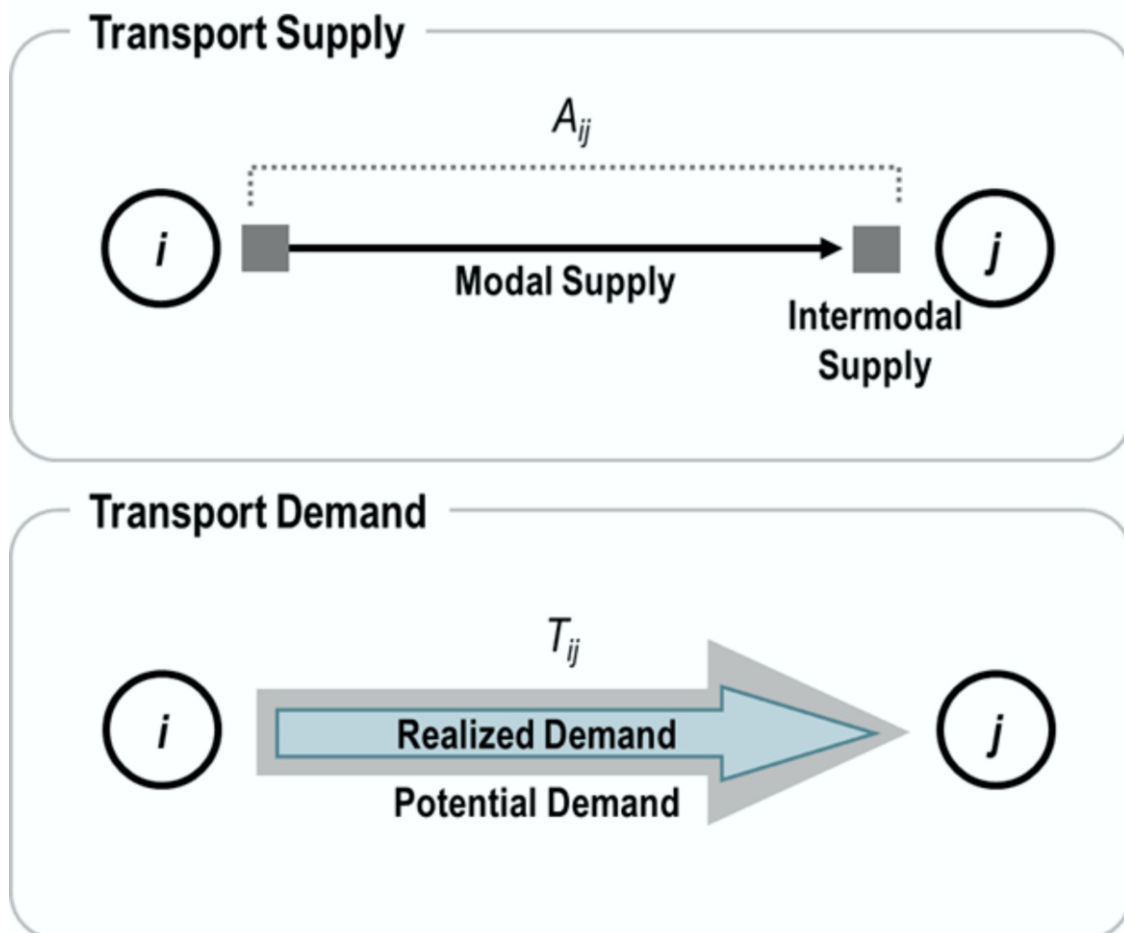
2.1.2 Transport Supply and Urban Congestion

Transport supply is the capacity of specific transportation infrastructures and modes over a time period. Transport demand are mobility needs for the same time period, even if they are only partially satisfied. The capacity of transportation infrastructures and modes, generally over a geographically defined transport system and for a specific period of time. Supply is expressed in terms of infrastructures (capacity), services (frequency) and networks (coverage).

Capacity is often assessed in static and dynamic terms where static capacity represents the amount of space available for transport (e.g. terminal surface) and dynamic capacity are the improvement that can be made through better technology and management. The number of passengers, volume (for liquids or containerized traffic), or mass (for freight) that can be transported per unit of time and space is commonly used to quantify transport supply.

Urban transport supply tends to be categorized according to its capacity, that is, the number of persons who can be transported in a given period of time. Just from the infrastructure standpoint, capacity is usually measured as the number of vehicles that can circulate in a given area in a certain period of time; this parameter is meaningful when analyzing congestion, but it should not be forgotten that what really matters in a city is allowing people to move around satisfactorily.

Source: (Jean-Paul & Theo, 2018)

2.1.2 Causes of Traffic Congestion

Traffic congestion occurs when a volume of traffic ormodal splitgenerates demand for space greater than the available street capacity; this point is commonly termed saturation. There are a number of specific circumstances which cause or aggravate congestion; most of them reduce the capacity of a road at a given point or over a certain length, or increase the number of vehicles required for a given volume of people or goods. There are principally two factors causing traffic congestion, namely micro-level factors, including the high number of people on the roads at the same time, and the overflow of vehicles on the limited road space; and macro-level factors, such as land use patterns, car ownership trends, and geographical economic development. Congestion is prompted at the micro-level, and steered at the macro-level (Tilak& Reddy, 2016).

Some of the factors causing traffic congestion are listed below:
Excessive number of vehicles in the city
Population increase
Inefficient public transport service
Inefficient roads and streets management
Poor roadway condition
Urbanization and
Unforeseen circumstances

Negative Effects of Traffic Congestion
Traffic congestion has a number of negative effects:

Wasting time of motorists and passengers ("opportunity cost"). As a non-productive activity for most people, congestion reduces regional economic health.

Delays, which may result in late arrival for employment, meetings, and education, resulting in lost business, disciplinary action or other personal losses.

Inability to forecast travel time accurately, leading to drivers allocating more time to travel "just in case", and less time on productive activities.

Wasted fuel increasing air pollution and carbon dioxide emissions owing to increased idling, acceleration and braking.

Wear and tear on vehicles as a result of idling in traffic and frequent acceleration and braking, leading to more frequent repairs and replacements.

Stressed and frustrated motorists, encouraging road rage and reduced health of motorists

Emergencies: blocked traffic may interfere with the passage of emergency vehicles traveling to their destinations where they are urgently needed.

Spillover effect from congested main arteries to secondary roads and side streets as alternative routes are attempted ('rat running'), which may affect neighborhood amenity andreal estateprices.

Higher chance of collisions due to tight spacing and constant stopping-and-going.

2.2 Theoretical Framework
The theoretical interpretations of this study were reviewed below:

The Estraus and Verdi Models
2.2.1The Estraus Model
Estraus (1997) is a model that balances transport supply and demand. It is applicable to multimodal urban transport networks with many different types of travelers (as a function of their income, the purpose of their trips, or other factors).

Travelers are classified according to the socioeconomic attributes of the household they belong to; for this purpose, average income and the number of vehicles owned are taken into consideration. The model assumes that in choosing among different available modes of transportation travelers apply a number of criteria, including costs, travel time and subjective preferences for one over another.

The multimodal network encompasses

single modes of transportation, such as car, bus, taxi or subway, and combined modes, such as bus-subway, car-subway, etc. The model incorporates capacity restrictions for both private and public transportation, which allows it to treat congestion explicitly. It also incorporates the cost functions that exist on arcs (stretches of road) in the network.

In other words, ESTRAUS delivers a complete representation of the urban transport system and all of its essential characteristics.The analyses are carried out for two periods during the day: i) the morning rush hour, from 7:30 a.m. to 8:30 a.m., and ii) off hours, between 10:00 a.m. and 12:00 noon. The morning rush hour is when the urban transport system has the most unfavourable operating conditions, in terms of the number of trips by motor vehicle and the amount of congestion. The importance of dealing with this period correctly is fundamental, considering that transport systems are designed to meet the demand for travel that occurs at that time, in terms of motorway capacity and public transit fleets.

2.2.2 The Verdi Model

Verdi (1999) is an evaluation model that analyses the economic impacts of a given intervention in the urban transport system. Verdi uses the results derived from ESTRAUS for base and "with project" situations (figure1). The differences between the two make it possible to calculate the costs and benefits of the project associated with the simulation periods of the Estraus Model.

Using expansion coefficients, it is possible to represent an entire day and year on the basis of the periods simulated with Estraus. Repeating the exercise for successive years, the measures under study can be evaluated socially or privately. The principal indicator considered is the net present value (NPV).
Verdi includes two options for the social evaluation of projects, called:

Classic evaluation, or resource savings

- evaluation, and
- Evaluation of benefits to travelers.

3.3 Methodology

A descriptive approach was adopted in this study. The study used survey research design. Primary data was collected using questionnaires. Commuters working in both public and private sectors within Abuja Metropolis and drivers that use passenger vehicles constituted the study population.
The population for this study included drivers that use passenger vehicles (taxis and mini-buses) that ply the roads within Maraba-Nyanya axis and commuters within Abuja metropolis. It was realized that using all the roads in the F.C.T. for the study would present practical difficulties. In view of this, the researchers sampled one key road link (Mararaba – Nyanya and AYA) was used. Since it was impossible to construct a sample frame for the drivers and commuters, the researchers used both quota and purposive sampling techniques were used in this selection to enable the researchers' select road links with high traffic congestion records.

These groups were purposively targeted with the view that they could provide relevant information in relation to the research question since they constitute major stakeholders in passenger transportation within the city.

Based on this, the three road links under this study in which the vehicles ply them, a quota of one (100) drivers of passenger vehicles was allocated to each of the five roads to make a sample size of 300 for the drivers.

The quota distribution rate for each road comprised of forty-one (41) taxi drivers and nineteen (19) mini bus drivers. This is presented in table 3. The respondents from each category were selected using systematic random sampling based on every third driver met at the terminals. The drivers were given higher quota than the commuters due to the technical information required which could best be provided by

them.
As stated earlier, hundred and fifty (150) commuters working in both public and private sectors were involved in the study with a quota of thirty (30) from each road. The 50 respondents from each road links were also selected randomly so that each has an equal chance of being selected. Thus making for a total respondent of four hundred and fifty-five (450).

4.4 Results and Discussions

Category	Category of Respondents
	Sample size
Drivers	300
Commuters	150
Total	450

Source: Researcher's field work (2018)

Table 1 shows the categories of the respondents on the basis their sample size. Drivers on the average has 300 sample size while commuters based on the surveyed has 150 making a total of 450(67% and 33%) respectively and this signified excessive cars in the F.C.T.

Table 2

		Sample and Response Rate	
	Respondents	Sample Size	Response Rate
	Drivers	300	300(100%)
	Commuters	150	150 (90%)
	Total	450	450(96.7%)

Source: Researcher's field work (2018)

Table 2 shows the response rate of the respondents with drivers having 100% and commuters having 90%. It was identified that on the average of the total responses rates 450 (96.7% acknowledged that congestion increased the operating costs of bus transport by up to 50%(drivers) while the commuters identified a significant increase of transportation fares 50% at rush hours, and late arrival to work .

Table 3
MARARABA NYANYA: ESSENTIAL CHARACTERISTICS OF TRANSIT DURING MORNING RUSH HOUR (7:30 a.m. TO 8:30 a.m.)

Number of trips	2017	A 2018	Change 2017-2018
	1 208 056	1 469 297	+ 22%
Total distance travelled (km)	10 411 568	13 209 551	+ 27%
Total time taken (hours)	702 021	1 254 441	+ 79%
Trips by bus (percentage)	52.4	47.1	- 5.3 %
Trips by car and taxi (percentage)	27.5	35.8	+ 8.3%
Trips by subway Average bus trip	4.2	4.7	+ 0.5%
Total distanceb (km)	9.7	9.8	+ 1.0%
Total timeb (minutes)	48	70	+ 46%
Speed of bus (km/h) Average car trip	16	9	- 44%
Distance (km)	9.5	9.8	+ 3.2%
Time (minutes)	22	39	+ 77%
Speed (km/h)	26	15	- 42%
Congested stretches	140	735	5.3 times

Source: Researcher's field work (2018)

Based on the table 3 the following conclusions can be drawn about the morning rush hour from:

- The total number of trips made will increase at an average rate of 2.5% a year, or a cumulative 22% over the entire period.

- The total distance travelled by all vehicles will increase by 27%, while the total time taken will rise 79%.

- Although buses will account for the majority of trips, the modal distribution will change in favor of cars, and the subway will still account for less than 5%.

- Trip indicators suggest a major increase in congestion if corrective measures are not taken. Thus, an average trip by car for approximately

- the same distance will take 77% longer, whereas an average bus trip will take 46% longer.

- Although the rise in the number of trips and distances travelled appears moderate, all service indicators, especially speeds and travel times, will be significantly worse.

- Congestion levels in certain areas and streets of the city will become more severe and the sphere of influence will gradually expand, such that the number of congested stretches of roadway will quintuple. This is why a combination of measures aimed at controlling congestion must be considered.

Table 4
AYA- NYANYA- MARARABA: RELATIVE INCOMES OF USERS OF DIFFERENT MEANS OF TRANSPORT, 2018.

Means of transport (Private cars = 100)	Relative income of travelers
Bus only	55
Private car only	100
Taxi only	91
Metro only	89
Combination bus+bus	50
Combination bus+metro	62.5
Total	

Source: Researcher's field work (2018)

Congestion obviously causes bus passengers to take longer time to complete their journeys. These longer journey times are a loss in real terms, although perhaps this does not attract so much attention because these passengers have relatively low incomes, so that their personal time is assigned a low monetary value.

Table 4 indicated the relative incomes of different means of transport - AYA, NYANYA and MARARABA axis of the F.C.T. with Bus users having an average income of 55, , for taxi users as 91. while combination of bus and metro is estimated at 62.5 and income of private car users was over three times that of bus passengers 100.

Plate I and II
The Selfish and Undisciplined Behaviour of Motorists in Mararaba – Nyanya road link

Source: Mararaba – Nyanya Road Axis (2018)

Plates I and II shows the behaviours of some selfish and undisciplined motorists in Mararaba – Nyanya road links who show little respect for other road users. In the capital city, many drivers try to cut a few seconds off their journey times by forcing their way into intersections and blocking the passage of other motorists, thus causing economic losses to others which are much greater than their own gains.

It is a tradition for buses to stop immediately before an intersection, thereby causing congestion (and accidents). In those same cities, as in others that have an excessive number of taxis that do not habitually operate from fixed taxi ranks, these vehicles crawl along looking for passengers, and this also gives rise to congestion. In addition to these practices, the traffic flows also often include old and poorly maintained vehicles.

It must be borne in mind that when the traffic flow resumes after being stopped at a traffic light, a form of congestion ensues because

vehicles with a normal rate of acceleration are held up by slower vehicles located in front of them. Furthermore, a vehicle which is stopped or moving sluggishly seriously affects the smooth flow of traffic, since in effect it blocks a traffic lane. Reduces the capacity of the road system to a fraction of its real potential.

Some vehicles cause more congestion than others. In transport engineering, each type of vehicle is assigned a passenger car equivalence called a pcu, or passenger car unit. A private car is equivalent to 1 pcu, while other vehicles have equivalencies corresponding to their disturbing influence on the traffic flow or the space they occupy in it, as compared with a private car. A bus is normally considered to be equivalent to 3 pcus and a truck to 2 pcus. Strictly speaking, however, the pcu factor varies according to whether the vehicle in question is close to an intersection or is in a stretch of road between two intersections.
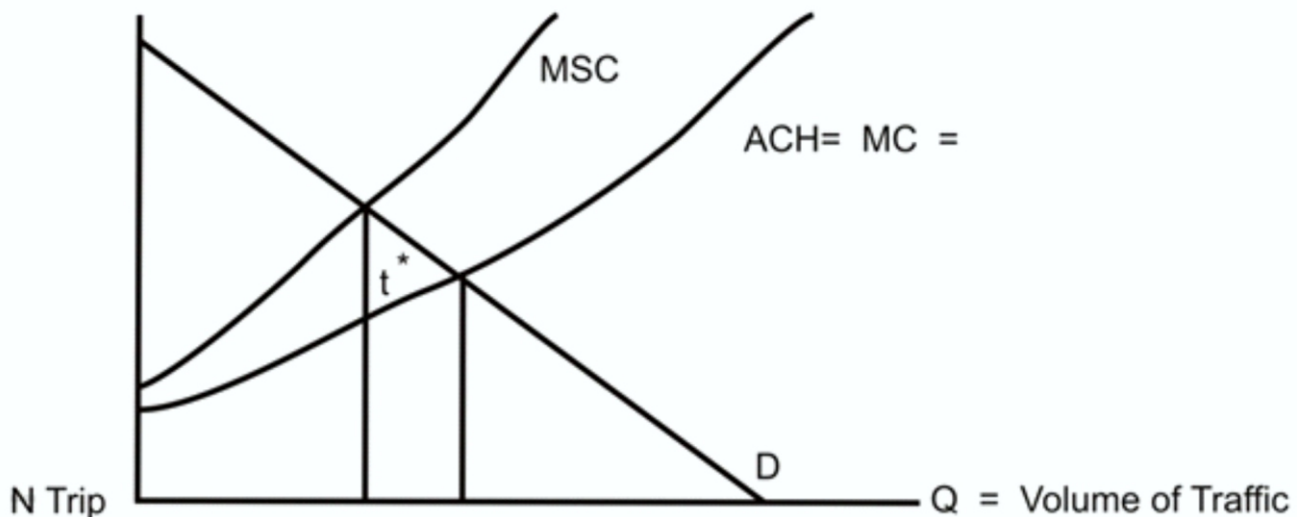

Figure1. Diagramatic representation of the basic model of trafic congestion
Congestion is captured by a congestion cost function which relates trip cost to traffic volume and capacity.
Figure 1 gives a diagrammatic representation. D is the demand curve; AC relates each driverGs trip cost to traffic volume, Q, and is variously referred to as trip cost, average cost, user cost, and marginal

private cost; and MSC is the marginal social cost of a trip. In the absence of government intervention, the equilibrium occurs where demand intersects average cost. The optimum occurs where demand intersects marginal social cost. The vertical distance between MSC and AC is the congestion externality cost. The minimal government intervention needed to decentralize the social optimum is the imposition of a

congestion toll equal to the congestion externality cost, evaluated at the social optimum.

The demand for highway transportation represents the value that consumers place on traveling in a particular time, manner, and place, as measured by their willingness to "pay" for a trip. Some trips will be valued very highly, whereas others will be valued much less so. This relationship between the cost of travel and the level of demand for travel is commonly depicted as the travel demand curve (Figure 2).

The travel demand curve slopes downward, reflecting a basic economic truth: As the price of a good or service falls, the quantity that will be demanded increases, holding other factors constant. The demand for travel is no different: When the price of travel is high (in the generalized user-cost sense described above), fewer people will be willing to make fewer trips; when that price falls, there will be more people willing to make more trips.

The demand curve is characterized by two important qualities: its level and its shape. The level of demand (i.e., the position of the demand curve) is affected by a number of factors. For example, each trip has an origin and a destination. The more people there are at a particular origin and the more activities (e.g., shopping or employment) there are at a particular destination, the more will routes between the origin and destination be in demand for travel. As income levels rise, the willingness to pay for travel also increases, shifting the demand curve outward.

Demand levels can also vary significantly (and importantly for the discussion here) by time of day, due to the simple fact that people prefer to sleep at night and be active during the day, leading to higher levels of demand for travel in the morning and early evening and lower levels of demand during mid-day and overnight hours. Finally, subjective qualities such as comfort and convenience can affect the level of demand.

The responsiveness of the quantity of travel demanded to changes in the price of travel is measured by *travel demand elasticity.* Mathematically, it is simply the percentage change in quantity demanded divided by the percentage change in price.
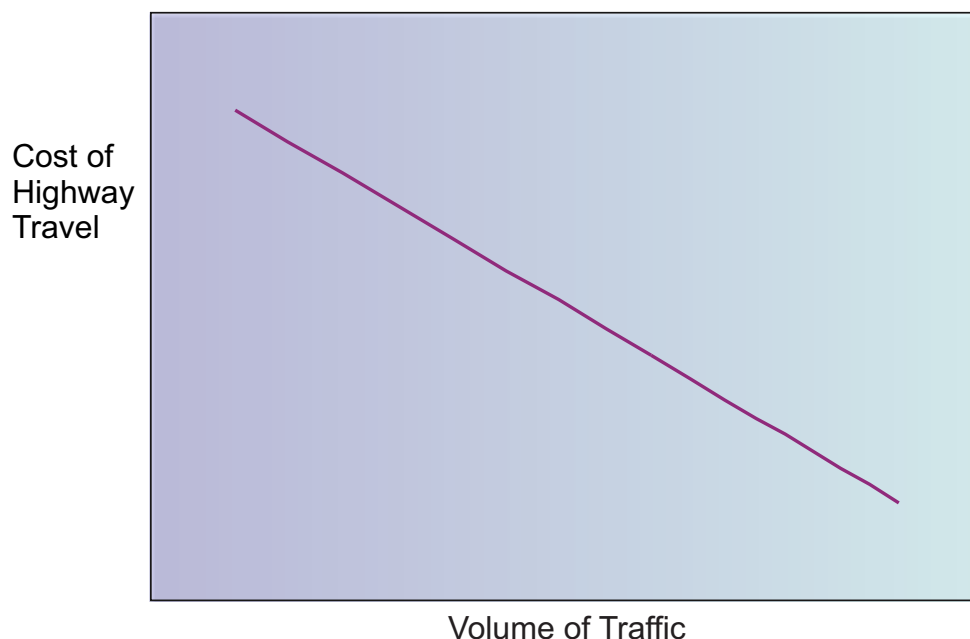

Figure 2. The travel demand curve.

Intuitively, elasticity represents the shape of the demand curve. If the quantity demanded changes significantly in response to small changes in price, demand is said to be relatively elastic; thus, the demand curve is fairly flat. Conversely, if demand changes only slightly in response to large changes in price, demand is said to be relatively inelastic; thus, the demand curve will be relatively steep. At the extremes, demand can be said to be perfectly elastic (i.e., any change in price results in an infinite change in quantity demanded) or perfectly inelastic (i.e., any change in price results in no change in quantity demanded).

The elasticity of demand also depends on a number of factors. Perhaps most important is the timeframe being considered: Demand is typically less elastic in the short run than in the long run. When the price of travel changes significantly, travelers initially have relatively few opportunities for adjusting their behavior. They may decide not to make some trips or to change their mode of travel to work, but their housing and employment locations, key determinants of the level of travel, are likely to remain fixed initially. In the long run, however, everything is variable. People may choose to move closer to their work or take jobs closer to home. Commercial real estate development patterns may also respond to reduce the distance between consumers and activity centers. As a result, the longterm impact of an increase in travel costs on the volume of highway may be much higher than the short-term impact.
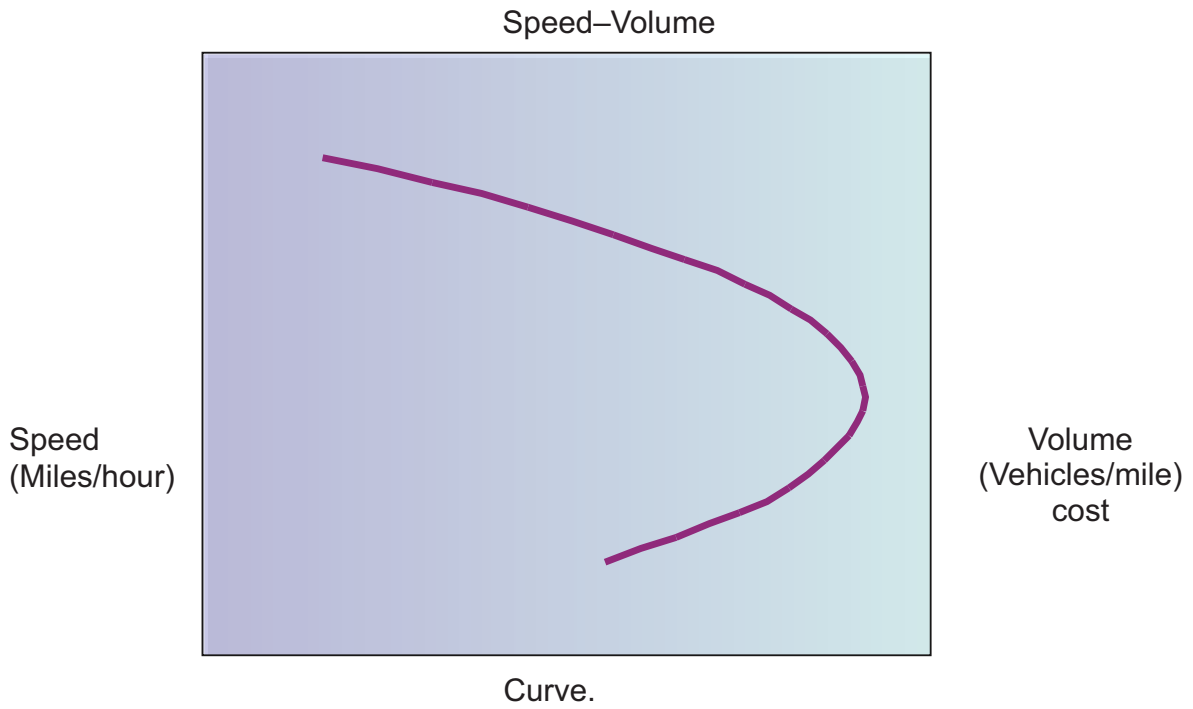
The elasticity of demand is also affected by the quality and availability of close substitutes. For example, if two companies make very similar products, then consumers are likely to readily switch from one product to the other in significant numbers if the price of one of the products changes, resulting in high-demand elasticity for each product. Conversely, if there are no good substitutes for a good or service, then consumers might simply be faced with a choice between paying a higher price or going without, in which case demand is likely to be inelastic.

Traffic engineers typically characterize traffic flow as a relationship between travel speeds, traffic volumes, and traffic density (e.g., number of vehicles occupying a given space on the road). Figure 3 shows the general shape of these relationships.

Volume–Density When traffic volumes are very low, vehicles have minimal impact on one another, and their travel speeds are limited only by traffic-control devices and the geometry of the road.

As traffic volumes increase, however, traffic density increases, and the freedom for vehicles to maneuver is more constricted. As a result, travel speeds begin to decline, relatively slightly at first, but falling significantly as traffic volumes approach the maximum capacity (service flow rate) on the facility. As traffic density continues to increase beyond this saturation point, the speed–volume relationship actually bends backward, as traffic flow breaks down and fewer vehicles are able to get through.

The decline in travel speeds as traffic volumes approach roadway capacity, of course, is what we all know as *congestion delay*. The important implication of this is that there will be a relationship between highway-user costs and traffic volumes on a particular road. At lower volumes, user costs will be relatively constant with respect to volume. As traffic volumes increase, however, user costs will eventually begin to rise at an increasing rate; the point at which this occurs depends on the capacity of the road (see figure 3).

Speed–Volume

Speed
(Miles/hour)

Volume
(Vehicles/mile)
cost

Curve.

This relationship is sometimes referred to as a generalized user

Speed–
Density

Density (Vehicles/Mile)

Cost of
Travel

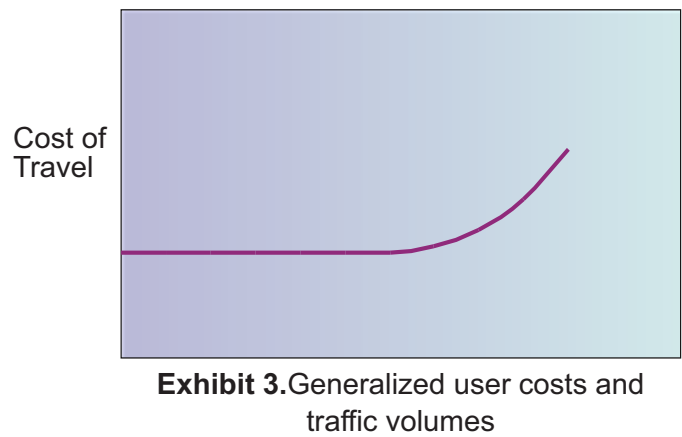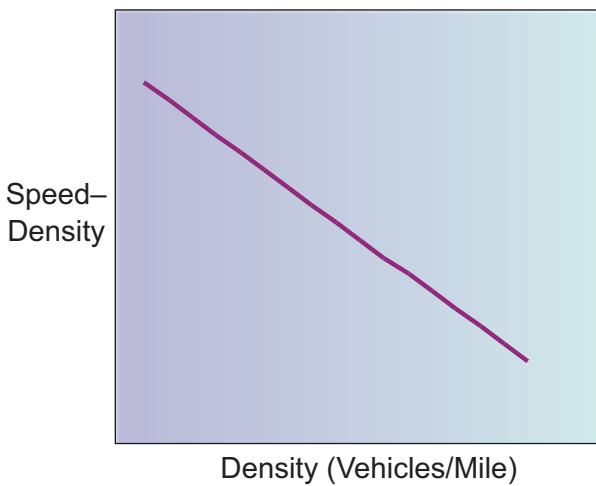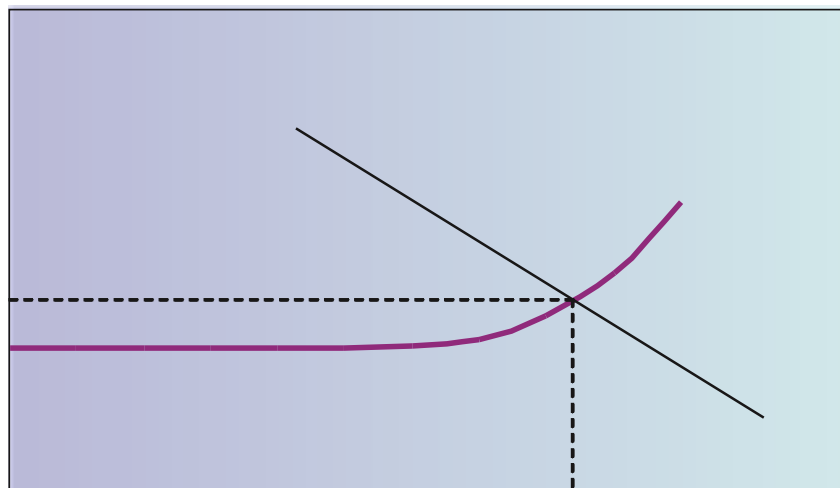**Exhibit 3.** Generalized user costs and
traffic volumes

Figure4. Equilibrium user costs and traffic volumes. P = price. V = volume.

When supply and demand are in balance, a market is said to be in *equilibrium*. This is often represented as the intersection of a supply curve and a demand curve, which determines the market clearing price and quantity (see figure 4). At this point, everyone who purchases the good is willing to (collectively) buy that amount at that price, and producers are willing to supply that quantity at that price. If either the supply or demand curves shift, the market price and quantity will also change.

For highway travel, demand is determined as described above. The "supply" curve, however, is essentially represented by the generalized cost curve. The intersection of these two curves determines how high traffic volumes will be and what the associated average highway-user costs will be at that volume level. When the level of demand is low relative to the capacity of the road, it will be uncongested, and prices will be relatively constant even as volumes increase (the "flat" part of the user cost curve in Exhibit 4). However, when demand levels are high and the road is congested, both user costs and traffic volumes will be higher, potentially rising sharply as demand continues to increase.

Table 5 Abuja Cities: Increase in Operating Costs of Public Transport Due to Traffic Congestion (Effects)

Municipal/City	I Increase in bus operating costs due to congestion
Garki	6.2
AYA	0.9
Nyanya	6.4
Mararaba	1.6
Area 11	3.7
Federal Secretariat	2.1
Zone 2-3	3.5
Area 1	9.6
Wuse	15.8

Source: Researcher's field work (2018)

$\frac{49.8}{450}$ x 100 = 11.4%
response rates.

Table 5 shows the average increase in operating costs of public transport due to traffic congestion

effect of both public and private car owners as well as commuters by the survey. It was identified that both public and private vehicle owners as well as commuters in the Abuja have an average of eleven (11%) operating costs of public transport due to traffic congestion across the city centers. This and other findings revealed that congestion is too serious and far-reaching a problem to believe that it can be relieved through unilateral, erratic or voluntaristic measures.

In these areas, the greater accessibility created by the subway leads to the construction of office buildings that workers can reach easily on subway trains.

5.1 Conclusion

In conclusion, the study revealed that traffic congestion, especially in the big cities, is an increasingly widespread problem all over the F.C.T. The enormous and growing costs caused by it in terms of loss of time and vehicle operation make it essential to find an alternative ways and means of tackling

it. In other word, keeping it under control and ensuring a minimum of sustainability of urban standards of living calls for a multidisciplinary effort which includes the improvement of driving habits, the provision of better infrastructure, and measures to manage traffic (supply-side management) and rationalize the use of public roads (demand management).

5.2 Recommendations

- Greater utilization of modes of transportation with a high occupancy coefficient, including carpooling;
- Shifting of car travel from peak hours to off-peak hours; and Travel on foot or by bicycle.
- Controlling on-street and off-street parking;
- Staggering or spreading out work, school and business schedules;

- Restricting the circulation of certain vehicles or prohibiting certain vehicles at certain times;
- Road pricing using electronic and non-electronic collection methods;
- Methods and situations that alleviate congestion by means of instilling personal convictions and reducing the need to travel.
- Rectification of intersections
- Improvement of road markings and signs
- Rationalization of on-street parking
- Staggering of working hours
- Synchronization of traffic lights
- Reversibility of traffic flow direction in some main avenues
- Establishment of segregated bus lanes, together with the restructuring of the system of bus routes

References

Arasan, T.V (2012*)."* Urban Transportation systems planning". Unpublished Hand Book presented at Short

Courseorganized by Kwame Nkrumah University of Science and Technology and Indian Institute of Technology Madras,Accra.

Broadstock. D. C. *et al. (*2011). " Transportation oil demand, consumer preferences and asymmetric prices "*. Journal of*

Education Studies, vol. 38 No5 pp. 528-536.

Downie, A.(2008) "The World Worst Traffic Jams time". Available at:http://www.time/world/article/0,8599,1733872,00.html.

(Retrieve on 28th February,2019.

Gillen, D.W.(1977). "Estimation and speciEcation of the effect of parking costs on urban transport mode choice", Journal

of Urban Economics 4: 186-99.

Gillen, D.W.(1978)." Parking Location Decisions and the Distribution of congestion", Transportation 7: 69-85

Glazer,A. and Niskanen, E.(1992). "Parking Fees and Congestion", Regional Science and Urban Economics 22: 123-32

Jones M. and Collings S.(1999). "Can Efficient Logistics Reduce Transport Energy Demand? " In D. Watters (eds) *Global*

Jean-Paul R. Theo N.(2018), The Provision and Demand of Transportation Services; https://transportgeography.org/?page_id=5650, Assesed on 04/10/2020

Karsson, C. *et al.* (2007). "The Management of Infrastructure: Performance, Efficiencies and Innovation". UK: EdwardElgar publishing Ltd.

Menon, G., (2004). Report on Congestion Pricing in Port Louis. Ministry of Public Infrastructure and Land Transport, Republic of Mauritius.

Nadiri, M.I. and Mamuneas, T.P. (1996). "Contribution of Highway Capital to Industry and National Productivity

Growth. Federal Highway Administration. Office of Policy Development". Available at: www.ntl.bts.gov/lib/5000/5800/5807/growth.pdf(Accessed 20th October.2018).

Shoup, D. (1982). "Cashing Out Free Parking" Transportation Quarterly 35: 351-364 [53]

Shoup, D. (1987). "Evaluating the Effects of Cashing Out Employer-paid Parking": eight case studies Transport Policy 4: 201-16

Shoup, D. and Willson,R.(1992)."Employer-paid Parking ": the problem and proposed solutions, Transportation Quarterly 46: 169-92

Rahane, S. K. &Saharkar, U. R., (2014). Traffic Congestion Causes and Solutions: A Study of TalegaonDabhade City. Journal of Information, Knowledge and Research in Civil Engineering, 3(1), 160-163.

Roth, G.J.(1965)."Paying For Parking", The Institute of Economic Affairs, London

Rodrigue, J.P. *et al.* (2009). "The Geography of Transportation System". New York: Routledge. Available at: www.en.wikibooks.org/wiki/Gravity_of_migration(Accessed 24th July, 2018).

Tilak, C. & Reddy, R. R., (2016). Measurement of Traffic Congestion on High Dense Urban Corridors In Hyderabad City. Engineering   and   Applied   S c i e n c e s [online],   1(10). Available   from http://publications.anveshanaindia.com/wp-content/uploads/2016/10/Measurement-of-Traffic-Congestion-on-High-Dense-Urban-Corridors-in-Hyderabad-City-2.pdf [Accessed 03 January,2020]

Vencatayaetal. (2018), Assessing the Causes & Impacts of Traffic Congestion on the Society, Economy and Individual: A Case of Mauritius As An Emerging Economy, DOI 10.2478/sbe-2018-0045/SBE no. 13(3) 2018

Vickrey, W.S.(1954). "The Economizing of Curb Parking space" Traffic Engineering Magazine, Nov. Reprinted in Journal of Urban Economics 36: 56-65(1994)

Verhoef, E, Nijkamp, P. and Rietveld, P.(1995)."The Economics of Regulatory Parking Policies": the Impossibilities of parking policies in traffic regulation, Transportation

Weisbrod, G. Vary, D. and Treyz, G (2003). "Measuring the Economic Costs of Urban Traffic Congestion to

Business". Transportation Research Board #1839. Available at: HYPERLINK "http://www.edrgroup.com/pdf/weisbrod-congestion-trr2003.pdf" www.edrgroup.com/pdf/weisbrod-congestion-trr2003.pdf(Accessed 24th Febuary, 2019)

Investigating the Impact of Widening Price Limits on Volatility: The Experience of the Nigerian Stock Exchange

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Abstract

This paper empirically evaluates the impact of return volatility from widening price limits from 5% to 10% on the Nigerian Stock Exchange(NSE) on September 18, 2012 using a Stochastic Volatility model in an event study framework. Using daily trading data from September 2010 to September 2014, the study finds that widening of price limits in the NSE has not increased volatility as feared by some regulators. Stocks with higher free floats and institutional ownership display lower volatility when price limits are widened. This suggests that smaller stock exchanges can improve market efficiency by widening price limits without increasing volatility. The findings also suggest the benefits of widening price limits in improving the price discovery process outweighs any costs associated with irrational behavior by market participants.

Keywords: Price Limits, Stochastic Volatility, Market Efficiency and Emerging Markets

1 Introduction

Even though the efficacy of price limits in moderating stock return volatility is in doubt , many countries continue to employ them. Regulators argue that if markets are small, illiquid and prone to market manipulation, then price limits can mitigate overreaction by unsophisticated retail investors. However, the Chinese debacle of early 2016, where price limits were hurriedly instituted to counter choppy trading and then swiftly dismantled, calls into question that argument .

This paper uses a unique market and a robust methodology to answer the question: What happens to stock return volatility in small, illiquid markets that lack extensive price discovery mechanisms when price limits are removed or expanded?
It is not clear if removing or widening price limits will always moderate volatility. In well developed markets, price limits may not reduce volatility. Rather, price limits may slow down the process of price discovery, disperse volatility to other trading days and reduce liquidity (Surahmanyam, 1994). On the other hand, Deb, Kalev, and Marisetty (2010) argue that price limits may be beneficial in markets susceptible to price manipulation. The lack of consensus on the impact of price limits on stock volatility calls for a more in-depth examination.

The purpose of this paper, therefore, is to bridge the gap in the existing literature by using a more robust methodology to empirically assess whether loosening price limits in a small, speculative and illiquid market will increase stock market volatility. This study uses a stochastic volatility (SV) model in an event study framework to examine whether the policy that widened price limits from (+/-) 5 to (+/-) 10 on 18th September 2012, on the Nigerian Stock Exchange (NSE) has increased stock return volatility. The study also investigates whether widening price limits improves market efficiency by reducing the serial correlations in stock returns.

The main contribution of this paper is to show that even for markets that lack sophisticated investors, widening price limits does not increase conditional volatility. Instead, expanding or removing price limits may increase the efficiency of the market by improving the process of price discovery and liquidity. This study also extends the price limit literature by using a SV method for estimating conditional volatility in a very thin market. Previous studies looking at the impact of price limits on stock return volatility use the autoregressive GARCH methodology. However, using GARCH methodology to examine financial series is subject to bias due to fat tails, leverage effects, and unobserved values (Alberg et al., 2008). SV methods provide more robust estimates in dealing with volatility in financial series (Nakajima, 2008).

From a theoretical point of view, placing limits on the movement of prices for an asset will prevent an equilibrium price from being established on that trading day. When obstacles to the free movement of prices are instituted, costly inefficiencies may be introduced into the market. That is, investors who wish to purchase (or sell) a security at a price beyond the arbitrarily set limits may be unable to complete their trades on that trading day. Consider this example. An investor wishes to bid for Microsoft shares up to a price, say $(p+5) but the daily price limit does not allow trades at prices beyond $p. Since the investor values Microsoft at a price outside the price limit range, the closing market price of $p does not constitute a true clearing price of that stock for the day. Unless the investor's demand changes, the price of the stock on the second day will move in the direction of the previous trading day to accommodate the investor's valuation of the stock.

Lee et al. (1994) argue that the prevention of trading caused by regulatory devices causes

volatility and volume to increase on the subsequent trading day. In that case, price limits simply disrupt the normal and efficient transmission of information used to determine the price of the stock. This is the foundation of the information hypothesis. The fundamental assumption of the information hypothesis is that investors are rational and also that prices are governed by the efficient market hypothesis (EMH). If price limits are truncating the flow of information, then pre-limit and post-limit price behavior will be predictable (Lehmann, 1989). This predictability violates the EMH and makes price limits costly and inefficient.

Regulators in developing countries where these price limits are mostly found view the function and consequences of price limits differently. Typically, these markets are dominated by unsophisticated retail investors and suffer from poor liquidity, herd mentality, and high volatility resulting from markets overreacting to information (Greenwald & Stein, 1988). It is assumed that investors in such markets are prone to overreacting to both positive and negative information shocks. The assumption that market participants are inclined to overreacting is termed the overreaction hypothesis. The overreaction hypothesis suggests markets are characterized by erratic and panic tendencies that are not consistent with market fundamentals.

In such markets, price limits can temper the actions of participants by restricting prices to a limit on that trading day. The limit will provide a cooling off period through which traders can reassess information and make more informed decisions in the subsequent trading period. If traders were overreacting to information, then price limits will break that trend and, therefore, reduce volatility. The overreaction hypothesis can be tested by looking at the conditional volatility of assets before and after price limits are put in place. If volatility declines after price limits are instituted, then the overreaction hypothesis cannot be rejected thus lending credence to the argument of regulators- that price limits moderate volatility.

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[1]See Zhang et al (2016) for a survey of recent literature on this subject

[2]Chinese regulators placed price limits that were supposed to suspend or halt altogether trading on a particular trading day if prices were to fall outside a certain range. On 4th January 2016, the first day of trading, the composite index declined enough to activate the circuit breaker. The circuit breaker was again activated on the 7th of January when the CSI 300 index fell by 7% in the first 29 minutes trading.

Examining overreaction in the behavior of market participants would be futile if limited to larger markets. This is because most of these markets are at-least semi-strong efficient. However, the same cannot be said of participants and price in weaker markets. Predictable behavior in stock returns in emerging markets is due to market inefficiency and overreaction (Boubaker et al., 2015) and speculative trading (Bekaert and Harvey, 1997). Figure 1 shows some divergence in return characteristics between well developed markets in the United States (DOW) versus less developed markets in China (SSE) and Nigeria (NSE). While the DOW is relatively stable with returns oscillating between a +/- 3% ranges, both the NSE and the SSE show frequent deviation from the mean.

Table 1 shows the summary statistics of returns on the NSE, SSE and the DOW. There are key distinctions on the measures that indicate non-normality in returns, particularly the standard deviation of the returns, the coefficient of variation, and excess kurtosis. These differences in characteristics partly explain why the evidence on the efficacy of price limits is mixed. In addition, the macro-economic, political and social environment in developed countries is different from those in emerging countries. The peculiar characteristics of emerging markets necessitate a separate analysis to determine the impact of price limits on volatility.

It is imperative, therefore, to examine the impact of price limits in markets such as the SSE and NSE that are inefficient. This is especially important in markets with weak corporate governance structures and poor or non-existent market monitoring mechanisms. The NSE is a good example of such markets.

The Nigerian Stock Exchange

Established in 1960, the Nigerian Stock Exchange is, as of 2015, the third largest stock exchange on the African continent. As of the 18th of September 2012, the NSE had 201 stocks listed on the main board, with the 30 largest stocks accounting for almost 85% of its capitalization. Market capitalization is around $90 billion. Average daily trading volume is approximately $30 million, which translates to turnover ratio of 0.033%. Foreign investors (mostly institutional investors) account for about 55% of all transactions from 2010 to 2015 (NSE Annual report 2015). The average capitalization of firms in the exchanges is about $203 million with the average firm having about 85 percent of its shares free floating.

From the inception of the exchange in 1960 to 2008, asymmetric price limits of (+/-) 5 of the previous closing price were maintained to moderate volatility. The exchange temporarily changed the price limit to (+ 5) and (-1) in 2008 due to the global financial crises. The price limits reverted to a symmetric (+/-) 5 late 2008 until September 18th 2012, when the price limits were widened to (+/-) 10 on a selected group of 16 stocks.
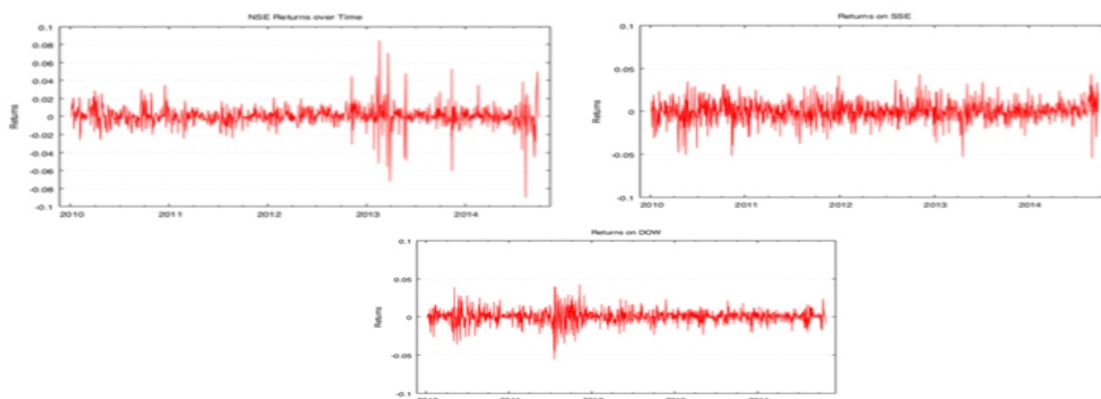

Figure 1: Return Characteristics of NSE, SSE and the DOW Indexes

Some relevant market characteristics about the 16 stocks included in the wider price limit (WPL) group is provided in Table 2. For the stocks included in the WPL regime: median capitalization is $244.4 million; free float 75%, dividend yield 4.6%; and 0.030% turnover ratio. The stocks included in the WPL regime have slightly above average capitalization and liquidity. No explicit reason was given for why the 16 stocks are chosen. But it appears that the chosen stocks have a longer history of unbroken dividend payments, better corporate governance structures, and larger capitalization.

The rest of the paper is organized as follows: Section 2 surveys the literature on this topic. Section 3 explores the data and empirical strategy. Section 4 presents the results, discussion and robustness checks. Section 5 concludes.

2.0 Literature Review

Proponents of price limits believe that, in situations where panic behavior and overreaction is present, price limits dampen overreaction and thus cause volatility to decline. Looking at the performance of price limits on Treasury bond futures in the highly volatile period of the early 1980's, Ma, Rao & Sears (1989) conclude that the presence of price limits causes volatility to decline on subsequent trading days if limits are reached on a particular day. They anchor this belief on the power of price limits in counteracting 'noise' in trading during highly volatile periods. Lehmann (1989) disputes the conclusions from Ma, Rao and Sears on the grounds that without an accurate accounting for the type of traders (patient traders or noise traders), it is difficult to ascertain whether over reactive elements dominate the market. Indeed, he argues that price limits can cause volatility to increase if patient traders cut their supply of the security as the stock reaches its limit. Lauterbach & Ben Zion (1993) present a more detailed look into the performance of price limits and other circuit breakers during the October 1987 market crash in the Tel-Aviv stock

exchange. They find mixed results that show circuit breakers may moderate volatility in the short run causing some price reversal after limits hits. Most of the price reversal and overreaction is limited to stocks with larger capitalizations and lower leverage. However, they also conclude that the long run effectiveness of price limits cannot be established.

Lu (2016) also finds capitalization and trading volume play an important role in assessing the impact of price limits on volatility. This suggests a dichotomy between thinly traded stocks, which tend to display return predictability, versus large cap stocks. Huang et al. (2001) explicitly examined both the information and overreaction hypothesis in the Taiwan stock exchange between 1991-1996. Due to the nature of the market, they find price continuations in overnight trading and then price reversals for subsequent trading periods. This is an indication in support of both the information and overreaction hypothesis. Huang et al. (2001) argue that price continuation is caused by noise traders who cannot discern the actual value of the stock overnight- a period in which trading is not allowed to occur. This price continuation behavior is manifested by the opening price in the subsequent trading period moving in the same direction as the closing price. However, as information traders incorporate their private valuation of the security, all the volatility generated by noise traders is reversed. This, they argue, shows a certain level of erratic behavior in the market, which is consistent with the overreaction hypothesis.

Kim, Liu and Yang (2013) present evidence that shows price limits facilitating the process of price discovery, moderating volatility and mitigating abnormal trading activity. This result stands in direct contrast to Kim and Rhee (1997) who argue that price limits disrupt the price discovery process, which leads to volatility spilling over to subsequent periods. While Kim, Liu and Yang (2013) show the merits of price limits, they did not state the mechanism through

which price limits moderate volatility or mitigate abnormal trading activity. One potential explanation for the conclusions in Kim, Liu and Yang (2013) may be found in Kim and Park (2010). According to Kim and Park (2010) price limits are an indirect way of minimizing the disruptive action of market manipulators. For markets where price manipulators are prevalent or the fear of price manipulation is real, price limits may be beneficial. Under these conditions, they argue, price limits increases the cost of manipulation and also increase the likelihood of being exposed.

Perhaps the main issue ignored in assessing the merits of price limits is the market structure. As noted previously, markets governed by the EMH as less sensitive to predictable behavior. Many emerging markets have been shown to exhibit some of tendencies that violate EMH (Aggarawal et al., 1999). To account for these factors, Westerhoff (2003) constructed an artificial market with these peculiar characteristics to examine the efficacy of price limits. The artificial market is designed to have bubbles, excess volatility and fat tails for returns. Westerhoff (2003) finds that under these conditions, price limits may reduce volatility. The result suggests that markets with these peculiar characteristics are prone to overreaction and that price limits function as regulators intended in mitigating volatility. Yeh and Yang (2010) improve Westerhoff (2003) by constructing a market with rational and heterogeneous traders to examine the effectiveness of price limits.

The artificial market in Yeh and Yang (2010) is designed in such a way that traders have a dynamic learning behavior to mimic the stylized facts observed in real financial markets. They find mixed evidence on the effectiveness of price limits in moderating volatility. They argue that since traders are characterized by bounded rationality, the traders do not know the fundamental value of an asset. The information used to assign value to the asset is constantly updated by the traders relative to an anchored level. Because prices do not deviate sufficiently

from the anchored level (which are forced through price limits), price movements are reduced, in turn lowers volatility.

The results of testing the overreaction hypothesis in actual markets such as the artificial one modeled in Yeh and Yang (2010) have been consistently against evidence of overreaction. For instance, Phylaktis, Kavussanos & Manalis (1999) in the Athens stock exchange; Bildik & Elekdag (2004) in the Istanbul Stock Exchange; Zhang et al. (2016) in the Shanghai Stock Exchange; Henke &Voronkova (2005) in the Warsaw Stock Exchange; Polwitoon (2011) in the Thai Stock Exchange; and Farag (2013) in the Egyptian Stock Exchange all reject the overreaction hypothesis.

The discourse above demonstrates the lack of consensus on the actual impact of the adoption of wider price limits on the market. More recent empirical studies support this. For instance, Lin and Chiao (2019) shows a tradeoff between improvements in liquidity and inefficiencies in the price discovery process when price limits are widened. This suggests markets are irrational but as Wang, Ding, and Hsin (2018) shows, price limits are effective in mitigating irrational behavior in stock markets. Both studies were conducted within similar time frames on the Taiwan Stock Exchange; but the results would seem contradictory with one showing partial evidence on market inefficiencies introduced by price limits while the other suggests price limits help in countering inefficiencies (and irrational behaviors) on the exchange.

At the same time, Seddighi and Yoon (2018) finds recent expansion on price limits increases market efficiencies which is at direct variance with Lim and Brooks (2009) who argue that narrow price limits do not introduce market inefficiencies.

This study utilizes an event study framework with SV specification to compare the conditional volatility of stock returns before and after price limits are widened on the

Nigerian Stock Exchange. The use of SV as a device of estimating conditional volatility allows for a robust estimation of volatility in the presence of censored prices and other market inefficiencies. Additionally, previous studies conducted on this topic had been concentrated on markets that have large trading volumes and large market caps. It is then expected that examining this subject under a small and illiquid market such as NSE can provide a better insight on the impact of price limits in markets where market manipulations are rampant and irrational behavior is frequently observed.

2.1 Why Use Stochastic Volatility?

As noted previously, using GARCH methodology to examine financial series is subject to bias due to censored observations and distributional assumptions. I explain below the reasons for using a SV model to provide more robust estimates in assessing the impact of price limits on conditional volatility.

Censored observations: Are limit-hitting closing prices in a market with price limits the equilibrium prices for that trading day? The answer is: (i) Yes, if prices would have settled at the price limit even if there were no price limits in place; (ii) No, if price limits prevented the closing prices from reaching a point which is beyond the limit ranges. In markets with price limits, it is difficult to establish whether condition (i) or (ii) causes closing prices to settle at the price limit. Some studies have modeled this uncertainty in examining the efficacy of price limits (See Kodres, 1988 for example). While these adjustments improve the estimation of conditional volatility, they do not completely remove the bias. Wei (2002) shows that using a censored-GARCH model provides a more robust estimation of volatility associated with the imposition of price limits. However, even censored-GARCH models do not completely eliminate the bias inherent in AR models.

Fat tails: It is well-established that stock returns (and return volatility) in emerging markets exhibit skewness and kurtosis that are changing over time (Bekaert et al., 1998). As such, volatility models that use autoregressive methods are likely to provide biased estimates. Wilhelmsson (2006) shows forecasting with GARCH methods provide significantly different point estimates based on distributional assumption employed. On the other hand, Watanabe and Asai (2001) argue that SV model are less sensitive to distributional assumptions. Unlike SV models, the leptokurtosis of returns increases GARCH variance estimates due to current volatility determined only by previous volatility.

Based on the two factors above, I expect using SV to model time varying volatility to provide more robust estimates. This is mainly due to SV models incorporating two error processes in the return equation and the conditional volatility equation that provide more flexibility in fitting the data (Hafner and Preminger, 2010).

3.0 Methodology
3.1 Data of Constituent Stocks

I source daily trading data primarily from http://www.cashcraft.com/pmovement.php. Market data for individual stocks was extracted fromhttp://markets.ft. com/research.This study uses daily trading data from September 2010 to September 2014 for a total of 1,010 trading days. This time frame covers 2 years prior to the policy widening price limits and 2 years after.
I present the stock return summary statistics in Table 3. The mean return is statistically indistinguishable from zero. I check for autocorrelation using Box-Pierce Test with a lag order of 2. From column 5 of Table 3, I reject the null that returns are unpredictable for nine out of the sixteen stocks under examination. The existence of serial correlation in daily return is not in of itself conclusive evidence of a violation of the EMH. The fact that the majority of stocks in this analysis exhibit this behavior provides more justification for using the NSE to examine the impact of price limits. The Jarque-Bera statistics show that the null of

normality is rejected for all stocks.

3.2 Models Specification

To determine whether widening price limits in the NSE increases stock return volatility, I empirically test the Information and Overreaction Hypotheses. The identifying assumption in testing the information hypothesis is: I expect to see more serial correlation in stock return due to the regulation widening price limits. I formulate a hypothesis similar to Phylaktis, Kavussanos & Manalis (1999): There are significant serial correlations in returns in the narrower price-limit period. I test this hypothesis using the following econometric specification:

$$y_t = \sum_{i=1}^{N} \beta_i y_{t-i} + \varepsilon_t \qquad (1)$$

where $y_t = \ln(p_t/p_{(t-1)})$ is the stock return between two trading days, t is the time in days, while ε_t is the error term. The lag order is captured by i. If price limits restrict prices from hitting their equilibrium on a limit-hitting day, then it should be the case that prices will continue moving in the same direction in the subsequent trading periods until the equilibrium is reached. Accordingly, this hypothesis examines whether the narrow price limits prevailing prior to the policy change cause a predictable movement in prices in the day after the limit is hit. In essence, if more $\sum_i^N \beta_i$ are significantly different from zero in the narrow price limit period, this indicates that price limits are truncating the flow of information into prices.

The second question I investigate is whether stock return volatility increases when the price limit is widened. I test the following hypothesis: Stock return volatility of returns in the wider price-limit period should be greater than in the narrow-limit period. I test this hypothesis by employing a time-varying volatility model along the lines of Kim, Shepard & Chib's (1998) as follows:

$$y_t = e^{\frac{h_t}{2}} \varepsilon_t \qquad (2)$$
$$h_t = \mu + \phi(h_{t-1} - \mu) + \sigma_n \eta_t \qquad (3)$$
$$h_1 \sim N\left(\mu, \frac{\sigma^2}{1 - \phi^2}\right) \qquad (4)$$

where y_t is the return for the stock between two trading days; ε_t is a normally distributed error in the return equation; h_t is the conditional volatility at time t; μ is the mean of log volatility, ϕ is the persistence in volatility, and σ_n is the volatility of log volatility. η_t is the error in the variance equation. I modify the conditional volatility Equation (3) by adding a binary dummy variable (WPL). WPL takes the value 0 prior to the 18th of September 2012 and 1 afterwards.

$$h_t = \mu + \phi(h_{t-1} - \mu) + \delta(WPL) + \sigma_n \eta_t \qquad (5)$$

The parameter of interest is δ. It measures whether stock return volatility changes after price limits are widened on the NSE. A significantly positive coefficient on WPL means a wider price limit causes conditional volatility to increase when price limits are widened. A negative δ suggests conditional volatility decreases when price limits are widened.

Table 4 presents some raw data on the number of limit hits before and after price limits are widened. As expected, there are more limit hits during the narrow price limit regime.

On average, stocks hit the 5% limit about 11 times during the narrow price limit period. Upper hits are more common than lower hits that may indicate an asymmetry in how market participants react to positive and negative news. When price limits are widened, the average number of limit hits falls to around 2 times over the time frame. Based on the Information hypothesis, limit hits are indicative of a truncation of the price discovery process. In that regard, the data from Table 4 suggests that narrower price limits do restrict the free movement of prices.

Figure 2 presents a time series plot of stock returns. The vertical line at the middle of the figures represents the period when price limits were widened. The figure shows less variability and more clustering in stock returns during the narrow price limit period. This suggests a level of predictability in the movement of prices, which is in violation of the EMH. After price limits are expanded, the

figure shows more variation in returns and less clustering. The increasing randomness in returns after price limits are widened provides a visual confirmation of markets becoming more efficient.

4.0 Results and Discussion

Prior to commencing the analysis, I check the stationarity of the series to ensure boundedness. Unit root tests using ADF and KPSS models show the series are stationary (results not shown). I present the results of testing the information hypothesis as specified in Equation (1) in Table 5. I limit the analysis to two lags because serial correlation on lags greater than two days were mostly insignificant. β_1, which measures first-order serial correlation in returns under the narrow price limit (NPL) regime is statistically significant in six out of fourteen stocks. Upon widening price limits, only two out of 14 stocks show first-order serial correlation.

More price continuations over 2 consecutive trading days, t and $t+1$, in the NPL regime provides some evidence in support of the information hypothesis.
Evidence of first-order autocorrelation in stock returns is necessary but not sufficient to make definitive statements about the information hypothesis. To obtain more robust evidence, I check whether prices continue along the same trend 2 days apart. That is, will the direction of the second-order lag, β_2, also be consistent with first-order lag? Under narrow price limits, the coefficient on the second order lag, β_2, for four out of fourteen stocks is negative and statistically significant. The coefficient β_2, during the wider price limit is negative and statistically significant in three out of the 14 stocks.

A Price continuation between t and $t+1$ is consistent with the information hypothesis but price reversals between $t + 1$ and $t + 2$ suggests overreaction. The estimates seem to be in conflict with some evidence in support of the information hypothesis and other pieces of information in support of the overreaction hypothesis. I attempt to clarify

the results disaggregating the analysis for each stock separately. This may show if the estimates from a few stocks are driving the results.

DIAMOND: From Table 5, the coefficient on the first-order lag shows that there is no serial correlation in the NPL regime. The result also rules out the existence of first-order serial correlation in the WPL. However, the second-order lag presents a different story. The coefficient, β_2, under NPL is insignificant while β_2 is negative and significant for WPL. These estimates provide a mixed picture. Instead of establishing the information
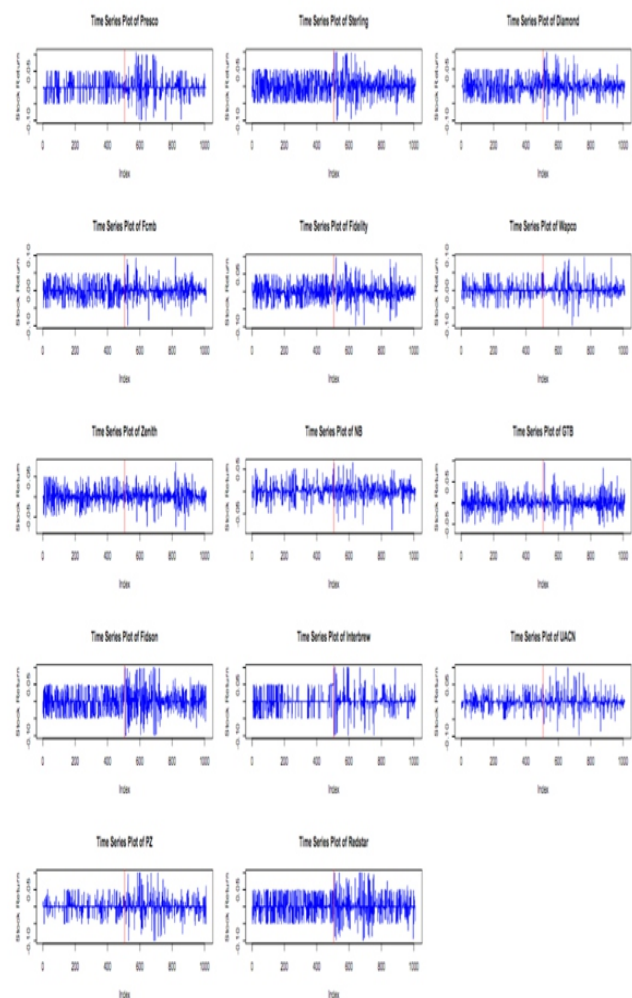

Figure 2: Times Series Plot of the Stocks

hypothesis, this result points to some level of market correction which is inconsistent with the EMH.

FCMB: The coefficient β_1 for this stock is positive and statistically significant under NPL but insignificant under the WPL. This indicates that under NPL, the stock is exhibiting serial autocorrelation. Upon widening the price limits, serial correlation in stock returns in not present. The coefficients on the second order lag are insignificant. These results suggest that when price limits are narrow, the stock exhibits price continuation which is consistent with the information hypothesis.

FIDELITY: The coefficient on β_1 is significant at the 90% under the NPL but insignificant under WPL. The coefficient on second-order serial correlation is insignificant for both NPL and WPL. This result is consistent the information hypothesis and the raw data in Table 4 which shows the number of limit hits falling from 12 under NPL to zero when price limits were expanded.

FIDSON: The estimate on β_1 for this stock shows there is no serial autocorrelation under both NPL or WPL. However, the coefficient on the second-order serial correlation is negative and statistically significant under NPL. The estimate on β_2, is insignificant under WPL. Price reversals, even under NPL, do not provide evidence in support of the information hypothesis. The lack of such price reversals under WPL may indicate an improvement in market efficiency.

GTB: Table 5 shows the estimate on β_1 for this stock is insignificant in the NPL but negative and significant under the WPL. This is a curious result in that no price continuations are observed under NPL but price reversals are prevalent under WPL. It is hard to reconcile this result with the assumption that NPL reduce market efficiency. This result suggest the reverse. For β_2, the estimate is negative and statistically significant under NPL but insignificant under WPL. This result is more consistent with expectation. It shows price

reversals- a sign of market inefficiency- in the NPL which does not carry over when price limits are widened. This is consistent with the information hypothesis, which posits that non-linearities are more likely to occur during NPL.

INTERBREW: The estimate on β_1 for this stock is positive and significant under NPL but insignificant under WPL. The results on β_2, are both insignificant. These results suggest the stock exhibited serial autocorrelation in the NPL but not in the WPL, which is consistent with information hypothesis.

NB: Table 5 shows the estimate on β_1 for this stock is positive and significant during the NPL but insignificant in the WPL regime. Additionally, β_2, is negative and significant under NPL but not in the WPL. This result indicates both price continuation at $t + 1$ and price reversals at $t + 2$. The price reversal at $t + 2$ suggests the price continuation in $t + 1$ is cancelled out thus negating the conclusion on the significance of β_1. The existence of return predictability during NPL and not in WPL points to the disruptive feature of price limits.

PRESCO, PZ and WAPCO: For these three stocks, I do not estimate a statistically significant coefficient for serial autocorrelation in either NPL or the WPL.

REDSTAR: Table 5 shows the estimate of β_1 and β_2 are negative and statistically significant under the WPL period.

The coefficients on first-order and second-order serial correlations are insignificant under the NPL. This is interesting on 2 counts. First, it suggests that there is no serial autocorrelation under the more restrictive NPL period. This is contrary to my expectations of more predictability in a narrow price limit period as seen in other stocks. Secondly, the negative signs on both β_1 and β_2 suggests price reversals on both days $t+1$ and $+2$. This implies that when price limits were widened, stock returns may be inflated at t which necessitates a reversal on days $t+1$ and $t+2$. This is not consistent

with the information hypothesis which assumes more inefficiencies in the NPL.

STERLING and UACN: The estimate on first-order serial correlation under NPL is positive and statistically significant for both stocks. When price limits were widened, β_1 is positive but insignificant. All estimates on the second-order lag are also insignificant. These results provide strong support for the information hypothesis.

ZENITH: Table 5 shows there is no first-order serial correlation in stock returns under both NPL and WPL. The estimate of β_2, however, is negative and statistically significant under both the NPL and the WPL. Stock return predictability between days t and t+2, does not provide strong evidence to reject the information hypothesis.

In summary, Table 5 shows that evidence supporting the information hypothesis is mixed. For the most part, stocks exhibited return predictability during the narrow price limit period. This is consistent with the information-censoring story. However, frequent price reversals suggest markets may be overreacting in exhibiting price continuations. A few other things also come to light. The stocks that exhibit first-order serial correlation in stock returns tend to be illiquid. Chordia, Richard, and Subrahmanyan (2008) shows that as a result of more private information being incorporated into stock prices return autocorrelations decrease when liquidity improves. The results in Table 5 also confirm the link between liquidity and market efficiency. It indicates that more liquid stocks are not the ones displaying first-order correlations. I argue that when limits were widened, liquidity improved which lead to fewer stocks exhibiting first-order autocorrelations.

Ultimately, my hypothesis is that there is more serial correlation in returns during the narrow price limit regime. The results show

more stocks exhibiting serial correlation in the NPL which is consistent with the information hypothesis.

Turning to the overreaction hypothesis, the [3]RSTAN bayesian package to estimate conditional volatility was utilized. I initialize the prior distributions of the hyper-parameters following Hsieh & Yang (2009) as follows. The model was estimated using 10,000 iterations, 1 chain, 2,000 burn-in iterations, and the last 1,000 draws in the chain for analysis.

$$\mu \sim normal(-5,2)$$
$$\phi \sim beta(0.9,2)$$
$$\sigma \sim cauchy(0,5)$$
$$\delta \sim uniform(-2,5)$$

Table 6 presents the results of testing the overreaction hypothesis. The posterior means of the parameters and standard deviation are reported for: the mean of log volatility, μ; the persistence in volatility, ϕ; and the volatility of log volatility σ_n.

The mean of parameter of interest, δ, is presented in column 7 with the 95% credibility interval reported in the square brackets beneath the mean $_o$, in column (7). The study finds widening price limits did not alter the conditional volatility of 10 stocks out of the fourteen stocks examined. The coefficient that measures whether volatility increased when the price limit was widened, δ, is negative, but statistically insignificant, for half the stocks. For FCMB, δ, is negative and significant which implies that price limits caused the conditional volatility for FCMB to decline. For NB, PRESCO and PZ, conditional volatility increased when price limits were widened. But why does volatility increase when price limits are widened for NB, PRESCO and PZ , but not the other stocks?

Free Float and Liquidity: From Table 2, the stocks with the least ratio of shares floating are PZ, NB and PRESCO. These also happen to be the stocks that exhibit higher conditional volatility when price limits were widened. FCMB, with 98% of its shares free floating, witnessed a decline in conditional stock volatility

[3]Stan Development Team (2015). Stan:
A C++ Library for Probability and Sampling,
Version 2.8.0. URL http://mc-stan.org

during the WPL regime. While not directly linear, it appears that there is a relationship between free float and volatility (Hong, Scheinkman and Xiong, 2006). Floating affects volatility through the flow of information in the valuation of the stock. Since investors have heterogeneous beliefs about the intrinsic value of the stock, the availability of free floating stocks allow both investors with an optimistic and pessimistic valuation of the stock to trade. In the limit with a large shareholding base, the expectations of optimistic and pessimistic investors cancel each other, which moderates the volatility in prices. This constant tug between buyers and sellers with different expectations increases the liquidity of the stock. In fact, the medium through which stocks with higher free floats exhibit lower volatility is liquidity. It is not surprising therefore that the stocks exhibiting higher conditional volatility when price limits were widened are the least liquid. Illiquidity hampers market efficiency, which in-turn causes the conditional volatility to increase.
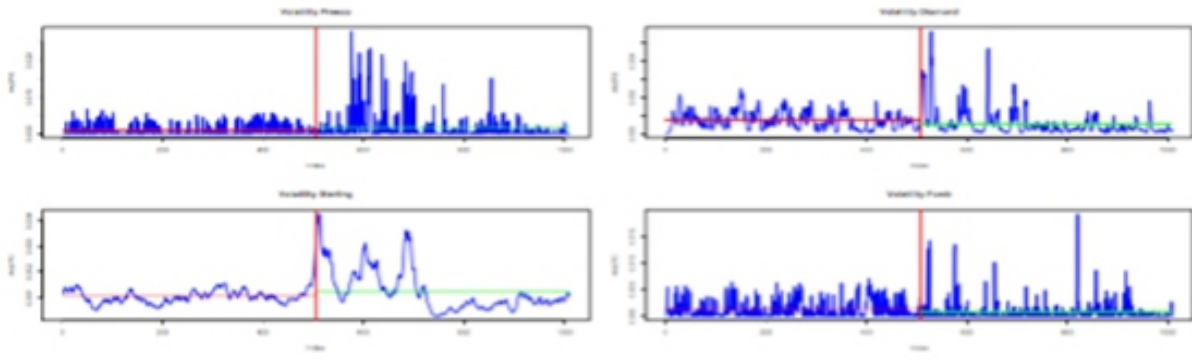
Foreign Ownership: Table 2 also provides an additional clue on why conditional volatility increased during the WPL for NB, PRESCO and PZ. With the exception of WAPCO, all the stocks with foreign ownership greater than 50% witnessed an increase in volatility during the WPL. Foreign investors raise the volatility of stocks by importing world market risk (Bae et al., 2004). Even a relatively small number of foreign investors can have a disproportionate impact on volatility (Wang, 2007). The nature of foreign ownership in the NSE is not in the form of foreign institutional investors. Rather, stocks with large foreign ownership tend to be subsidiaries of foreign companies in Nigeria. It is noteworthy in this context that foreign participation in the NSE has increased by 72% from 2006 to 2011 (NSE Annual report, 2011).
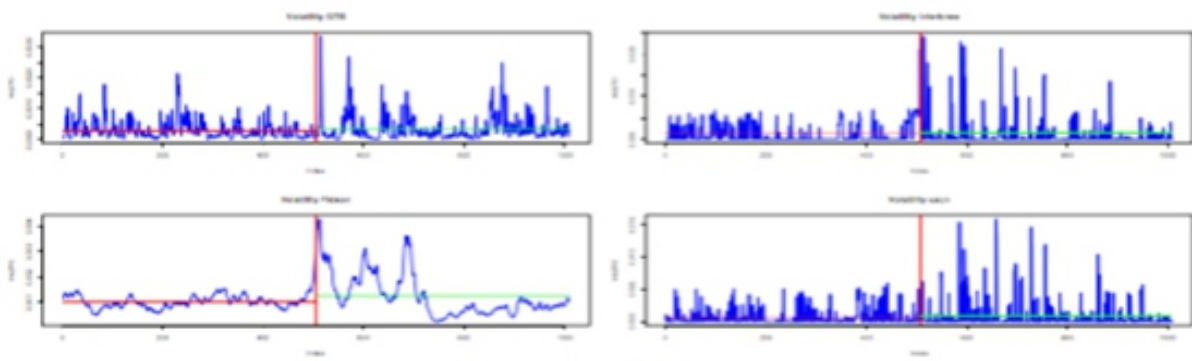
I present the plots of the conditional volatility over time in Figure 3. These give additional insight into the evolution of volatility before and after widening price limits. The horizontal volatility. Additionally, the figure shows large, but infrequent, spikes in conditional volatility after price limits are widened for NB, PRESCO and PZ. This seems to suggest that volatility increased for NB, PZ and PRESCO in the WPL due to few periods of extreme volatility and not as a result of sustained overreaction. There seems to be less clustering in the conditional volatility plots for all types of stocks after price limits are expanded. As a whole, these results are consistent with previous studies conducted on small markets that reject the overreaction hypothesis (See Bildik & Elekdag, 2004; Polwitoon, 2011; and Farag, 2013). This result enriches the literature by showing evidence against the overreaction hypothesis in a very small illiquid market characterized by many small-unsophisticated retail investors. It also shows even in the absence of tools which aid the process of price discovery (derivatives and market makers), widening price limits on the NSE does not increase volatility.

While the results from this section largely reject the overreaction hypothesis, the results from the 3 stocks showing higher volatility warrants further examination. The study employs a different specification to confirm the consistency of the results. Using GARCH methods, Ohuche and Ikoku (2014) find the introduction of higher symmetric price band moderated volatility on the NSE while Olowookere (2014) shows volatility increasing when price limits are widened on the (NSE).

The study finds that widening price limits does not worsen stock return volatility as feared by regulators. Using the SV framework, no change was observed in the conditional volatility for nine out of 14 stocks I examine when price limits were widened.

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[a]For instance, NB is the Nigerian subsidiary of the Dutch brewing giant Heineken BV and Distilled Trading BV. The parent company holds close to 67% of the stock. PZ is a subsidiary of PZ Cussons of the UK who hold 69.22% of the shares. PRESCO is a company focused on growing, processing, and marketing Palm oil. The SIAT group of Belgium is the parent company of PRESCO and holds 60% of the equity with the other 40% held by other domestic investors. In these three companies and others that subsidiaries of foreign conglomerates, the block shares owned by the parent company are scarcely traded.

(a) Conditional Volatility

(b) Conditional Volatility

(c) Conditional Volatility

(d) Conditional Volatility

Figure 3: Conditional Volatility Plots

Three stocks experienced higher volatility when price limits were widened, Notably, stock return volatility actually decreased for one stock when price limits were widened. These results suggests that even for markets dominated by unsophisticated retail investors, wider price limits do not worsen volatility. I suspect that widening price limits is not causing an increase in volatility due to improvements in market efficiency. With respect to the claim that narrow price limits introduce inefficiencies, this study shows that stocks that exhibit serial correlation when price limits are more restrictive. This is consistent with the arguments in Fama (1988) and Lehmann (1989).

I also note some negative correlation between stock liquidity and conditional volatility after price limits are widened. Stocks with lower free-floats/turnover-ratios tend to exhibit higher volatility when price limits are widened. Additionally, I find that the stocks with large foreign ownership also experience higher volatility when price limits are expanded.

The study uses the NSE as a case study to investigate the efficacy of price limits because it exhibits the very characteristics regulators cite as the reason for instituting price limits. More than any market of its size, the NSE is characterized by very low liquidity, the absence of derivatives, and low capitalization.
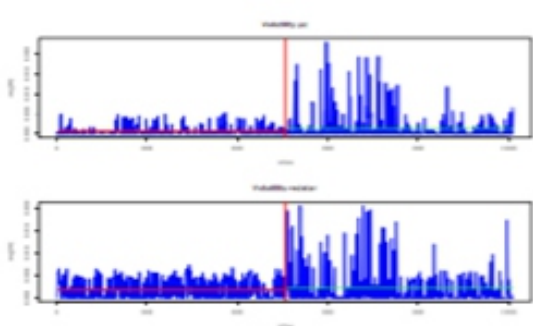
4.2 Implications and Limitations

The results of this paper have direct implications for other small markets having similar characteristics with NSE. Widening price limits may increase efficiency without increasing volatility making these markets attractive to foreign portfolio investors. Additionally, expanding price limits can mitigate the Magnet Effect commonly observed in emerging markets with price limits.

Even with a more appropriate specification and market conditions, there are still other issues not explicitly modeled here that may be useful in enriching the robustness of these results. It must be noted that this study does not examine whether the results will be consistent if the initial level of the price limits are different. Also, the study may not be generalizable to other markets if insider trading or other frictional issues are prevalent. It may also be beneficial to control the impact of some macroeconomic variables such as inflation, FDI, growth rates, commodity prices, etc. on volatility to ensure robustness of the results.These results have important practical implications for emerging countries. Small markets can widen/expand price limits because they do not increase volatility but rather improve efficiency. A more efficient market may attract foreign and institutional investors who may help reduce the cost of capital or even spur economic growth.

5.0 Conclusion

This study evaluates whether widening price limits from (+/-) 5% to (+/-) 10% in the Nigerian Stock Exchange (NSE) caused volatility to increase. It has been argued by Kim & Rhee (1997) and more recently by Farag (2013) that removing price limits does not cause volatility to worsen. Others like Westerhoff (2003) and Huang et al. (2001) counter by arguing that price limits do moderate volatility if markets are inefficient. I extend the conversation by empirically assessing the overreaction and information hypotheses by using a more appropriate market (NSE) and a more robust methodology- the Stochastic Volatility model. The study finds that widening price limits does not cause volatility to increase in the NSE. Widening price limits improves the efficiency of the NSE which explains why volatility does not worsen. I also find a strong connection between level of foreign ownership of a stock and an increase in conditional volatility when price limits are widened. These results are robust to other empirical specifications.

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[5]At 8.2 percent, the *stocks traded turnover ratio* of domestic shares is much lower in the NSE than almost all peer countries. The median turnover as a percentage of GDP for emerging countries like Nigeria is around 18.2 (World Bank 2015).
The lack of derivative securities on the NSE makes it unique for examining the impact of price limits. According to Pericli and Koutmos (1997), derivative securities are an important tool in the price discovery process and also useful in minimizing stock volatility.

References

Aggarwal, R., Inclan, C., & Leal, R. (1999). Volatility in Emerging Stock Markets. *Journal of Financial and Quantitative Analysis*, *34*(01), 33-55.

Alberg, D., Shalit, H., & Yosef, R. (2008). Estimating Stock Market Volatility using Asymmetric GARCH Models. *Applied Financial Economics*, *18*(15), 1201-1208.

Bae, K.H., K. Chan, & A. Ng. (2004). Investability and Return Volatility. *Journal of Financial Economics*, *71*(2), 239-263.

Bekaert, G., & Harvey, C. R. (1997). Emerging Equity Market Volatility. *Journal of Financial Economics*, *43*(1), 29-77.

Bekaert, G., Erb, C. B., Harvey, C. R., &Viskanta, T. E. (1998). Distributional Characteristics of Emerging Market Returns and Asset Allocation. *Journal of Portfolio Management*, *24*(2), 102-116.

Bildik, R., & Elekdag, S. (2004). Effects of Price Limits on Volatility: Evidence from the Istanbul Stock Exchange. *Emerging Markets Finance and Trade*, *40*(1), 5-34.

Boubaker, S., Farag, H., & Nguyen, D. K. (2015). Short-term Overreaction to Specific Events: Evidence from an Emerging Market. *Research in International Business and Finance*, *35*, 153-165.

Chiou-Fa Lin & Cheng-HueiChiao (2019) Widening price limit effects: evidence from an emerging stock market, Applied Economics,

Chordia, T., Roll, R., &Subrahmanyam, A. (2008). Liquidity and Market Efficiency. *Journal of Financial Economics*, *87*(2), 249-268.

Deb, S. S., Kalev, P. S., &Marisetty, V. B. (2010). Are Price Limits Really Bad for Equity Markets?.*Journal of Banking & Finance*, *34*(10), 2462-2471.

Farag, H. (2013). Price Limit Bands, Asymmetric Volatility and Stock Market Anomalies: Evidence from Emerging Markets. *Global Finance Journal*, *24*(1), 85-97.

Fama, E. F. (1988). *Perspectives on October 1987, or, what did we learn from the crash?*. Center for Research in Security Prices, Graduate School of Business, University of Chicago.

Greenwald, B., & Stein, J. (1988). The task force report: The reasoning behind the recommendations. *Journal of Economic Perspectives*, *2*(3), 3-23.

Hafner, C. M., & Preminger, A. (2010). Deciding between GARCH and stochastic volatility via strong decision rules. *Journal of Statistical Planning and Inference*, *140*(3), 791-805.

Henke, H., &Voronkova, S. (2005). Price limits on a call auction market: Evidence from the Warsaw Stock Exchange. *International Review of Economics & Finance*, *14*(4), 439-453.

Hong, H., Scheinkman, J., &Xiong, W. (2006). Asset Float and Speculative Bubbles. *The Journal of Finance*, *61*(3), 1073-1117.

Hsieh, P. H., & Yang, J. J. (2009). A censored stochastic volatility approach to the estimation of price limit moves. *Journal of Empirical Finance*, *16*(2), 337-351.

Huang, Y. S., Fu, T. W., &Ke, M. C. (2001). Daily price limits and stock price behavior: evidence from the Taiwan stock exchange. *International Review of Economics &*

Finance, *10*(3), 263-288.

Kim, K. A., & Rhee, S. (1997). Price limit performance: evidence from the Tokyo Stock Exchange. *The Journal of Finance*, *52*(2), 885-901.

Kim, K. A., Liu, H., & Yang, J. J. (2013). Reconsidering price limit effectiveness. *Journal of Financial Research*, *36*(4), 493-518.

Kim, K. A., & Park, J. (2010). Why do price limits exist in stock markets? A manipulation-based explanation. *European Financial Management*, *16*(2), 296-318.

Kim, S., Shephard, N., &Chib, S. (1998). Stochastic volatility: likelihood inference and comparison with ARCH models. *The Review of Economic Studies*, *65*(3), 361-393.

Kodres, L. E. (1988). Tests of unbiasedness in foreign exchange futures markets: the effects of price limits. *Review of Futures Markets*, *7*(1), 139-175.

Lauterbach, B., & Ben-Zion, U. R. I. (1993). Stock market crashes and the performance of circuit breakers: Empirical evidence.*The Journal of Finance*, *48*(5), 1909-1925.

Lee, C., Ready, M. J., & Seguin, P. J. (1994). Volume, volatility, and New York stock exchange trading halts. *The Journal of Finance*, *49*(1), 183-214.

Lehmann, B. N. (1989). Volatility, price resolution, and the effectiveness of price limits: Commentary. *Journal of Financial Services Research,3*, 205-209.

Lim, K.-P. and R.D. Brooks (2009). Price limits and stock market efficiency: Evidence from rolling bicorrelation test statistic. *Chaos, Solitons& Fractals*, *40*(3),1271-1276.

Lu, L. (2016). Performance of price limits: Evidence from cross-listed stocks in China. *Journal of Shanghai Jiaotong University (Science)*, *21*(2), 247-256.

Ma, C. K., Rao, R. P., & Sears, R. S. (1989). Volatility, price resolution, and the effectiveness of price limits. *Journal of Financial Services Research*, *3*(2), 165-199.

Nakajima, J. (2008). *EGARCH and stochastic volatility: Modeling jumps and heavy-tails for stock returns* (No. 08-E-23). Institute for Monetary and Economic Studies, Bank of Japan.Retrieved from https://www.imes.boj.or.jp/research/papers/english/08-E-23.pdf

Nigerian Stock Exchange Annual Reports http://www.nse.com.ng/aboutus-site/Pages/Annual-Reports.aspx

Ohuche, F. K., & Ikoku, A. E. (2014). Financial Management Focus on Price Volatility and 'Circuit Breakers' in the Nigerian Equity Market Implications for Monetary Policy. *Journal of Financial Management & Analysis*, *27*(2), 1-29.

Olowookere, A. E. (2014). Institutional Requirement on Price Limit and Stock Market Volatility in Nigeria. The Nigerian Journal of Economic and Social Studies, *56*(1), 1-22

Phylaktis, K., Kavussanos, M., &Manalis, G. (1999). Price limits and stock market volatility in the Athens Stock Exchange. *European Financial Management*, *5*(1), 69-84.

Pericli, A., &Koutmos, G. (1997). Index futures and options and stock market volatility. *Journal of Futures Markets*, *17*(8), 957-974.

Polwitoon, S. (2011). The effect of price limits changes on return volatility: Evidence from the stock exchange of Thailand. *International Business & Economics Research Journal (IBER)*, *3*(9), 49-64.

Seddighi, H. R. and Yoon, Il-Hyun, (2018), Stock Market Efficiency and Price Limits: Evidence from Korea's Recent Expansion of Price Limits, *Asian Journal of Economics and Empirical Research*, *5*(2), 191-200.

Subrahmanyam, A. (1994). Circuit breakers and market volatility: A theoretical perspective. *The Journal of Finance*, *49*(1), 237-254.

Wang, J. (2007). Foreign equity trading and emerging market volatility: Evidence from Indonesia and Thailand. *Journal of Development Economics*, *84*(2), 798-811.

Wang, Ming-Chang, Ding, Yu-Jia and Hsin, Pei-Han, (2018), Order Aggressiveness and the Heating and Cooling-off Effects of Price Limits: Evidence from Taiwan Stock Exchange, *Journal of Economics and Management*, *14*(2), 191-216.

Watanabe, T., &Asai, M. (2001).*Stochastic volatility models with heavy-tailed distributions: A Bayesian analysis*. Institute for Monetary and Economic Studies, Bank of Japan. Retrieved from http://www.math.chuo-u.ac.jp/~sugiyama/15/15-02.pdf

Wei, S. X. (2002). A censored–GARCH model of asset returns with price limits. *Journal of Empirical Finance*, *9*(2), 197-223.

Westerhoff, F. (2003). Speculative markets and the effectiveness of price limits. *Journal of Economic Dynamics and Control*, *28*(3), 493-508.

Wilhelmsson, A. (2006). GARCH forecasting performance under different distribution assumptions. *Journal of Forecasting*, *25*(8), 561-578.

World Bank. (2015). Stocks traded, turnover ratio of domestic shares. Retrieved from:http://data.worldbank.org/indicator/CM.MKT.TRNR

Yeh, C. H., & Yang, C. Y. (2010). Examining the effectiveness of price limits in an artificial stock market. *Journal of Economic Dynamics and Control, 34*(10), 2089-2108.

Yan Du, D., Liu, Q., & RHEE, S. (2009). An analysis of the magnet effect under price limits. *International Review of Finance*, *9*(1-2), 83-110.

Zhang, X., Ping, J., Zhu, T., Li, Y., &Xiong, X. (2016). Are Price Limits Effective? An Examination of an Artificial Stock Market. *PloS one*, *11*(8), 1-21

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Table 1: Summary of Market Return Characteristics

	Mean	Std. Dev	C.V	Skewness	Ex. Kurtosis
NSE	0.00047	0.01079	22.689	-0.1792	13.81
SSE	0.00007	0.0118	174.96	-0.2222	2.08
DOW	0.00045	0.00917	20.09	-0.3483	3.98

NOTES- NOTES- Std. Dev stands for standard deviation; C.V is the coefficient of variation

Table 2: Select Financial Features of Chosen Stocks

	Market Cap ($,millions)	Shares Out (billions)	Daily Average Turnover (%)	Free Float (%)	Dividend Yield (%)	Foreign Ownership (%)
BAGCO**	104.5	6.2	0.002	99	4.12	N/A
DIAMOND	205.1	23.2	0.045	69	5.03	14.79
DNMEYER*	3.3	0.4	0.004	67	N/A	N/A
FCMB	213.8	19.8	0.017	98	10.2	5.31
FIDELITY	217.3	28.9	0.025	96	10.61	0.14
FIDSON	23.3	1.5	0.079	93	2.73	0.18
GTB	3500	30	0.042	93	6.42	11.91
INTERBREW	271.5	3.2	0.013	82	1.52	65
NB	4870	7.9	0.031	32	3.14	67
PRESCO	152.5	1.1	0.004	40	2.81	60
PZ	495.1	3.9	0.008	31	2.92	63.89
REDSTAR	12.6	0.6	0.011	77	7.45	0.79
STERLING	320.6	28.9	0.005	62	2.54	11.81
UACN	305.2	1.9	0.015	51	4.9	7.8
WAPCO	2172	4.7	0.043	91	3.35	60.07
ZENITH	2775	31	0.109	93	1.24	15.44

NOTES- Market data is from closing prices on September 18, 2012 from the Financial Times. * Trading in DNMEYER was suspended in 2013 due to pending litigation ** BAGCO was delisted from the main board of the NSE because the company was bought over by another firm on the exchange. Due to inadequate observation points for BAGCO and DNMEYER, I did not include them in the analysis.

Table 3: Return Summary Statistics for the Selected Stocks

	Mean Return	Std Dev of Return	Ex. Kurtosis	Box-Pierce Test	Jarque-Bera Statistic
DIAMOND	0.000339	0.0264	2.07	24.63 (0.000)	73.16 (0.000)
FCMB	-0.000421	0.0244	1.15	7.82 (0.020)	47.17 (0.000)
FIDELITY	0.000337	0.0256	0.19	1.16 (0.561)	49.27 (0.000)
FIDSON	0.000288	0.0337	0.42	15.19 (0.000)	8.00 (0.018)
GTB	0.000943	0.0191	1.78	2.09 (0.352)	165.95 (0.000)
INTERBREW	0.001458	0.0268	3.05	11.36 (0.003)	393.9 (0.000)
NB	0.00092	0.0176	2.67	8.67 (0.013)	273.24 (0.000)
PRESCO	0.001663	0.0267	2.99	4.09 (0.195)	404.78 (0.000)
PZ	0.00028	0.0232	4.42	3.49 (0.174)	841.21 (0.000)
REDSTAR	0.000483	0.0308	0.88	16.21 (0.000)	34.45 (0.000)
STERLING	0.000172	0.0307	0.16	6.84 (0.032)	3.93 (0.140)
UACN	0.000557	0.0201	4.56	8.22 (0.016)	922.78 (0.000)
WAPCO	0.001209	0.0193	4.56	1.42 (0.493)	919.36 (0.000)
ZENITH	0.000684	0.0203	2.04	7.97 (0.018)	112.37 (0.000)

NOTES -This table highlights some features of the selected stocks. Std Dev stands for Standard Deviation. The numbers in parenthesis are standard errors.

Table 4: Raw Count of Limit Hits

	Narrow Price Limits		Wider Price Limits	
	Upper Hits	Lower Hits	Upper Hits	Lower Hits
DIAMOND	18	15	1	2
FCMB	9	11	0	1
FIDELITY	9	3	0	0
FIDSON	7	10	3	2
GTB	9	3	0	0
INTERBREW	23	10	8	2
NB	13	5	0	0
PRESCO	25	11	9	3
PZ	14	10	4	3
REDSTAR	13	10	5	1
STERLING	13	13	2	1
UACN	17	11	2	0
WAPCO	17	7	0	1
ZENITH	11	3	0	0

NOTES - Presented in this table are the number of times stocks attain the maximum limit allowed in a trading session.

Table 5: Serial Correlation of Daily Stock Returns

	Lag 1		Lag 2	
	Narrow Limits	Wider Limits	Narrow Limits	Wider Limits
DIAMOND	0.191	0.114	0.042	0.087[*]
FCMB	0.111[**]	0.054	-0.018	0.007
FIDELITY	0.085[**]	-0.026	-0.031	0.06
FIDSON	0.178	0.077	-0.012[***]	0.027
GTB	0.078	-0.107[**]	-0.100[**]	-0.007
INTERBREW	0.156[**]	0.072	0.056	-0.023
NB	0.137[**]	- 0.065	-0.110[**]	-0.071
PRESCO	0.092	0.023	-0.076	-0.022
PZ	0.014	0.069	-0.071	0.000
REDSTAR	-0.082	-0.145[**]	-0.047	-0.157[***]
STERLING	0.142[**]	0.013	-0.023	0.016
UACN	0.109[*]	0.073	-0.018	-0.027
WAPCO	0.03	0.037	-0.057	0.065
ZENITH	0.004	0.037	-0.087[**]	-0.076[*]

NOTES -*** shows significance at 99% level, ** at 95% level and * is at 90% level.

Table 6: Conditional Volatility of Stock Returns

	μ		φ		σ		δ
	Mean	*Std*	*Mean*	*Std*	*Mean*	*Std*	*Mean*
DIAMOND	-7.62	0.17	0.75	0.05	0.84	0.12	-0.12 [-0.26 0.00]
FCMB	-9.36	0.34	0.22	0.04	5.41	0.16	-0.90*** [-1.6 -0.18]
FIDELITY	-7.55	0.16	0.83	0.04	0.54	0.08	-0.05 [-0.14 0.02]
FIDSON	-6.92	0.21	0.95	0.02	0.19	0.05	0 [-0.03 0.02]
GTB	-8.64	0.17	0.65	0	1.08	0.1	0 [-0.15 0.16]
INTERBRW	-15.51	0.53	0.43	0.03	6.77	0.17	0.57 [-0.33 1.40]
NB	-11.73	0.3	0.28	0.04	4.45	0.15	1.54*** [0.89 2.19]
PRESCO	-15.52	0.41	0.23	0.03	7.28	0.17	1.21*** [0.35 2.15]
PZ	-15.41	0.39	0.16	0.03	7.1	0.17	1.24*** [0.46 2.10]
REDSTAR	-11.94	0.4	0.14	0.03	7.39	0.19	-0.65 [-1.61 0.31]
STERLING	-6.91	0.18	0.93	0.04	0.18	0.07	-0.03 [-0.09 0.00]
UACN	-13.51	0.35	0.09	0.03	6.79	0.16	-0.5 [-1.36 0.35]
WAPCO	-13.73	0.36	0.11	0.03	6.63	0.16	0.3 [-0.54 1.14]
ZENITH	-8.4	0.17	0.68	0.07	1	0.14	-0.05 [-0.21 0.10]

NOTES- Columns 1 & 2 present the mean posterior density of log volatility μ and its standard deviation respectively. Columns 3 & 4 display the mean and standard deviation of the persistence of log volatility, φ; Column 5 & 6 presents the volatility of log volatiliy, σ, and its standard deviation. Column 7 presents the mean of the dummy variable that captures the impact of wider price limits, δ. The numbers in parentheses in column 7 gives the 95% credibility interval for δ.

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