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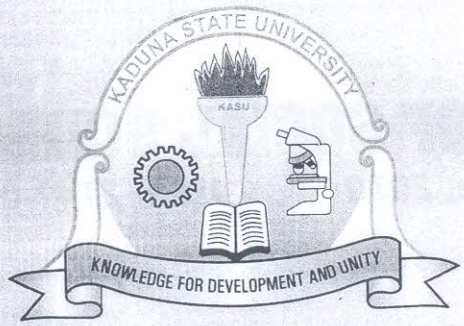

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ANALYSIS OF POVERTY STATUS AND PRODUCTIVITY OF RURAL FARMERS IN ANKPA LOCAL GOVERNMENT, KOGI STATE NIGERIA

ADAMA I. JOSEPH

ABSTRACT

This study examines poverty and resource use efficiency among rural farmers in Ankpa local government, Kogi state, Nigeria. The finding shows that, poverty is more prevalent and severe among the female-headed than the male-headed farmers. Productivity estimates also revealed that, the moderate poor farmer were more prudent and judicious in the use of productive resources than the other groups. Thus the three groups of farmers, that is the core poor, moderate poor and the non poor were inefficient in the use of all the productive resources with the exception of labour. From the result there is the need to create an enabling environment that would reduce poverty among the rural farmers and promote efficient and judicious use of available farm inputs by the farmers. This would boost crop production and sustainable agricultural development.

Key words: *poverty, resource use efficiency, rural poverty.*

INTRODUCTION

The bedrock of agricultural development in developing countries of sub-Saharan Afric is rural development, without which all efforts aimed at agricultural development an sustainability will be futile.(Olayide,1980).Here, large majority of the farmers operat at the subsistence, smallholder level, with intensive agriculture being uncommon. feature of the agricultural production system in such countries is that disproportionately large fraction of the agricultural output is in the hands of thes smallholder farmers whose average holding is about 1.0-3.0 hectares is on the declin owing largely to a mono based economic system, CTA Report (2000). Also, there is ver limited access to modern improved technologies and their general circumstance doe not always merit tangible investments in capital, inputs and labour. Household foo and nutrition security relies heavily on rural food production and this contribute substantially to poverty alleviation.

The bulk of the poor, some three-quarters according to a recent World Bank estimate live in rural areas where they draw their livelihoods from agriculture and relate activities, (Kotze, 2003).

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The relationships between poverty and productivity have been the subject of theoretical and empirical debate. There is no consensus on the nature of the relationship between poverty and productivity or the impact of productivity on poverty. Empirical evidence across countries suggests that poverty and productivity are twin issues that present a paradox. More recent literature had brought attention to the twin issues of poverty and productivity of rural farmers. (Gabriel and sulaiman, 1999; Rodriguez, 2000; Barbosa and Kathleen, 2001; Elsheik, 2002; Figueroa, 2003; Hazor, Zakir and Abdul, 2006; Babatunde, 2008; Yemisi and Aisha, 2009) pointed out that poverty has been higher in rural areas and that majority of these rural poor are the small farmers who lack productive assets to expand agricultural production. The resulting effect is low income and widening income inequality. Schultz (1964) attests to the efficiency of farmers in developing countries when he remarks that farm families are efficient but poor and that low productivity is an aspect of the vicious cycle of poverty. Increase in productivity of rural farmers will help to bridge the widening income inequality between the rural poor and urban rich.

Evidently, development, food security and poverty alleviation will not be truly achieved without rapid agricultural growth and productivity. Olayide (1980); Olayemi (1980) and World Bank (1996) cited in Umoh et al (1999) stated that assisting the rural poor who lived in the rural areas where poverty is more prevalent to enhance their poverty status and food productivity in a sustainable manner is therefore a great challenge. Broadly put, increases in agricultural productivity of the rural farmers in the state are central to growth, income distribution, improved food security and alleviation of poverty (FAO, 2002). In all of these, the rural farmer plays a pivotal role and she is crucial to the overall success of efforts directed at agricultural development in rural areas, Ogunlela et al (2009).

Poverty is the denial of choices and opportunities for living a tolerable life, (United Nations 1997). Poverty amid plenty is the world's greatest challenge. Poor people live without fundamental freedoms of action and choice that the better off take for granted (Sen., 1999). They often lack food and shelter, education and health, deprivations that keep them from living the kind of life that every one values. They also face extreme vulnerability to ill health, economic dislocation, and natural disasters. And they are often exposed to ill treatment by institutions of the state and society and are powerless to influence key decisions affecting their lives. These are all dimensions of poverty (World Bank, 2001). Indeed, of the world over 6 billion people, 2.8 billion live on less than $2 a day, and 1.2 billion live on less than $1 a day, World Bank (2008). The drive to

eradicate extreme poverty in developing countries has become more urgent, given the need to attain the United Nations Millennium Development Goals (UN MDGs) by 2015. Poverty eradication, being the first of the eight goals, becomes crucial, since more than one billion people live on less than US$1 per day (UN 2002).

The principal constraint to the growth of the agricultural sector in the study area is the fact that the structure and method of production have remained the same since independence more than four decades ago, Ingawa, (1979). The United Nations Food and Agriculture Organization rate the productivity of Nigeria's farmland as low to medium— but with medium to good productivity if properly managed, NPC, (2004). To be effective, and attain higher level of productivity and growth in the agricultural sector there is a need to identify the major factors that determine its growth. These resource-poor smallholder farmers (Emokaro et al 2006) who contribute more than 90% of agricultural output in the state and Nigeria in particular (FMA&WR 2008) and Sub-Saharan Africa in general (Spencer, 2002) must be assisted to rise beyond the level of subsistence to higher levels of profitability through more efficient use of their production resources.

Therefore, this paper examined the relationship between poverty status and agricultural productivity of rural farmers in Ankpa local government. This was achieved within the framework of the following specific objectives:

1. To analyze the poverty status of the rural farmer in the study area.
2. To analyze the resource use efficiency of the respondents.
3. To make policy recommendations.

In the rest of the paper, section two is devoted to conceptual literature review; section three is methodology; section four present results and discussion while the last section is conclusion.

CONCEPTUAL LITERATURE.

Poverty

A concise and universally accepted definition of poverty is elusive largely because it affects many aspects of the human conditions, including physical, moral and psychological. Different criteria have, therefore, been used to conceptualize poverty. Most analyses follow the conventional view of poverty as a result of insufficient income for securing basic goods and services. Others view poverty, in part, as a function of education, health, life expectancy, child mortality etc. Blackwood and Lynch (1994),

identify the poor, using the criteria of the levels of consumption and expenditure. Further, Sen (1983), relates poverty to entitlements which are taken to be the various bundles of goods and services over which one has command, taking into cognizance the means by which such goods are acquired (for example, Money and Coupons etc) and the availability of the needed goods. Yet, other experts see poverty in very broad terms, such as being unable to meet "basic needs" – (physical; (food, health care, education, shelter etc. and non – physical; participation, identity, etc) requirements for a meaningful life (World Bank, 1996).

Poverty is often defined based on income or money. The poor are often considered as those earning below a particular income recognized as minimum amount needed to provide the basic necessity for a living. This is put at US$275 and US$370 per annum (Levy, 1991) for the extreme poor and for the moderate poor respectively. However, poverty is more than income; it entails lack of access to a range of basic services and infrastructures which include education, health and farm inputs and outputs, Oriola (2009).

Productivity

Productivity often evokes emotional, polarized and perhaps irrational reaction from the entire sector of the economy. Hershauer et al (1974), pointed out that productivity is the great need for increasing the level of output in order to maintain, if not increase the standard of living and the quality of working life. Resource allocation and productivity is an important aspect of increased food production which is also associated with the management of the farmers who employ these resources in production. Furthermore, efficiency in the use of available resources is a major pivot for a profitable farm enterprise. Therefore, inefficiency in the use of resources, wrong choice of enterprise combination and cropping systems constitute the major constraints to increased food production in Nigeria (Okorji and Obiechina, 1985). Technical efficiency in production is the physical ratio of output to the factor input while economic efficiency, on the other hand, occurs when a firm chooses resources and enterprises in such a way that a given resource is considered efficiently utilized in production if its marginal value product is equal to its marginal factor cost (Adegeye and Dittoh, 1985). Rahman and Lawal (2003) and Iheanacho et al (2000) used production function analysis to estimate efficiency of resource use in crop production systems and determined the optimal resource allocation for adjustment in resource allocation. They reported that there is inefficiency in the use of resources. Hence, adjustments in resource allocation for economic optimum was required in order to

meet the needed percentage change based on the equality of marginal value products and marginal factor costs of inputs.

Physical productivity is the quantity of output produced by one unit of production input in a unit of time, Piana (2001). Productivity is a measure of output from a production process, per unit of input. For example, labor productivity is typically measured as a ratio of output per labor-hour, an input. Productivity may be conceived of as a metric of the technical or engineering efficiency of production. As such, the emphasis is on quantitative metrics of input, and sometimes output. Productivity is distinct from metrics of allocative efficiency, which take into account both the monetary value (price) of what is produced and the cost of inputs used, and also distinct from metrics of profitability, which addresses the difference between the revenues obtained from output and the expense associated with consumption of inputs, (Courbois & Temple, 1975; Gollop 1979; Kurosawa, 1975; Pineda, 1990; and Saari, 2006).

According to the Centre for the Study of Living Standards-CSLS report (1998), productivity is the relationship between output of goods and services and the inputs of resources, human and non-human used in the production process, with the relationship usually expressed in ratio form. Both outputs and inputs are measured in physical volumes and thus are unaffected by price changes. Constant prices as of one period are used to add up the units of different outputs and inputs in order to combine them into aggregate measures. The ratios may relate to the national economy, to an individual industry, or to a company. Furthermore, the report explained that productivity measures are sub-divided into partial and total factor or multi-factor productivity measures. The former are defined as the relationship between output and one input, such as labour or capital, while the latter represents the relationship between output and an index of two or more inputs. The most readily available and widely used measure of productivity is labour productivity, the ratio of output to some measure of labour input (employment or hours). This term sometimes creates confusion in the mind of the general public as it may seem to imply that the level of labour productivity or the rate of growth of labour productivity is attributable solely to the effects of labour. In fact, labour productivity reflects the influence of all factors that affect productivity, including capital accumulation, technical change, and the organization of production. While the intensity of labour effort is obviously a factor that does affect labour productivity, it is generally significantly less important than the amount of capital a worker has to work with or the level of production technology. The

concept of total or multi-factor productivity has been developed to measure the contribution of all factors of production to productivity growth. The rates of growth of all inputs are weighted to give one growth rate for the combined inputs. The weights used to aggregate the different input growth rates are generally the inputs' income share of value added. Total factor productivity growth is defined as the growth rate of output minus the growth rate of the combined inputs (just as labour productivity growth equals output growth minus labour input growth).

Following Schultz's policy conclusions on traditional agriculture as cited in Obwona (2006) that no significant increase in agriculture production is possible by reallocating the factors at the disposal of farmers, any agricultural policy discussion is centered on the issue of raising production levels. In recent decades, the Green Revolution (or new technology) has been recognized by policy makers as an important tool for increasing agricultural productivity. Thus, the primary objective of agricultural policies is to examine and then eliminate the constraints on the adoption of new technology. This is based on the assumption that productivity will be increased once new technology is adopted. Productivity increases do not depend on adoption rate only. What is also needed is the effective use of available technology. The importance of the efficient use of technology, otherwise called technical efficiency, is seldom realized by policy makers. The term technical efficiency, generally, refers to the performance of processes of transforming a set of inputs into a set of outputs. It is a relative concept, which means that the performance of the economic unit in question should be compared with a standard model. In the context of establishing a standard criterion, there has been extensive literature on this since the late 1950s.

Rural farmers

The majority of the rural populace in Nigeria either depends entirely on farming and farming activities for survival and generation of income, or depends on these activities to supplement their main sources of income. The validity of this statement becomes evident when it is realized that over 90% of the country's local food production comes from farms, which are usually not more than 10 hactare in size, with at least 60% of the population earn their living from these small farms. The World Bank (1997) described rural farmers in Nigeria as small scale operators, tenants or landless, characterized by low income and high nutritional deficiency. They also have limited assets made up of productive and non productive, family size and dependency rate. Despite their situation, these rural farmers and their farms collectively form an important foundation on which the nation economy revolves. The significance of rural farming

can thus, not be over emphasized as rural areas form the food basket of the nation, and a major source of export materials. The fortunes of poor rural farmers can be determined by a number of factors. The initial distribution of income accruing to the rural farmer stands out as the most accessible determinant of the rural standard of living, since it is most quantifiable factor and the most reliable as majority of the people in the rural areas are predominantly farmers. Territorial social indicators provide a means of measuring the extent to which various human needs are met. The determinants of income among the target population therefore serve as social indicators of their standard of living. Adedayo, (1985) suggested that the income levels of rural communities may be attributed to certain crucial factors, and understanding these factors may hold the keys to effective rural development policy making. This in part led to the submission of Olatona (2007), that a closer look at the determinants of rural income provides an in-depth knowledge into the factors that explain low income yields and poverty in rural regions where these rural farmers constitute about 90% of the total population (Olayemi, 2001; Olatona, 2007). Adedayo (1985: 25) has also suggested that any rural development policy aimed at poverty alleviation should concentrate on farming, which is the main occupation of the poor, who lack access to credit, farm input and implements and are unable to save or own production infrastructure. It is worthy of note that elimination of poverty, though always an aim of development assistance, has been brought more sharply into focus in the Nigeria's development policies. For such communities of farmers, there is now a fresh emphasis on delivering outputs which have verifiable impacts in their standard of living. There is therefore the need to investigate more on those aspects that affect their incomes positively. The inventory of farmers' income in Nigeria has always been problematic. This is because most of the rural farmers do not keep records and a host of them are not literate. Meanwhile, the Federal and State Governments have been trying to alleviate farmers problems through various programmes. Despite all these development efforts, the rural farmer is still regarded as poor, Olawepo (2010). The agricultural sector is the largest sector of the State's economy, employing over 70% of the adult labour force. The sector impacts on many aspects of development in the state. Apart from striving to meet the food needs of the citizenry, the agricultural sector impacts strongly on the needs of the people, the state's Industrialization efforts, particularly agro-industrial sector and the overall quality of life of the people. At the same time, agricultural production and productivity depend largely on the quality of land and sustainable practices. Consequently, there is a need to make agriculture economically viable by seeking a balance between efficient and productive agricultural enterprise and environmental protection and sustainability (Olawepo, 2003).

METHODOLOGY

Source and methodology of data collection

This Study was carried out in Ankpa local government area of Kogi State, Nigeria. The data for this study came from the primary source with well-structured questionnaires. The questionnaires were administered to 150 respondents selected through multi-stage sampling procedures. The first stage involved the random selection of two districts out of the six districts in the local government area. These were Ojogobi and Ojokwu district. The second stage involves a random selection of two villages proportionate to the village population. Final sample necessitated the use of systematic random sampling procedures. This entailed listing every tenth household farmer in the selected village using probability samples proportionate to size based on the available number of household farmer from the Kogi State Agricultural Development Project, In the final stage, 85 respondents were drawn from Ojogobi district and 65 respondents were drawn from Ojokwu district. Responses from 130 farmers were finally used in the analysis while 20 were discarded due to inconsistent information those respondents provided.

Analytical Technique:

Two analytical techniques were used for in analyzing the data collected for this study. First was the use of Gini coefficient as a measure of the depth of poverty among the rural farmers and across gender in the income distribution.

The Gini coefficient is given by

$$G = 1 - (Xi+1 - Xi)(Yi+1 + Yi)$$

Where G = Gini coefficient or Gini ratio.
Xi = frequency of respondents in the ith group.
Yi = share of respondents income in the ith group.

The more the dispersion of income among the respondents as the figure gets larger.

Production Function Analysis:

The second analytical technique employed was the production function which provides measurement of useful economic tools such as marginal productivity of factors of production, factor intensity, efficiency of production and return to scale. The purpose of the production function is to determine the technical relationship between variable inputs used in the production and output. The greater the extent to which the variable inputs are able to explain the variability in output, the larger is the influence which the inputs have on output. For this study the data to be obtained among the

three categories of farmer would be fitted into three different functional form namely: Linear, Double log and Semi-log functions to obtain the best fit for farmer productivity function. The best fit function will be judged by the R2 values, sign an significance of the regression coefficients using the T- Statistics F-ratio statistics to te the significant differences among the three categories of the poor farmers (The cor poor, the moderate poor, and the non poor). This analysis is used to obtain th parameters for the measurement of productivity and resource use efficiency amon these categories of farmers identified.

The Explicit form of the production function is specified as

Q = F (X1, X2, X3, X4, X5,).

Where Q = Quantity of output produced by the three categories of farmers.[in naira multiple cropping is predominant in the study area , as such the value of eac enterprise is aggregated to obtain the total crop output of each farm household.

X1 = labour [in naira].Three types of labour are identified in the study are namely: family, hired and exchange. These are combining together to give total labou used by the farmers measured in Man days.

X2 = Capital (in Naira). The common capital used by rural farmers in the stud area includes, cutlasses, files, basins, hoes, among others. The total cost measured i Naira would be used.

X3= farm size [in hectares].

X4= Quantity of fertilizer used.

X5= Scale of farming (Small, Large).

Linear Model of the Production Function is given as:

$Q = a0 + a1x1 + a2x2 + a3x3 + a4x4 + a5x5 + \mu$

Q, a1, a2, a3, a4, a5 are parameters to be estimated, x1, x2, x3, x4, x5 and μ are defined as above.

$a1 > 0, a_2 > 0, a_3 > 0, a_4 > 0, a_5 > 0$; and μ is random error term.

Semi- Log Function:

$Q = \text{Log}a_0 + a_1\text{Log}x_1 + a_2\text{Log}x_2 + a_3\text{Log}x_3 + a_4 + a_5\text{Log}x_5 + \mu$

$Q = a_1\ a_2\ a_3\ a_4\ a_5$ are parameters to be estimated, $x_1 x_2, x_3, x_4\ x_5$ and μ are as defined above,

$a_1 > 0, a_2 > 0, a_3 > 0, a_4 > 0, a_5 > 0.$

Double– Log Function:

$Q = a_0 x_1^{a1} x_2^{a2} x_3^{a3} x_4^{a4} x_5^{a5} + \mu.$

Q, a_1, a_2, a_3, a_4, a_5, and μ are as define above. $a_1 > 0, a_2 > 0, a_3 > 0, a_4 > 0, a_5 > 0.$

The production function would be applied to the three categories of rural farmers. These are, the core poor, moderate poor and non poor.

RESULTS AND DISCUSSION

Socio-economic characteristics of farmers in the study area

Out of 130 respondents who participated in the survey, 90(69.2%) were male and 40(30.8%) were female. The age of respondents ranged from 15 years to 65 years. The average age of the male household farmer was 46.2 years, while the average for the female household farmer was about 41 years. This shows that most of the rural farmer was between 40 and 50 years. Majorities of the male and female respondent had primary education while few of the respondents of about 7% had tertiary education. Also majority of the farmers farm size ranges between 1 and 2hectares and mostly depend on personal exchange, hired and family labour as the source of labour. Families engaged in farming as a source of livelihood has an average income of #589.8.30 for male-headed households and #3848.36 for the female households respectively.

In table 1 and 2 the socio- economic characteristics and income of the rural farmers were presented. In table 2 for instance the modal income of the male- headed and that of the general respondents ranges between #3,001.00 and #4,000.00 while, no female household head earned income above #8,000.00 per month; the result also shows that the average monthly income of the male-headed in the study area was to some extent higher than the female-headed, it could be deduced that poverty is more severe among the female headed, thus, the socio cultural practice of the study area might not be connected with the prevailing poverty situation among the female- headed.

Resource- use efficiency

The response of crop output of the three groups of farmers to the production input was determined with the use of regression analysis. Given the a-priori expectation, the double logarithm functional form was chosen for the three group base on the statistical significance and the coefficient of determination. The results of the analysis are presented in table 3.It shows that all the inputs (capital, labour and farm size) has a positive relationship with output of the identified poverty groups. The estimated value of the adjusted R2 shows that 91 per cent, 52 per cent and 27 percent of the changes in the output of core poor , moderate poor and the non poor farmers where explained by the independent variables. The standard error for the core poor and non poor are small compare to that of the moderate poor. This could be attributed to the small sizes of the two sample groups (where n=35 for core poor and n= 30 for the non poor) rather than by the non addition of relevant explanatory variables in the model. The same variable that explain 91 per cent of the changes in output of the core poor were also used in the models to for the rest of the two groups. The F-test also revealed that the model

performed creditably well for core poor, for moderate poor it was fairly well and not a that well for the non poor farmers. In general, labour, capital and farm size influence the productive activities of the core poor more than the extent at which it influence the activities of the other two groups. In co-incidence farm size and capital has positive effect on the output of the core poor farmers even though at 1% level c significance. In other word, the output of the moderate poor and the non poor ar influenced by labour at 1% and 5% level of significance. The coefficients of the doubl log is the elasticity it then mean that for the core poor a 10% change in capital and farn size inputs would led to a corresponding change in output by 2.3 and 6.4 % . Also th moderate poor will attain a level of increase by 3.4 % in output due to a 10% change i labour and a 10% change in farm size will result to 5.0 % changes in the output of th non poor farmers.

The measures of the technical efficiency of resource use such as the mean, averag physical product, marginal physical product, marginal value product, and also th marginal factor cost were derived as shown in table 4. The average resource input use by the core poor and non poor farmers was less than the average resource input use by moderate poor farmer. This means that increase in the resource input at the sam proportion for the three groups of farmer would result to a larger increase in the leve of output among the moderate poor than other groups of farmers. This could be as result of certain circumstances such as capability of the moderate farmers to improve agricultural technologies and good management practice while outdated technologie that are non productive are still been used by the core poor. The non poor may also no be efficient in the use of the farm inputs because they cannot be able to acquire mor due to their status. This may result to inefficient use of resources by the core and no poor farmers respectively.

The marginal physical product revealed that the core poor farmers are more efficien compare to the moderate poor and the non poor farmers in the use of resources. I then means increase in labour would lead to increase in crop production and yiel among the core poor farmers than other groups of farmers. The core poor farmers lea to a less increase in the agricultural output whereas it leads to a greater increase i output of the moderate and non poor farmers. This shows that the moderate and th non poor are more technically efficient in the use of capital input compare with th core poor farmers. In general farm size possess the least marginal physical product an this was reflected among the three categories of the poor farmers, which mean inefficiency in the use of farm land as a result of abundant farm land in the study area

Efficiency of resource input can also be ascertained when the marginal value product (MVP) is equated to marginal fixed cost (MFC) of resource inputs. If there is no significant difference then, resource is said to be optimally allocated.

From the table it could also be deduced that exception of labour which shows 81.5, 69.3, and 64.2 % divergence for all the three categories of the farmers, the rest of the inputs indicate a negative divergence between MVP and MFC. It was observed that there were inefficiencies in the use of resources among the three groups of poor farmers. Someone could put forward the following question. Why should farmers produce when they seems to be technically inefficient? The main aim of traditional agricultural crop production is to provide food security. It could be noticed that households still continue to produce crop despite their inefficient in the use of resources.

CONCLUSION

The findings from this study shows that male headed households have more income than the female- headed households and the income distribution is extremely skewed among the female households. The study also revealed that, technical inefficient use of farm resources was more prevalent among the core poor households, therefore the study recommend the need to pursue more seriously those poverty alleviation measures that would reduce poverty. For the most part, female headed households needed more attention to be financially buoyant and independent

Poverty in the study area may be directly or indirectly influence the inefficiency of the farmers in the study area therefore inefficiency and poverty are inter linked. To ensure reduction in the level of poverty among farming household, productivity must be enhanced. It is the responsibility of individual farmer, government and farmers organizations for improvement in the level of productivity. Factors such as high yield crop varieties, hybrid seeds, fertilizer and non fertilizer technologies should be adopted by farmers to improve their productivity. Prudent management of available resources should be encouraged. Provision of needed infrastructure such as farm to route, electricity, pipe borne water and other enabling policies etc are necessary for increase productivity among the less disadvantaged farming communities.

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List of Tables:

Table 1 selected socioeconomic characteristics of the rural farmers in Ankpa

Characteristics	Male-headed households		Female- headed households	
Age	Frequency	percentage	Frequency	percentage
=-19	3	4.52	2	0.02
20–29	12	12.71	3	0.93
30–39	18	18.16	10	7.29
40–49	28	27.25	14	10.93
50–59	11	11.80	4	1.84
= 60	2	3.62	3	0.93
Total	74	78.06	36	21.94
Educational level				
No formal education	36	36.33	15	10.94
Primary	19	20.88	11	7.30
Secondary	16	18.15	7	3.67
Tertiary	3	2.70	3	0.03
Total	74	78.06	36	21.94
Number of person				
per room 1-4	24	32.67	15	8.24
Over 4	50	45.39	21	13.70
Total	74	78.06	36	21.94
Size of labour				
Family	60	59.96	25	19.13
Exchange	5	8.14	6	1.86
Hired	7	9.96	5	0.95
Total	74	78.06	36	21.94
Size of farm owned				
(ha) <2	62	60.87	26	20.04
3–4	17	14.50	6	1.86
>5	1	2.69	4	0.04
Total	74	78.06	36	21.94

Table 2 Classification of household by income group

	Male respondent		Female respondent	
Income group #	Frequency	%	Frequency	%
= 1000	4	5.41	7	19.44
1001- 2000	0	0	11	30.56
2001 - 3000	9	12.16	3	8.33
3001 - 4000	3	44.59	4	11.11
4001 - 5000	7	9.46	3	8.33
5001 - 6000	5	6.76	2	5.56
6001 - 7000	3	4.05	2	5.56
7001 - 8000	7	9.46	4	11.11
8001 - 9000	4	5.41	0	0
> 9000	2	2.70	0	0
Total	74	100.00	36	100.00
Mean income #	5898.30		3848.36	

Table 3 Regression results for core poor, moderate poor and non poor

Item	Core poor n = 35	Moderate poor n = 70	Non poor n = 30
Constant	7.335	6.108	7.088
Log X_1	0.512 (0.723^{xx})	0.348 (4.334^{xx})	0.230 (1.564)
Log X_2	0.341 (6.711^{xx})	0.869 (1.214^{x})	0.781 (1.381^{x})
Log X_3	0.642 (9.193^{xx})	0.173 (0.842)	0.506 (1.822)
R^2	0.913	0.518	0.271
F - value	42.138^{xx}	8.170^{x}	2.197
Se	0.154	0.536	0.166
Dw	1.724	1.901	1.385

xx: significant at 1% probability level
x: significant at 5% probability level
Source: computed from field data 2010
Figure in parenthesis are t -

Table 4 Value of estimates of efficiency parameters.

Resources	Mean	APP(average physical product)	MPP (marginal physical product	MVP (marginal value product)	MFC (marginal factor cost)	Efficiency gap	% divergence
Core poor	-	-	-	-	-	-	-
Labour X_1	115.80	2.00	0.23	392.6058	81.00	312.6	81.53
Capital X_2	23.00	9.00	0.05	57.82	302.01	-254.2	-439.65
Farm sizeX_3	2.97	8554.56	0.00008	0.1217	503.00	-500.87	-44921.63
Moderate poor	-	-	-	-	-	-	-
Labour X_1	91.82	2.95	0.14	253.10	81.0	174.52	69.31
Capital X_2	21.43	12.11	0.11	192.35	302.01	-112.53	-59.25
Farm sizeX_3	2.51	11406.91	0.00003	0.0450	503.00	-499.56	-1206437.35
Non poor	-	-	-	-	-	-	-
Labour X_1	58.00	2.54	0.091	227.01	81.00	146.20	64.21
Capital X_2	83.11	8.31	0.091	227.01	302.01	-76.01	-34.31
Farm size X_3	5.00	1085.74	0.00006	0.126	503.00	-499.89	-499.92

Computed from results in table 3

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SPECULATIVE BUBBLE AND THE NIGERIAN STOCK MARKET

NJIFORTI P.P AND ADAMA I.J.

ABSTRACT

The phenomenal increases of stock prices in NSE were highly suspected. The question is whether the growth in the NSE was in line with market fundamentals or a mere speculative bubble. This paper investigated the characteristic growth in the NSE by considering the share prices of selected banks and insurance companies. Time series data on daily basis for price-dividend ratio, share prices, dividend from 1st quarter of 2008 to 4th quarter of 2009 were used for analysis. The Augmented Diker-Fuller (ADF) test, Augmented Engel Granger (AEG) cointegration test and the Autoregressive Conditional Heteroskedascity (ARCH) are the econometric techniques used to investigate the characteristic bahaviour of the NSE. The ADF result suspected speculative bubbles in most of the banks and insurance companies (i.e. the price-dividend ratio, share prices and dividend were non stationary). The AEG result confirmed that the ADF conducted on the residuals for most of the banks and insurance companies were non stationary. The GARCH estimates suggested volatility clustering meaning that the shock in these stocks were persistent. TARCH estimate indicated that positive and negative shocks /news are asymmetry and have asymmetric effect on volatility. Therefore, it is concluded that bubble existed in the NSE in the period under review. Information should be well circulated about the stocks in the market and Investors especially illiterate ones should be tutored before they make their investment decision

Key words: Speculative, bubble, stock market, share price, dividend, ADF, AEG, ARCH, TARCH.

INTRODUCTION

Bubbles can be defined as increase in share prices and volumes that are far from intrinsic values. It is described as a steep and persistent increase in the price of an asset which is followed by a sharp fall, whatever the causes of price movements (Pratten

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1993:29). It is also described as a situation when the price for an asset exceeds its fundamental price by a large margin (WEO.2003). Prices rise or bubble when investors become greedy and act as risk lovers. The bubble is not completed until prices fall back down to normalized levels; this usually involves a period of steep decline in price during which most investors panic and sell out of their investments. While each speculative bubble has its own driving factors and variables, most involve a combination of fundamental and psychological forces. In the beginning, attractive fundamentals may drive prices higher, but over time behavioral finance theories suggest that people invest so as to not "miss the boat" on high returns gained by others. When the artificially high prices inevitably fall, most short-term investors are shaken out of the market after which the market can return to being driven by fundamental metrics (Investopedia). Moreover, a bubble is not indefinitely sustainable. Prices cannot go up forever, and when price increases end, then the increased demand that the price increases generated ends too. Then, a downward feedback can replace the upward feedback.

Nigeria, from a market capitalization of 2.94billion in 1999, the Nigerian Capital Market as at June 2007 had reached a stock value of 63 billion and by March 6, 2008 reached a peak of 12.6 trillion. We see that the percentage increase is quite high and that from history a huge and rapid growth in the stock market will most times lead to a feedback correction mechanism owing to the fact that the growth or increase may not have been genuine, efficient or realistic in the case of those nations. However in the case of NSE we see that this growth (sudden rise in prices of stock) was not sustained for a long period of time such that by the month of March 2008, the market started declining. It was like a joke to the stock market brokers and the NSE body as a whole because they were busy telling people then that it was just a correction that will quickly take place and not affect their investments such that within a little time the market will bounce back. This seems not to be true because as at March 2009 the market has lost over 50 % from that high peak of March 2008. It is necessary to see if the growth that was in the market between 2004 and March 2008 could be explained by fundamentals or not, and its impact on the economy. Also relating what is happening globally in the economy it is seen that the melt down or sudden decrease have been experienced might be as a result of domestic factors or foreign factors.Having seen these experiences by others, it becomes expedient to look at this financial term "bubble" in the case of Nigeria Stock Market knowing that countries that had this experience never remained the same in that despite the fact that their income grew around that period the negative effect was undesirable and disastrous. As believed by most authors that a bubble will always be followed up by a crash due to the imperfections in the financial market it then becomes

necessary to consider the NSE and its behavior to observe the following to verify if the NSE has experienced a speculative bubble, and whether the bubbles had impact on the economy. Therefore, this paper is divided into 7 section. Section 1 is the introduction. Section 2 is theoretical literature. Section 3 is possible causes of bubbles, section 4 examines event in the NSE. Section 5 is methodology and analytical techniques, section 6 is results and discussions and section 7 is summary and recommendations.

THEORETICAL LITERATURE

The efficient market theory assumes rational behaviour. It states that the price of a stock at any given time is equal to the expected present value of the stream of future dividends that will accrue on the stock. This theory can be seen as theory of competitive equilibrium applied to assets market. EMH evolved in the 1960s from the PhD dissertation of Eugene Fama in which he defined an efficient market as a market where there are large numbers of rational profit maximizers, actively competing with each other trying to predict future market values of individual securities and where important current information is almost freely available to all participants. If a market is perfectly efficient, price at all times will reflect consensus of value determined by buyers and sellers acting upon their assessment of all pertinent information (i.e. unexpected news) will cause prices to change quickly until a new consensus of value is reached too quickly for traders to profit from the news unexpected events randomly occur thereby making the market either bullish or bearish (Herbst 1992).

In an efficient market, stock prices are expected to reflect present value of future dividends from stocks. However the persistent deviation of actual stock price from its present (fundamental) value has led some analysts to conclude that stock markets are inefficient. The EMH contradicts the basic tenets of technical analysis by stating that prices cannot be used to profitably predict future prices (Wikipedia.com). EMH advocates reply that while individual market participants do not always act rationally (or have complete information), their aggregate decisions balance each other, resulting in a rational outcome in such a way that optimists who buy stock and bid the price higher are countered by pessimists who see their stock, thereby keeping the price in equilibrium. In the same way complete information is reflected in the price because all market participants bring their own individual but incomplete knowledge together in the market.

However researchers have been able to label three forms of market efficiency hypothesis. They are:-

A). Weak-form market efficiency: This exists if price follows a random walk model. If a market is weak form it implies it is not possible to forecast tomorrow's price accurately using only the historical series of prices extending through today's price. The test of it shows whether the successive stock price changes follow an unsystematic random walk pattern Barry Naughton (2002)

B) Semi strong market efficiency: This is defined by the proposition that no publicly available information will enable one to predict tomorrow's price. If a market is semi strong form efficient, price fully reflects not only its history but also all other information in the public domain. Semi strong is actually all about studying the response of stock prices to the publicly available information.

C) Strong form market efficiency: This holds even if "insider" information cannot enable those who possess it to "beat the market" to earn returns consistently above a buy and hold strategy. The strong form test is concerned with whether all available information is fully reflected in prices in the sense that no individual has higher expected trading profits than others because he has monopolistic access to some information.

It should be noted that when there is an inefficient market, there is a tendency of prices to be determined by factors such as insider trading, institutional buying power, mis-information, panic and stock market bubbles (Bakori 2007). EMH presupposes trading in that security markets are taken to be liquid and competitive, however, it finds it hard to explain trading because it tends to suggest that a 'buy-and-hold' strategy would be optimal for the representative agent.

ARCH AND GARCH

The ordinary least square (OLS) lacks the ability of estimating fat fail, clustered volatility and large effect nature of financial data because of its assumptions of constant variance and normal Gaussian distribution, this therefore makes it insufficient to handle financial data.

However, this led to the discovery of ARCH – type modes by Engle with a new class of stochastic processes that model time varying conditional variances by relating them to variables known from the previous periods.

The ARCH type-models fit in well with the financial time series data for some reasons like.

I. Probability distributions for asset returns often exhibit fatter tails than the standard normal or Gaussian distribution.

II. To explain the volatility clustering that is usually exhibited by financial time

series. This volatility clustering is when large changes tend to follow large charges and small changes follow small changes.

III. The ARCH type-model helps to capture leverage effects that are evident in financial data or assets. (in which asset returns are often observed to be negatively correlated with changes in volatility.

The ARCH model was first introduced by Engle (1982) and as GARCH (Generalised ARCH) by Bollerslev (1986). They have proven to be useful in financial time series analysis. ARCH which is the same as Autoregressive conditional Hetro-schedasticity is specifically designed to model and forecast conditional mean and conditional variance. Conditional here implies a dependence on the observations of the immediate past while autoregressive emphasizes that there is a feedback mechanism involved which incorporates past observations into the present to explain future variances. Standard econometric tests applied to simulated data confirm that the extent of ARCH effects depends on agent aggressiveness and on the variance of the potential extraneous element that might enter the mystical forecast. If the latter variance is small relative to the variance of the fundamentals or if agents are not very aggressive, then the asset price tends to follow fundamentals nearly all the time. If the variance of the extraneous element is larger and agents are more aggressive, then asset prices show occasional bubble behaviour and both Engle's (1982) test for ARCH and estimates of a GARCH(1,1) model support the conclusion that the data can be described as ARCH/GARCH for many of the simulations.

GARCH which is Generalized Autoregressive conditional Hetro-schedasticity enables you to take care of the declining effect of information on volatility ie it allows the user to model the serial dependence of volatility.

Two specification are required in the application of ARCH model and are

$y_t = a + X_t Y + \epsilon_t$ ----------(1)

$?^2_t = \phi + ?\epsilon^2_{t-1} + \beta ?^2_{t-1}$ ----------(2)

Where eq (1) is the conditional mean and eq (2) is the conditional variance.

$X_t Y$ __ exogenous variables

Φ __ mean

ϵ^2_{t-1} _ News about volatility from the previous period, measured as the lag of the squared residual from the mean equation, which is the ARCH component.

$?^2_{t-1}$ ____ last periods forecastvariance which explains the GARCH term

? & β ___ _parameters to be estimated

While eqn. (1) is a function of exogenous variables with an error term, eqn. (2) is a function of mean, lag of the squared residual from the mean equation and last periods forecast variance.

Variables that have been shown to help predict volatility are trading volume macroeconomic news announcements, implied volatility from option prices and realized volatility, overnight returns, and after hours realized volatility. (Ziovt, 2008).

Volatility clustering and non-Gaussian behave often financial returns is typically seen in weekly, daily or intraday data.

We test for ARCH effects in daily returns using modified Q-statistic or Ljung Box.

Asymmetric ARCH and GARCH models:

ARCH/GARCH models thus far has ignored information on the direction of returns, only the magnitude matters but it has been shown that for broad based equity indices and bond market indices, it appears that market declines forecast higher volatility than comparable market increases do. A stylized fact of financial volatility is that bad news (negative shocks) tends to have a larger impact on volatility than good news (positive shocks). That is volatility tends to be higher in a falling market than in a rising market, this has been attributed to the fact that bad news tends to drive down the stock price. Thus increasing the leverage (i.e. the debt equity ratio) of the stock and causing the stock to be more volatile.

This asymmetric news impact on volatility is commonly referred to as the leverage effect and can be tested for using the GARCH, EGARCH, TGARCH and PGARCH models are all capable of modeling leverage effect. Zivot (2008)

E-GARCH model is an asymmetric ARCH model and was proposed by Nelson (1991). It stands for exponential Generalized Autoregressive Conditional Hetroschedasticity. It allows for the asymmetry in the responsiveness of returns to the sign of shocks to policy change and is specified in logarithms thereby not imposing the non negativity constraints on parameters. Specified as:

$$ht = a_0 + \sum_{i=1}^{p} ai \frac{\left|\varepsilon_{t-i} + y_i \varepsilon_{t-i}\right|}{\sigma_{t-i}} + \sum_{j=1}^{q} b_j h_{t-j} \qquad (3)$$

Where $ht = \log\sigma^2_t$

An advantage of the E-GARCH model over the basic GARCH model is that the conditional variance σ^2_t is guaranteed to be positive regardless of the value of the coefficient in eqn. (3), because the log of σ^2_t instead of σ^2_t itself is modeled.

GARCH-M model allows the conditional variance to affect the mean. Engle, Lilien and Robins (1987) proposed to extend the basic GARCH model so that the conditional volatility can generate a risk premium which is part of the expected returns. This extended GARCH model is often referred to as GARCH in the mean or GARCH-M model. The estimated coefficient on the expected risk is a measure of the risk return trade-off and is specified thus:

$y_t = X_t Y + \beta\sigma^2_t + \epsilon_t$

y_t _____conditional mean return

σ^2_t_____conditional variance as previously defined

$X_t Y$_____exogenous variable included in the mean deviation

ϵ_t _____error term

TGARCH model is the threshold GARCH model and was proposed by Zakoian (1990) and Glosten, Jaganathan & Runkle (1993). It is specified as follows:

$$\sigma_t^2 = a_0 + \sum a_i t_{t-i}^2 + \sum_{i=1}^{p} y_i S_{t-i}\varepsilon_{t-i} + \sum_{v=1}^{q} b_j \sigma_{t-j}^2$$

Where St-i denote a dummy variable equal to unity when $S_{t-i} = 1$ if $\epsilon_{t-i} < 0$

0 if $\epsilon_{t-i} \geq 0$

This then means that depending on whether ϵ_{t-i} is above or below the threshold value of zero ϵ^2_{t-i} has different effects on the conditional variance σ^2_t such that when ϵ_{t-i} is positive, the total effects are given by $a_i\epsilon^2_{t-i}$ when ϵ_{t-i} is negative, the total effects are given by $(a_i + \gamma_i)\epsilon^2_{t-i}$. So, one would expect γ_i to be positive for bad news to have larger impact.

GENERAL CAUSES OF BUBBLES

In explaining bubbles various authors have tried to associate its cause with varying ideas. These include:

Greater fool theory: This is when the market is driven by behaviour of optimistic participants (the fools) who buy overvalued assets in anticipation of selling it to other rapacious speculators (the greater fool) at a much higher price. This therefore follows that the bubble continues until the greater fool becomes the greatest fool which will now end the bubble. This theory was quite evidenced in the NSE.

Irrational Exuberance: bubbles are seen to be caused by greed and irrational exuberance of investors. Most times investors make their investments out of excitement that doesn't make sense and looks illogical thereby leading to irrational purchase and adverse effect on the market in the long run.

Financial liberalisation: Many authors have pointed this to be a main cause of bubble and so attributes it to be as a result of loose financial monetary policy by the federal reserve(in this case the CBN) . In Sperandeo"s view the Fed through the CBN holds the pump and the needle. When the Central Bank expands its credit, depending on the credit regulation they encourage bubbles.

Mal investment: This is seen in a case where the CBN reduces the interest rate as one of its credit controls and then encourages borrowing but the people instead of spreading their investment may decide to invest it to either stocks or housing alone, this then means that to any of the sector which this borrowed money is invested the more will be the one experiencing the bubble.

Herd behaviour: This is when one move in the market by a particular broker or investor tends to be the signal others are waiting for or looking unto in such a case the persons move determines what others in the market will do. They all begin to act as sheep following their leader there by leading to a bubble. As in the United States, the much greater dependence on external financing has also been a key feature of the recent boom in the euro area, although data limitations preclude a direct comparison with previous booms. Relative to the United States, however, growing reliance on external financing in the euro area has been more tilted toward debt—and more particularly to bank debt—rather than equity liabilities, consistent with the more bank-based nature of financial systems in continental Europe.

Assymetric Information: A bubble can be caused by a situation of asymmetric information. This is when a few investors have an incentive to dissemble the market. For example, if in a company (Patto ventures), the management deceives the market by claiming false profits via accounting fraud. This would drive up Patto's market value. However, once the fraud is discovered, the asset price drops sharply causing the burst of Patto bubble in the market. Asymmetric information can work the other way around. For example, organized bear raids were conducted by Isaac Le Maire, an infamous speculator of the 1600s. He shorted stocks of a company while spreading negative rumors, causing numerous companys to fail.

A Ponzi scheme: This is like the pyramid scheme in that "the first investors are repaid from the money put up by later investors, who can never themselves be repaid because the scheme has run its course and there are no more investors". For example, a venture might use incoming investments to pay increasingly higher dividends. This will drive up market expectations and draw more investors in. But when the scheme is

discovered or when increasingly higher dividends cannot be sustained by new investments, the bubble will burst.

A chain letter: This refers to the situation when all investors have knowledge that a business has no chance of survival and its asset price will drop eventually. However, the investors buy on the assumption that they will not be in the last wave of buyers since they strongly believe in Ponzi scheme. One example is technology stock. Everyone knows that they are overpriced, but they invest anyway hoping that they are not the last wave of investors who will be left holding the bag.

Misprediction: Prices stray from fundamental value all the time, and no one is every really sure whether an asset is undervalued or overvalued. In addition, "people are prone to make mistakes when fundamentals are difficult to assess, as is the case when there are major changes in industry" (Chancellor). A business might sound pretty good in the beginning, but something can always happen. In hindsight, a bubble will be created as investors act under the misprediction of the future of a business.

It should thus be recognized that the solution to a bubble, which is essentially an output of inflation, is to just deflate the same. The subsequent pain that an economy undergoes is merely the medicine for the disease of the earlier mal-investments. When we try to postpone the bubble's bursting by supplying more credit, all we end up doing is to create a bigger bubble with even more dire consequences from the eventual burst. We saw that with Greenspan, who managed a near- seamless transition from the dot-com bubble to the housing bubble by holding down the Fed funds rate at 1% for an extended period of time.

FACTORS RESPONSIBLE FOR EVENTS IN THE NSE

It should be noted that globally the current crisis is rooted to the mortgage loan crisis which became heighted in the U.S in early 2004 until the mid 2007 when the bubble burst due to the inability of Sub-prime mortgage borrowers to service their loan. (allafrica.com). It should be noted that many of these loans were initially approved with no principal repayments in the first three years and on adjustable rate model. This mass default therefore triggered the beginning of the global crisis which our nation is also partaking in and is adversely leading not just to the crashing NSE but also affecting our economy as a whole.

On September 15 2008 layman brothers filed for bankruptcy. This further added to the panic on the global level which integrated into our stock market because foreigners also had their investment in the NSE and as soon as this panic arose they had to start withdrawing their investments.

Domestically our problem started from the aggressive entering of banks into the capital market following the recapitalization move in 2004. This desire for higher capitalization from the banks led to several IPOs (initial Public Offer) thereby boosting the market capitalization in the NSE to an unprecedented level thereby making banks to account for over 65% market capitalization at the NSE (Pedro 2008). This led to shares actively traded and some brokers in agreement with some banks due to greed sought to exploit the market through market making. This dubious action of theirs deceived people and with the coming in of foreign hedge funds, and the belief or expectations of huge capital gains fuelled the market and stock prices shot up to levels that had not been experienced before. The heightened market upside has been said to be largely a consequence of banking sector recapitalization.

However when all this was happening some people outside the NSE foresaw the coming doom but the regulators took it for granted and virtually did nothing to protect the market and so as soon as the CBN released the directive to harmonise banks year end, the market started to decline based on that information and also based that the market was not supporting financial fundamentals of the market. This directive of the CBN led banks to seriously seek out ways of generating liquidity to shore up their balance sheet. Their interest rates increased and so brokers could not meet up with their credit lines. This then brought in panic into the market and brokers in a bid to cut their losses started dumping their shares thereby depressing the market. It can be deduced from the above that the banking sector liquidity is at the centre of the stock market crisis

METHODOLOGY AND ANALYTICAL TECHNIQUES

UNIT ROOT TEST: This is a stationarity test that is necessary in time series data. According to Kasmir& Koskinen (2005) a characteristic property of rational bubbles is that the price-dividend ratio has a unit root. It is carried out using the ADF test. In this case we will investigate univariate time series of price-dividend ratio using unit root tests of ADF test. The ADF test constructs a parametric correction for higher order correlation by assuming that the time series of price-dividend ratio follow an AR (p) process and adding 'p' lagged difference terms of the dependent variable –price-dividend ratio to the right hand side of the test regression. So that

$$y_t = c + \alpha y_{t-1} + u_t$$

$$\Delta y_t = c + \alpha y_{t-1} + u_t \quad \text{.....4}$$

Where y_t -time series of (pricedividend ratio)

Δ_t -difference operator

u_t -assumed to be white noise

y is a stationary series if -1<ρ<1 if the absolute value of ρ is greater than 1, the series becomes explosive and doesn't make economic sense and so the null hypothesis is tested against the one sided alternative i.e.

Null hypothesis H_0:α=0

Alternative hypothesis H_1:α<0

Also if α =0 then ρ =1which implies non stationary

If α<0 then ρ<1 which implies stationary

Running the above model in the E-view, the evidence of a unit root in the price-dividend ratio will be consistent with rational bubbles, this then means that non-stationary price-dividend ratio are consistent with existence of rational speculative bubbles while stationarity implies that deviations from market fundamentals are short lived therefore showing absence of bubbles.

CO-INTEGRATION

In the stock market if the prices truly reflect the value of the expected future flow of dividends, we should be expecting a cointegration between dividends and stock prices in the long run despite the fact that they both follow random walks. Shiller (2001) quoted Campbell and Shiller (1987) to have argued that if dividend and stock prices fail to co integrate, then there is evidence of a bubble. If a cointegration exists between the stock price and dividends, it will be suggesting absence of bubbles meaning that there was no serious deviation from fundamentals. In a case where it shows no co-integration it will then suggest that speculative bubble is present and that there is actually a serious deviation from price. After we must have tested for random walks in the both variables using the unit roots test and found out if Δdividends and Δprices are stationary, we can then test for their co-integration by running the OLS regression i.e.

$$X_t = \alpha + \beta y_t + \varepsilon_t \text{ ----------5}$$

$$Sprices = \alpha + \beta dprices + \varepsilon_t \text{ ----------6}$$

We then test whether the residuals, et from this regression are stationary. If dividends and stock prices are not co-integrated, any linear combination of them will be non-stationary and hence the residuals et will be non-stationary. So we test the hypothesis that et is not stationary which is the hypothesis of no co-integration. This test of the hypothesis et is non stationary will be done in two ways.

1. Using the ADF unit root test on the residuals estimated from the cointegrating regression. Then we check the significant values based on the Engle Granger (EG) and augmented Engle Granger tests (AEG).

2. Using CRDW (Cointegrating Regression Durbin Watson) test. This will be done by using the Durbin Watson Obtained from the cointegrating regression and testing it against the null hypothesis that d=0 instead of the standard d=2. Such that if the computed d-value is smaller than the critical values then we reject the null hypothesis of cointegration depending on the level of significance we decide to use.

ARCH & GARCH MODEL: The stock market (price) is one of the financial time series that exhibit volatility clustering. From Singh Ajit(1996), Yartey & Adjasi(2007), Zivot (2008),Xavier (2006), Gurkaynak (2005) It is therefore important for investors in the stock market to know about volatility because high volatility which is a character of bubbles could mean huge losses or gains & hence greater uncertainty, which suggests why we are testing for it in this work. While the ARCH model is a mechanism that includes past variances in the explanation of future variances, the GARCH model takes care of the declining effects of information on volatility.

In constructing an ARCH model, two specifications are needed i.e. one for the conditional mean and the one for conditional variance so that the standard GARCH (1, 1) specification will be

$$y_t = a + by_{t-1} + \varepsilon_t \quad \text{----------(7)}$$

$$\sigma_t^2 = w + \alpha\varepsilon_{t-1}^2 + B\sigma_{t-1}^2 \quad \text{----------(8)}$$

$$prices = a + bprices_{t-1} + \varepsilon_t \quad \text{----------(9)}$$

$$\sigma_t^2 = w + \alpha\varepsilon_{t-1}^2 + B\sigma_{t-1}^2 \quad \text{----------(10)}$$

SOURCES OF DATA

Data were sourced from the Daily Price Listings from NSE, NSE fact book, Securities and Exchange Commission quarterly magazine and Central Bank of Nigeria (CBN) statistical bulletin. The banks considered are Access bank, GTB, Intercontinental, UBA and UBN and the Insurance companies are Aiico insurance, Cornerstone insurance, Lasaco insurance, Law union Rock and Niger insurance. The variables considered are the price-dividend ratio, share price and dividend for the selected banks and insurance companies.

RESULTS AND DISCUSSIONS

STATIONARITY TEST OF PRICE-DIVIDEND RATIO USING ADF TEST

The price-dividend ratio for all the banks were integrated of order 1 I(1) when the Mackinon critical values were considered at 1% and 5%. (appendix 1.1 and 1.2) The price-dividend ratio for the insurance companies were equally integrated of order one [I(1] except for Niger insurance which showed stationarity at levels (Appendix 2.1 and 2.2). Consequently, the result attested that bubbles existed according to Kasmir & Koskinen(2005).

The ADF test for bank share price and dividend (appendix 3.1 and 3.2) were stationary at first difference [I(1)].

The AEG cointegration test on the residuals of banks share price and dividend indicated that bubbles existed in three out of the 5 selected banks (appendix 3.3 and 3.4). Access, GTB, & Intercontinental banks showed the existence of bubbles while UBA and UBN showed the absence of bubbles.

For the insurance companies, the ADF result for the share price and dividend were integrated of first order for test for CORNERSTONE, LASSACO & LAWUNION and the AEG cointegrated test indicated the existed of bubbles for these insurance companies. However the result for AIICO and Niger was inclusive because one was integrated at level and the other at first difference (appendix 4.1, 4.2, 4.3 and 4.4)

For the 5 companies under the banking sector, ARCH and GARCH estimates, all but PGTB reflected persistent volatility. For the insurance companies, only PNIGERIN did not indicate volatility clustering. The rest suggests persistent volatility meaning that the shock in these stocks were persistent (appendix 5.1 and 5.2).

TARCH estimate (appendix 6.1 and 6.2) indicated that positive and negative shocks /news are asymmetry and have asymmetric effect on volatility. PINTER, PUBA and PUBN are negative but significant, which implies that volatility tends to fall when the returns surprises are negative i.e. when they come as bad news. In other words negative shocks in these three banks cause less volatility than the positive shocks which means that they contradict the theoretical expectation that negative shocks cause greater volatility than the positive shocks. In essence the effects of bad news on these three banks led to less volatility. However, the other two banks show positive relationship meaning that bad news brings about more volatility. This then suggested that the market had both stabilizing agents and destabilizing agents since most stock markets in reality do not adjust too quickly nor do they persist in their instability. The destabilizing agents are those who follow a behavior that will prolong the unexpected

shock and cause persistent volatility while stabilizing agents are those that would see that when there was an unexpected (rise) fall in prices they would expect the prices to (fall) rise. Therefore, disturbance from previous mean and variance varied and contributed to the volatility in the stock market because of information asymmetry. TARCH estimates for insurance companies (appendix 6.2) was similar to that of the banks i.e. two were negative and two were positive while PNIGERIN had a near singular matrix and so no result could be given for it.

Therefore, it is can concluded that bubble existed in the NSE in the period under review since both sectors exhibited bubbles except two companies in the insurance sector. In the banking sector the residuals of two banks UBA and UBN were stationary. However because the banking sector has been observed as the main contributor to the market capitalization of the NSE it can be said that the existence of bubbles in 3 out of the 5 banks sampled influenced the market and made others to also reflect the presence of this bubbles. The ARCH and the GARCH estimates equally manifested volatility clustering and the TARCH confirmed information asymmetry.

Summary and Recommendations

The pd-ratio of the insurance and banking sector showed the existence of bubbles. That the prices and dividends for most of them did not co integrate i.e. they violated the EMH that expected the price and dividends ratio to co integrate at the long run therefore showing an imperfect market that was run by things outside fundamentals. The fact that most of them violated the EMH means that information is not complete i.e. there is information asymmetry. Since bubbles have been tested to be in existence it means that the crash that was being experienced might not be out of place since a feedback correction mechanism was expected after bubbles to bring the market back to fundamentals. 6) Since banking & insurance sectors of the stock market contribute more to the market capitalization and it has been seen that bubbles existed in a greater pereentage of the ones examined, therefore, bubbles existed in the NSE as a whole. It was equally found that iInformation asymmetry and other factors contributed to the market deviating from its fundamentals.

Therefore, information should be well circulated about the stocks in the market so that investors will have every necessary information on what they want to invest into. Investors' especially illiterate ones should be tutored before they make their investment decision. The NSE body should have a way of moderating the market so that it is not falsified by activities of greedy brokers and investors. The SEC (Security Exchange Commission) and NSE directors should be at alert when they see unusual

purchases or sales going on in the market and should put a limit to the activities of the brokers so that they don't do whatever they feel like doing thereby affecting the market adversely. To improve efficiency they should carry out measures that will develop systems that facilitate smooth dissemination of important information to potential investors and rules should be set out to ensure that information is made known at the same time to all and on time.

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APPENDIX

APPENDIX 1.1

ADF TEST FOR PD RATIO		
LEVELS I(0)	INTERCE	
		INT. & TREND
		NONE
FIRST DIFF I(1)	INTERC	
		INT. & TREND
		NONE

APPENDIX1

Price-D	
Access	
GTB	
Interc	
UBA	
UBN	

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APPENDIX

APPENDIX 1.1: ADF test of price-dividend ratio for banks

ADF TEST FOR PD RATIO		ACCESS	GTB	INTERCON	UBA	UBN	ADFc FOR INTERCEPT	ADFc FOR INT &TREND	ADFc FOR NONE
LEVELS I(0)	INTERCEPT	-1.689439	-1.683187	-0.928214	-2.203650	-2.168389	1%=-3.4389	-3.9712	-2.5675
	INT. & TREND	-1.762597	-1.672726	-2.658578	-3.558074	-2.979544	5%=-2.8645	-3.4162	-1.9397
	NONE	-0.753591	-0.780205	-1.474141	-0.886291	-1.342699	10% = -2.5684	-3.1300	-1.6158
FIRST DIFF I(1)	INTERCEPT	-35.15281	-31.82461	-34.67889	-37.19972	-37.5991	1%=-3.4389	-3.9712	-2.5675
	INT. & TREND	-35.13749	-31.81755	-34.66402	-37.18884	-37.58843	5%=-2.8645	-3.4162	-1.9397
	NONE	-35.16479	-31.83849	-34.65575	-37.21595	-37.60141	10% = -2.5684	-3.1300	-1.6158

APPENDIX1.2: Summary of ADF results for price-dividend ratio for banks

	FOR SELECTED BANKS	
Price-Dividend Ratio	I(0)	I(1)
Access Bank	Non-stationary	stationary
GTB	Non-stationary	stationary
Intercontinental	Non-stationary	stationary
UBA	Non-stationary	stationary
UBN	Non-stationary	stationary

APPENDIX 2.1:ADF test of price-dividend ratio for insurance companies

ADF TEST FOR PD RATIO		AIICO	CORNERSTO	LASACO	LAW UNION	NIGER INS.	ADFc FOR INTERCEPT	ADFc FOR INT &TREND	ADFc FOR NONE
LEVELS I(0)	INTERCEPT	-1.790741	-1.818842	-1.198627	-1.366717	-6.992452	1%=-3.4389	-3.9712	-2.5675
	INT. & TREND	-2.044024	-1.761029	-1.398676	-1.365437	-7.544067	5%=-2.8645	-3.4162	-1.9397
	NONE	-1.145679	-1.829989	-1.266532	-1.376542	-2.914531	10% = -2.5684	-3.1300	-1.6158
FIRST DIFF I(1)	INTERCEPT	-29.40337	-31.10481	-26.20189	-32.50837	-55.76249	1%=-3.4389	-3.9712	-2.5675
	INT. & TREND	-29.39678	-31.09863	-26.19294	-32.50593	-55.74030	5%=-2.8645	-3.4162	-1.9397
	NONE	-29.41183	-31.11053	-26.20523	-32.50792	-55.78607	10% = -2.5684	-3.1300	-1.6158

APPENDIX 2.2: Summary of ADF results for price-dividend ratio for insurance companies

	FOR SELECTED INSURANCE COMPANIES	
Price-dividend ratio	I(0)	I(1)
Aiico insurance	Non-stationary	stationary
Cornerstone insurance	Non-stationary	stationary
Lasaco insurance	Non-stationary	stationary
Law union and Rock	Non-stationary	stationary
Niger Insurance	Stationary	stationary

APPENDIX 3.1: ADF test for bank share price

APPENDIX 3.1: ADF test for bank share price

ADF FOR BANK SHARE PRICES	ACCESS	GTB	INTERCONT	UBA	UBN	1%=-3.4389 5%=-2.8645 10%=-2.5684
LEVELS I(1)	-0.985452	-1.393945	-0.954996	-1.107434	-3.238421	

APPENDIX 3.2: ADF test for bank dividends

ADF FOR BANK DIVIDEND PRICES	ACCESS	GTB	INTERCONT	UBA	UBN	1%=-3.4389 5%=-2.8645 10%=-2.5684
LEVELS I(1)	-2.144667	-0.858278	-1.680124	-1.500235	-1.286836	

APPENDIX
COINTEGRATI
AEG TEST F
BANKS
LEVELS I(1)

APPENDIX 3.4
Companies
Access Bank
GTB
Intercontinei
UBA
UBN

APPENDIX 4.
ADF FOR INS
SHARE PRICE
LEVELS I(1)

APPENDIX 4
ADF FOR IN
DIVIDEND F
LEVELS I(1

APPENDIX
COINTEGF
AEG TEST
INSURAN
LEVELS I

APPENDI
Compa
Aiico ir
Corner
Lasacc
Law u
Niger

APPENDIX 3.3: AEG Cointegration test result for banks

COINTEGRATION AEG TEST FOR BANKS	ACCESS	GTB	INTERCONT	UBA	UBN	1%=-3.4389 5%=-2.8645 10%=-2.5684
LEVELS I(1)	-1.963762 NON-STAT.	-1.522753 NON-STAT.	-0.936247 NON-STAT.	-3.707203 STATIONARY	-4.168561 STATIONARY	

APPENDIX 3.4: FOR SELECTED BANKS

Companies	Price	dividend	cointegration	outcome
Access Bank	Non-stationary	Non-stationary	no cointegration	bubbles exist
GTB	Non-stationary	Non-stationary	no cointegration	bubbles exist
Intercontinental	Non-stationary	Non-stationary	no cointegration	bubbles exist
UBA	Non-stationary	Non-stationary	Co integrated	Bubbles don't exist
UBN	Non-stationary	Non-stationary	Co integrated	bubbles don't exist

APPENDIX 4.1 ADF test for insurance share price

ADF FOR INSUR. SHARE PRICES	AIICO	CORNERST	LASACO	LAW UNION	NIGER INS.	1%=-3.4389 5%=-2.8645 10%=-2.5684
LEVELS I(1)	-1.79071	-1.221052	-1.168202	-1.32003	-9.286987	

APPENDIX 4.2 ADF test for insurance dividends

ADF FOR INSUR. DIVIDEND PRICES	AIICO	CORNERST	LASACO	LAW UNION	NIGER INS.	1%=-3.4389 5%=-2.8645 10%=-2.5684
LEVELS I(1)	NEAR SINGULAR MATRIX	-1.885821	-3.195468	-0.297020	-1.917385	

APPENDIX 4.3 AEG Cointegration test result for insurance

COINTEGRATION AEG TEST FOR INSURANCE	AIICO	CORNERST	LASACO	LAW UNION	NIGER INS.	1%=-3.4389 5%=-2.8645 10%=-2.5684
LEVELS I(1)	N.A	-1.352366	-1.472225	-1.420523	N.A	

APPENDIX4.4: For selected insurance companies

Companies	Price	dividend	cointegration	Outcome
Aiico insurance	Non-stationary	stationary	no test	n.a
Cornerstone insurance	Non-stationary	Non-stationary	no cointegration	bubbles exist
Lasaco insurance	Non-stationary	Non-stationary	No cointegration	Bubbles exist
Law union and Rock	Non-stationary	Non-stationary	no cointegration	bubbles exist
Niger Insurance	Stationary	Non-stationary	No test	n.a

APPENDIX 5.1: GARCH ESTIMATED MODELS FOR BANKS

ARCH	PACCESS	PGTB	PINTER	PUBA	PUBN
Variance equation(c)	0.021248 (11.5187)	0.532804 (90.58551)	0.012974 (8.126773)	0.269236 (9.756190)	0.981320 (30.81640)
ARCH(1)	0.470140 (7.945855)	0.329637 (9.577750)	0.347881 (6.561671)	0.571563 (6.673320)	1.131271 (14.33159)
GARCH(1)	0.529973 (14.04160)	-0.019812 (-8.318771)	0.735435 (27.52430)	0.559268 (14.15754)	-0.005534 (-6.665910)

APPENDIX 5.2: GARCH ESTIMATED MODEL FOR INSURANCE

ARCH	PAIICO	PCORNER	PLASACO	PLAWUNI	PNIGERIN
Variance equationl	0.000455 (11.17541)	3.61E-05 (25.18169)	0.000137 (9.123774)	6.00E-06 (13.00840)	0.390521 (3.673476)
ARCH(1)	1.055591 (25.37354)	0.412701 (19.35204)	0.283561 (6.666467)	0.300337 (23.69768)	0.086214 (4.105662)
GARCH(1)	0.404605 (18.11204)	0.757452 (71.52725)	0.681129 (20.99135)	0.803902 (156.6735)	0.507715 (3.888153)

APPENDIX 6.1 TARCH ESTIMATED MODEL FOR BANKS

TARCH	PACCESS	PGTB	PINTER	PUBA	PUBN
C	0.027548 (12.72533)	0.696116 (78.31022)	0.000518 (8.124584)	0.296482 (8.832773)	1.821345 (23.81997)
ARCH(1)	0.454674 (3.657623)	0.004277 (7.389635)	2.112812 (29.53077)	0.897013 (7.113530)	0.643275 (6.868743)
RESID<0)*ARCH(1)	0.316155 (2.384414)	0.352847 (24.28563)	-1.741907 (-22.60309)	-0.761415 (-6.895097)	-0.522705 (-5.159925)
GARCH(1)	0.395013 (8.808305)	-0.034077 (-8.60912)	0.590430 (42.26354)	0.546475 (10.95426)	-0.011010 (-0.459999)

APPENDIX 6.2: TARCH ESTIMATED MODEL FOR INSURANCE

TARCH	PAIICO	PCORNER	PLASACO	PLAWUNI	PNIGERIN
C	4.30E-05 (8.168564)	3.61E-05 (20.28199)	0.000112 (8.691435)	1.10E-05 (12.9570)	
ARCH(1)	0.536391 (8.814651)	0.314803 (8.326077)	0.301827 (6.282325)	0.537223 (21.51903)	
RESID<0)*ARCH(1)	0.874423 (12.05689)	0.190530 (4.695997)	-0.125461 (-2.133707)	-0.364792 (-11.40808)	
GARCH(1)	0.544803 (42.76002)	0.760928 (60.61321)	0.726676 (26.21633)	0.787088 (164.7751)	