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Highlights

Effect of Capacity Utilisation

Foreign Aid and Poverty Level

Discovering Thoughts, Inventing Future

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Foreign Aid and Poverty Level: Does Public Investment Matter in Sub-Saharan African Countries?

By Alimi, Ahmed Shina
Obafemi Awolowo University

Abstract- This paper aims to investigate the relationship between foreign aid and poverty level by considering the role of public investment in the aid-poverty nexus for 14 low, 7 Lower-middle and 5 upper income countries in SSA as classified using 2012 GNI per capita indices. The study is conducted over the 1990–2015periodusing the Pooled Mean Group (PMG) estimator on a dynamic panel ARDL model. The results reveal that foreign aid and public investment have negative impacts on poverty level in upper income countries whereas in low and lower-middle income countries, foreign aid and public investment have positive impact on poverty level but the interaction of foreign aid with public investment reduces poverty level in the three income groups. This finding suggests that foreign aid inflows to SSA countries is associated with lower levels of poverty when the aid inflow is channelled to public investment rather than consumption. Hence, in order to reduce poverty, foreign aid donors should give high priority to sectors that benefit the poor such as agriculture and infrastructure development in the developing countries to facilitate poverty reduction. By doing so, such countries have a better chance of achieving sustainable transition out of poverty while promoting growth in both short and long run.

Keywords: *foreign aid, public investment, poverty level, sub-saharan africa countries, PMG estimator.*

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I. Introduction

Poverty is a major concern for academics, policy makers, governments at all levels and international organizations given its debilitating effects people and their wellbeing. This is because poverty, according to the United Nations (1998) is a fundamental denial of choices and opportunities, a violation of human dignity resulting in lack of basic capacity to participate effectively in the society. Specifically, extreme poverty has become a problematic issue in Sub-Saharan Africa, particularly since the 1980s and has risen to become one of the most challenging issues confronting many countries on the sub-continent. To this end, Sub-Saharan Africa is the world's leading beneficiary of external aid (Ogundipe and Ojeaga, 2014). Since 1960, the international community has devoted over US$568 billion to the development of Sub-Saharan Africa (SSA), representing roughly 15% of the continent's GDP or proportionally four times the Marshall plan that restarted the European economies after the Second World War (United Nations Economic Commission for Africa, 2010). However, after half a century of channeling resources to the Third World, unfortunately, poverty is still at an alarming rate in SSA region. A number of reasons have been cited to be responsible for this phenomenon, ranging from poor policies (see for example Burnside and Dollar, 2000; Collier and Dollar, 2001, 2002) and as well, the diversion of aid from investment to unproductive consumption uses (see Boone, 1996).

Foreign aid has emerged as a dominant strategy for alleviating poverty especially in developing countries deficient in investment capital (Kargbo, 2012). In these economies, the desired capital to improve economic growth and welfare is largely insufficient internally, which subsequently warrants the need for external capital. Given that most low-income countries lack the crucial incentive to attract significant foreign direct investment, the only external capital readily available to support development and welfare undertakings has to come from foreign aid (Kargbo, 2012). Foreign aid, and in general, external capital, has been postulated by noticeable scholars of development economics, to be a vital input to supplement low savings, support development and get rid of poverty in low-income countries.

Empirica evidences obtained from various research works within and outside Sub-Saharan Africa both at country-specific and cross-country level indicate that controversies abound on the relationship between foreign aid and poverty. For instance, Gomanee, Mosley, Morrissey and Verschoor (2003, 2005); Masud and Yontcheva (2005); Bahmani-Oskooee and Oyolola (2009); Alvi and Senbeta (2011); Herzer and Nunnenkam (2012); and Woldekidan (2015) showed that foreign aid reduces poverty and improves the welfare indicators in aid-recipient countries. The strand of the literature claims that foreign aid increases unproductive public consumption, worsen inequality and poverty in aid-recipient developing countries. Examples of such studies are: Boone (1996); Asra, Kim and Quibria (2005); Easterly (2006); Chong, Gradstein, and Calderon (2009) and Olofin (2013).

Given these polarized views therefore, this research contributes to the existing literature by incorporating public investment into foreign aid-poverty

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nexus. This is because public investment induced a reduction in poverty by creating direct welfare benefits in form of increased quantity and quality of final goods and services, higher employment by crowding in private investment (Anderson, Renzio and Levy, 2006). Also, the main objective of the donors in providing aid is to supplement domestic savings and increase public investment in LDCs which largely transformed to economic growth and reduces poverty. Hence, the need to examine the link among foreign aid, public investment, and poverty level. Although, the erstwhile studies have extensively focused on the linkage between foreign aid-poverty and public investment-poverty nexus.

This study adds to existing literature by exploring the nexusamong foreign aid, public investment, and poverty level based on their income level (Low, Lower-middle and upper income countries) using annual data of 26 sub-Saharan African countries covering the period of 1990 to2015. The classification of the SSA countries into sub-panels based on income level (Low, Lower-middle and upper income countries) is crucial in terms of homogenizing countries into similar characteristics which allows results to be compared and contrasted by income levels. The study focuses on only sub-Saharan African countries because the region is a major recipient of foreign aid and also, one of the poorest regions in the world. The choice of 1990 is based on the donor's objective of reducing the percentage of people living in extreme poverty between 1990 and 2015 by half and the countries are selected based on data availability.

In addition, in order to examine the link among foreign aid, public investment and poverty level in Sub-Saharan Africa based on their income level, this study employs the dynamic panel autoregressive distributed lag (PARDL) model introduced by Pesaran, Shin, and Smith (1999). This method is employed because it has the ability to: (i) distinguish between the short and long-run effect; (ii) overcome the delicate problems of the order of integration of variables that can work upon variables that are I(0) and/or I(1) and; (iii) allow for heterogeneity in the parameters. This represents the uniqueness of the present study on the aid-poverty relationship in the literature. Also, findings from this study will offer new insights to policy makers on ways to make aid more effective in reducing poverty through public investment in SSA region. The remainder of this paper is organized as follows. Section 2 presents are view of relevant empirical literature. Section 3 entails the methodology. Section 4 discusses the empirical results while Section 5 concludes the paper by recapping both the essence and findings of the study.

II. Review of Empirical Literature

The empirical relationship between foreign aid and its role in poverty reduction has been extensively examined in the past years. However, such empirical evidences appear to be inconclusive. For example, Gomanee, Mosley, Morrissey and Verschoor (2003) found that aid potentially benefits the poor when they employed random effect estimation technique to test the hypothesis that the wellbeing of the poor can be improved through public expenditure allocation induced by foreign aid, using two indicators of the welfare of the poor, namely; infant mortality and the Human Development Index (HDI) in 39 aid-recipient developing countries over the period 1980 to 1998. Using a different estimation technique, Gomanee, *et al.* (2005) re-examined the effect of aid on aggregate welfare for 104 aid recipient countries over the period of 1980-2000. The result of the fixed effect estimator revealed that aid has a direct effect on welfare or indirectly through growth with no evidence showing that aid operates through public spending.

Contrary to Gomanee*et al* (2003, 2005) Asra, Estrada, Kim and Quibria (2005) found that aid is ineffective when it is larger than the recipient country's absorptive capacity when they examined the impact of aid effectiveness in reducing poverty from 1960 to 1998 using panel data for 49 developing countries. They concluded that aid has not been effective in sub-Saharan African countries compared with other regions because there are other factors beyond macroeconomic policy and governance that are responsible for aid ineffectiveness in SSA region. However, Masud and Yontcheva (2005) evaluated the impact of two different kinds of aid (bilateral and Non-Governmental Organization (NGO) aid) on infant mortality and illiteracy rates for 58 developing countries between 1990 and 2001 using the random effects model and Two-Stage Least Square (2SLS) estimation technique. They found that NGO aid significantly reduces infant mortality and does so more effectively than official bilateral aid. The impact of bilateral aid on illiteracy was not significant.

Also, Nakamura and McPherson (2005) employed the Generalized Method of Moment (GMM) estimation technique to investigate the relationship between foreign aid and poverty reduction using a panel of 49 countries over the period of 1970 until 2001. They found that aid has no significant impact on several poverty indexes regardless of the decomposition of aid while real per capita income has the robust and highly significant impact on poverty reduction. Williamson (2008) found that foreign aid is ineffective at increasing overall health and is an unsuccessful human development tool using fixed effect estimation technique to test whether increases in human welfare (infant mortality, life expectancy, death rate, and immunizations (DPT and measles) can be achieved through the health sector of specific foreign aid in 216 aid-recipient countries over the period of 1973 and 2004.

Disparately, Asiama and Quartey (2009) found that aggregate bilateral aid flows to Sub-Saharan Africa

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do not have a significant direct effect on human development indicators (welfare and poverty) using GMM estimation technique to investigate the impact of foreign aid on the human development indicators (poverty and welfare) for 39 SSA countries over the period of 1975 to 2003. The study indicated that disaggregated aid, in the form of sector/project assistance and also programme assistance have significant effects on the human development indicators. Chong, Gradstein, and Calderon (2009) examined the impact of aid on both poverty and income inequality for 111 aid-recipient developing countries over the period of 1971-2002 and found that foreign aid is conducive to the improvement of the distribution of income when quality of institutions (Voice and accountability, corruption) are taken into account and that foreign aid itself does not have significant effect on inequality and poverty.

In investigating the relationship between health aid and infant mortality, Mishraa and Newhouse (2009) also applied the Generalized Method of Moment (GMM) estimation technique to examine the relationship between health aid and infant mortality, using data from 118 countries between 1973 and 2004. They found that health aid has a beneficial and statistically significant effect on infant mortality and that doubling per capita health aid is associated with a 2 percent reduction in the infant mortality rate. Bahmani-Oskooee and Oyolola (2009) found that foreign aid reduces poverty in aid-recipient countries and concluded that inequality was harmful in reducing poverty in investigating the impact of foreign aid on poverty, which was proxied by headcount ratio for 49 aid-recipient countries for the period 1981 to 2002 using the random effect models and the Two-Stage Least Square (2SLS) estimation techniques.

Furthermore, Alvi and Senbeta (2012) applied the same estimation technique as Bahmani-Oskooee and Oyolola (2009) to investigate the impact of foreign aid on poverty by aid source and type for 79 developing countries over the 1981-2004 period. The study established that a one percentage point increase in aggregate aid will reduce the proportion of people living below the poverty line by 1.8%, 2.8% for poverty gap and 2.6% for squared poverty gap. Similar to Chong *et al* (2009), Herzer and Nunnenkam (2012) assessed the long-run effect of foreign aid on income inequality for 21 aid recipient countries using panel co-integration technique over the period of 1970-2005, the authors discovered that aid exert an increasing effect on income distribution.

Focusing on ECOWAS countries, Olofin (2013) uncovered that total foreign aid and food aid impact positively on poverty, while technical aid reduces poverty when he examined the effects of different types of foreign aid on poverty levels in eight West African countries between 1975 and 2010 by employing both the Augmented Mean Group estimator (AMGe) and Common Correlated Effects Mean Group estimator (CCEMGe). In contrast to other studies above, Azam, Haseeb, and Samsudin (2016) investigated the effect of foreign remittances along with some other variables (foreign aid, debt, human capital, inflation and income) on poverty in 39 countries including the lower middle, upper middle and high income countries covering the period of 1990-2014 using the Panel Fully Modified OLS (FMOLS). The result of the study also revealed that aid and debt impact positively on poverty. Kaya, Kaya and Gunter (2013) examined the relationship between aid given to the agricultural sector and poverty reduction proxied by poverty headcount ratio at US$ 1 a day for a panel of 46 developing aid recipient countries over the period of 1980–2003. Using fixed effects and Three Stage Least Square (3SLS) estimation techniques, he established that aid directed to the agricultural sector of a developing country improves the welfare of the poor, by reducing the headcount poverty ratio both directly and indirectly.

Using the Iteratively Reweighted Least Squares (IRLS) and Generalized Method of Moment (GMM) estimation techniques, Pickbourn and Ndikumana (2016) assessed whether the volume of aid, its sectoral allocation has impact on human development outcomes (education, health, nutrition and access to clean drinking water and improved Sanitation) and gender equity in SSA countries over the period of 1973 to 2010. The result of the study revealed that increased allocation of foreign aid to the health and education sector not only ameliorates overall health outcomes, but it also improves gender-specific health outcomes and contribute to improving overall educational outcomes.

Edreese*t al* (2015) examined the impact of government spending, economic growth, trade, foreign aid and foreign direct investment on poverty reduction in Africa over the period of 1974 and 2013. The result of the GMM estimation technique revealed that foreign direct investment, economic growth, trade and government spending on education and health are positively related to poverty reduction while foreign aid negatively contributed to the poverty reduction in Africa. However, in a specific country study, Woldekidan (2015) examined the role of foreign aid in reducing poverty proxied by infant mortality rate, gross primary enrollment ratio and real household final consumption expenditure over the period of 1975-2010 in Ethiopia using Johansen maximum likelihood estimation technique. The study found that foreign aid has a significant impact on poverty by reducing infant mortality rate and increasing household consumption expenditure. The result further revealed that foreign aid has a negative impact on poverty when poverty is measured by gross primary enrollment ratio, but positive when augmented with macroeconomics policy index, while economic growth has a significant contribution to poverty reduction and poor quality of governance exacerbate poverty.

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In assessing the effectiveness of aid on public investment, Maria and Augustin (2012) applied Generalized Method of Moment (GMM) estimation technique to examine the impact of external debt and foreign aid on public expenditure allocation in 40 SSA countries after the launch of the Heavily Indebted Poor Countries initiative (HIPC) for the period of 1995-2009. The study found that debt servicing impact negatively on government expenditure and foreign aid while multilateral aid exhibits a positive effect on public investment.

In line with Maria and Augustin (2012), Chatterjee, Giuliano and Kaya (2012) also applied Generalized Method of Moment (GMM) estimation technique to examine the link between foreign aid and the composition of government spending in 67 developing countries for the period of 1972-2000. The results revealed that at the aggregate level, about 70 percent of total aid is fungible while aid targeted for public investment crowds-out 80 percent of domestic government spending. The results also revealed that aid does not affect private investment, but has a strong positive impact on household consumption. Gyimah-Brempong and Racine (2010) used panel data and the Local Linear Kernel Estimator (LLKE) to investigate the effects of foreign aid on physical capital investment in 32 SSA countries for the period of 1980-2007. The results revealed that foreign aid has a positive and significant impact on physical capital investment. This effect is robust to the measurement of aid as well as the policy environment.

Unlike Chatterjee, Giuliano and Kaya (2012) which regressed foreign aid on the composition of government spending, Douzounet and Urbain (2013) examined the effects of foreign aid on capital investment (human capital, physical capital) in 37 sub-Sahara African countries over the period 2000-2010. The results of their study showed that foreign aid positively and significantly affected the physical capital accumulation. However, Uneze (2012) investigated the impact of aggregate aid and disaggregated aid (multilateral and bilateral) on private investment in fourteen West Africa countries over the period of 1975-2008 using fixed effects estimation technique. The results revealed that multilateral aid affects private investment positively, but not bilateral aid. Aid uncertainty has a negative impact on domestic private investment and therefore reduces the value-effect of bilateral aid on domestic private investment. The study concluded that high volatility in bilateral aid is the source of the uncertainty in total aid. Ogun (2010) investigated the relative effects of physical and social infrastructure on poverty indicators over the period of 1970 to 2005 using Structural Vector Autoregressive (SVAR) estimation technique. The study found that infrastructure in general reduces poverty, social infrastructure explains a higher proportion of the forecast error in poverty indicators relative to physical infrastructure. In Pakistan, Ali (2010) examined the effect of different categories of government expenditures (government consumption, government investment, defense and educational expenditures) on poverty over the period 1972-2008 using Error Correction Mechanism (ECM). The result of the study revealed that productive government expenditures increase employment generation, improve the standard of living and thereby reduces poverty.

Lastly, Malimu, Toerien and Gossel (2013) investigated the effect of aid inflows and the volatility of public investment on economic growth in 26 Sub-Saharan African countries over the period of 1992 to 2011. Three volatility variables comprising aid, government revenue, and public investment were incorporated into an aid-growth model to test for their effect on economic growth using the Generalized Method of Moments (GMM) technique. The results revealed that foreign aid has a positive impact on growth while aid volatility has a negative impact on economic growth.

In summary, the subsidizing effects of foreign aid on poverty has been established in the literature. Studies have also explored the role of public investment in the poverty reduction debacle. However, the role of public investment in the foreign aid-poverty nexus has not been extensively dealt with. Further, studies that consider the trio of foreign aid, public investment and poverty level are scarce, especially for sub-Sahara Africa which is the focus of the present study. The foregoing gap in the literature therefore serves as the motivation for this study.

III. Model

Following the empirical literatures, this study adapts the model employed by Ferroni and Kanbur (1990) and Olofin (2013) to evaluate the relationship between foreign aid, public investment and poverty level. In the model, it is assumed that since aid directly finances government expenditure, focusing on public investment that is channeled towards projects that benefit the poor will provide a clearer transmission mechanism of aid effectiveness.

$$POV_{i,t} = \alpha + \beta FA_{i,t} + \delta PI_{i,t} + \theta Y_{i,t} + \varphi Z_{i,t} + \varepsilon_{i,t} \quad (3.1)$$

Where POV denotes poverty, α denotes country – specific intercept, FA is foreign aid, PI represent all forms of government investment that can improve citizen welfare such as government expenditure on education, health, infrastructure, Agriculture and Social sector, Y is the GDP per capita and Z_{it} corresponds alternatively to the level of financial depth, inflation rate and control of corruption COP while i denotes the country, t is the time period and ε_{it} is a time varying error term.

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a) Methodology

i. *Panel Unit Root Tests*

Panel ARDL or Pool Mean Group (PMG) can be applied whether the variables are purely I (0) or I (1), or the mixed of both (Pesaran and Smith, 1995; Pesaran *et al*., 1999). According to Asteriou and Monastiriotis (2004), the estimate of PMG could be spurious if the order of integration of any of the variables of interest happens to be I(2). It is therefore imperative to ascertain the order of integration of the study variables. For this tenacity, this study employs Im, Pesaran and Shin (IPS) (2003) panel unit root test technique. However, for comparison purpose, Levin, Lin, and Chu (LLC, 2002) panel unit root testis also applied.

ii. *Dynamic Panel ARDL (PMG) specifications*

This study employs the pooled mean group (PMG) estimator for dynamic heterogeneous panels. Pesaran, Shin, and Smith (1999) proposed important new technique to estimate non stationary dynamic panels in which the parameters are heterogeneous across groups known as pooled mean group. PMG estimator combines both pooling and averaging. This intermediate estimator allows the intercept, short-run coefficients, and error variances to differ across the groups but constrains the long-run coefficients to be equal across groups. This estimator is better over others because it provides consistent and efficient estimates of the parameters in a long-run relationship between both integrated and stationary variables in a panel data structure. The empirical specification of the PMG model can be written as follows:

$$\Delta InPOVI_{i,t} = \sum_{j=1}^{p-1} \lambda_j \Delta InPOVI_{i,t-j} + \sum_{j=0}^{q-1} \delta_j \Delta InFA_{i,t-j} + \sum_{j=0}^{q-1} \delta_j \Delta InPI_{i,t-j} + \sum_{j=0}^{q-1} \delta_j \Delta InY_{i,t-j} + \sum_{j=0}^{q-1} \delta_j \Delta FD_{i,t-j} + \sum_{j=0}^{q-1} \delta_j \Delta INF_{i,t-j} + \sum_{j=0}^{q-1} \delta_j \Delta COP_{i,t-j} +$$

$$\phi_i' \left[InPOVI_{i,t-1} - \left\{ \beta_0 + \beta_1 InFA_{i,t-1} + \beta_2 InPI_{i,t-1} + \beta_3 InY_{i,t-1} + \beta_4 FD_{i,t-1} + \beta_5 INF_{i,t-1} + \beta_6 COP_{i,t-1} \right\} \right] + \varepsilon_{it} \quad (3.2)$$

Where $\boldsymbol{POVI}_{i,t}$ is poverty index (FA) represents Foreign aid, (PI) represents Public investment. We also include a set of control variables that are commonly used in poverty equations: overall income per capita (GDP per capita) to control for economic development (Y), a variable of financial deepening (Private credit/GDP) (FD); growth of the consumer price index (Inflation) to control for the macroeconomic instability (INF); and an indicator of institutional quality (control of corruption) drawn from the International Country Risk Guide (ICRG) database which measures misuse or the abuse of public office for private gain. λ_j and δ_j represent the short-run coefficients of lagged dependent and independent variables respectively, β_i are the long-run coefficients, and ϕ is the coefficient of speed of adjustment to the long-run equilibrium. The subscripts *i* and *t* represent country and time indexes, respectively.

b) DATA

This study is based on panel data covering 14 low, 7 Lower-middle and 5 upper income countries as classified using 2012 GNI per capita over the period 1990–2015, to examine the relationship among foreign aid, public investment and poverty level. Data on foreign aid measured by Total Official Development Assistance received (constant 2010 US$), public investment (proxy by gross public investment; constant 2010 US$), poverty, GDP per capita (constant 2010 US$), financial deepening (Domestic credit to private sector as a ratio of GDP) and inflation rate (Annual percentage change in consumer prices) are sourced from the World Bank's World Development Indicators, 2016 edition while institutional quality measured by control of corruption is obtained from World Governance Indicators, 2016 edition. Countries are selected based on the availability of all the data required for this analysis. The list of sample countries considered is presented in Appendix (Table A1).

This study employs principal component analysis (PCA) to construct a composite index for the poverty from four indicators namely household consumption per capita, life expectancy at birth, infant mortality rate and gross primary school enrollment ratio. This index is hereafter denoted by poverty index. The justification for doing this is in two-fold. First, modeling various indicators of poverty in the same equation may lead to serious problem of multicollinearity. In addition, utilizing the aggregate effect of these indicators is likely a better approach than modeling each indicator separately. Second, there is no general consensus as to which measure of poverty is most appropriate. Therefore, having a summary measure of poverty that includes all the relevant poverty proxies (data permitting) to capture several aspects of poverty at the same time, such as household consumption per capita, life expectancy at birth, infant mortality rate and gross primary school enrollment ratio will provide better information on poverty level. It is believed that this new index of poverty is able to capture most of the information from the original data and is a better indicator than the individual variables.

IV. Results and Discussions

In this section, the estimated results for this study are presented and discussed. We first present the

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integration order of each variable include in our model in the context of unit root tests. The results of stationary tests in Table 1 show that indicate that financial deepening *(FD)*, inflation rate *(INF)* and Control of Corruption *(COP)*are stationary at level i.el(0) while poverty index *(POVI),* foreign aid *(FA)*, public investment *(PUI)* and GDP per capita *(Y)* are stationary at first difference i.e. I(1). Due to the existence of mixed levels of integration among series, PMG estimator is now suitable to estimate the impact of foreign aid, public investment among other variables on poverty level in SSA.

Table 1: Panel unit root test Result

	LLC-Test		IPS-Test	
	Level	First Diff	Level	First Diff
A: Upper Income Countries				
POVI	0.8196	-2.3175**	0.1624	9.938*
FA	-1.0814	-8.383*	-1.417	-8.6839*
PI	-0.8329	-7.9805*	-0.928	-8.0504*
Y	-0.4119	-7.9126*	-0.4449	-6.8518*
FD	-3.2741**		-2.4685**	
INF	-3.8038*		-4.2634*	
COP	-3.1664**		-3.4548**	
B: Lower-middle Income Countries				
POVI	2.3802	-6.2316*	1.2785	4.8311**
FA	-1.1734	-10.4189*	-1.3186	-11.7978*
PI	1.2314	-6.6195*	1.4834	5.9941*
Y	1.7144	-4.2944**	1.2122	5.0008*
FD	-5.1106**		-4.1326**	
INF	-4.7845**		-4.9563**	
COP	-8.9426**		-7.0033**	
C: Low Income Countries				
POVI	-0.8751	-4.4526**	0.6063	-4.3876**
FA	-1.3715	-14.0786*	-0.5011	-13.1808*
PI	1.2189	-17.0746*	-1.0721	-14.974*
Y	-0.0248	-8.8982*	0.3132	-11.3327*
FD	-4.4086**		-4.2591**	
INF	-6.3820**		-6.2917**	
COP	-11.2152*		-10.1861*	

Note 1: POV, LFA, LPI, LY, FD, INF and COP represent poverty index, natural log of foreign aid, natural log of public investment, natural log of GDP per capita, financial deepening, inflation rate and control of corruption respectively.
*Note 2: * and ** indicate significance at 1% and 5% levels, respectively, which Signifies rejection of the unit root hypothesis*.

In order to assess the short run and long run effects of foreign aid, public investment among other variables on poverty level, we estimate Pooled Mean Group (PMG) method. The result of the PMG-based error correction model is reported in Table 2. The log transformation of all the variables allows us to interpret the coefficients as elasticities. The result reveals that reduces poverty in aid-recipient countries. Conversely, foreign aid exerts a significant positive effect on poverty level in lower and low income countries both short and long run, that is foreign aid is associated with higher levels of poverty (corresponding to a rise in the number of poor people). This result conforms with the findings of Chong *et al* (2009), Olofin (2013), and Azam*et al* (2016). These studies found that aid is fungible because foreign aid has a significant negative impact on poverty level in upper income countries in the long run but insignificant positive impact on poverty level in the short run. This shows that foreign aid reduces poverty level in upper income countries. This result is in line with Gomanee*et al* (2003), Bahmani-Oskooee and Oyolola (2009), Alvi and Senbeta (2012): they suggest it increases the size of government unproductive consumption and not investment and that aid benefit the elitist group and not the poor. Additionally, the result indicate that public investment has a positive impact on poverty level in both short and long in lower and low income countries, that is public investment increases poverty level in both lower and low income countries. This outcome repudiates the finding of Ogun (2010) who

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found that massive investment in social infrastructure drastically reduce poverty in the urban areas. However, the result indicate that public investment has a negative impact on poverty in upper income countries. This finding replicate the common assumption that public investment plays an essential role in poverty reduction. This outcome is in line with the finding of Ali (2010) who found that government investment reduces poverty in Pakistan.

In order to investigate the composition effect of aid inflows, we add interaction terms of the aid inflows with public investment. This interaction term is to examine whether aid inflows and public investment are jointly influencing poverty level in SSA. The coefficient of the interaction term of aid inflows with public investment (FA*PI) is negative and significant in the long run in the three income groups though insignificant in the short run. These results suggest that a rise in aid inflows to SSA countries is associated with lower levels of poverty when the aid inflows is channeled to public investment rather than consumption in aid recipient countries. In other words, increase in public investment may allow the poor to benefit more from foreign aid. Furthermore, the result of the upper income countries reveals that GDP per capita, financial depth (measured by the private sector credit-to-GDP ratio) inflation rate exerts a negative impact on poverty in the long run but positive impact in the short run whereas control of corruption exerts a positive impact on poverty in the both short and long run in upper income countries. In addition, GDP per capita has a negative effect on poverty in low income countries in the long run but positive impact on poverty in the short run. On the contrary, GDP per capita and control of corruption have positive effect on poverty in both short and long run in lower middle income countries while financial depth and inflation have negative impact on poverty level in the long run. Lastly, the estimated coefficients of error correction terms are also significantly negative and smaller than unity in all the three income groups, thereby suggesting convergence to long run equilibrium. More specifically, the coefficients indicated that the system instantaneously reverts to its long run equilibrium following a shock that diverts its path away from steady state.

Table 2: Estimation results for PMG

	Upper Income		Lower Middle		Low Income	
Variable	Coeff	Prob	Coeff	Prob	Coeff	Prob
Long-run						
LFA	-5.0575	0.0421**	4.5860	0.0010*	3.9114	0.0001*
LPI	-5.7062	0.0121**	4.1469	0.0068*	2.5328	0.0088*
LFA*LPI	-0.2368	0.0429**	-0.1636	0.0193**	-0.1851	0.0001*
LY	-1.2846	0.0012*	5.4962	0.0006*	-0.0772	0.9034
FD	-0.0907	0.5807	-0.0139	0.0106**	0.0262	0.0074*
INF	-0.0116	0.1976	-0.0025	0.5916	0.0020	0.8312
COP	-0.6063	0.0005*	0.4841	0.0032*	0.7850	0.0109**
Short-run						
ECT(-1)	-0.7071	0.0000*	-0.5070	0.0022*	-0.2840	0.0480**
Δ LFA	-0.1035	0.8172	1.4418	0.6820	1.4983	0.6064
Δ LPI	-0.1481	0.6793	4.7978	0.1893	1.5600	0.5700
Δ LFA*LPI	-0.0009	0.9648	-0.2539	0.1851	-0.0698	0.5998
Δ LY	-0.0814	0.8232	1.5066	0.1442	1.8625	0.0001*
Δ FD	0.0202	0.8704	-0.0017	0.6768	-0.0028	0.5785
Δ INF	0.0029	0.5791	0.0013	0.8006	-0.0002	0.9030
Δ COP	0.0976	0.1134	-0.1254	0.4248	-0.1116	0.1370
C	-17.2184	0.0004*	8.6645	0.3963	7.0577	0.0451**
No of Contry	5		7		14	

Note 1: Note 1: POV, LFA, LPI, LY, FD, INF and COP represent poverty index, natural log of foreign aid, natural log of public investment, natural log of GDP per capita, financial deepening, inflation rate and control of corruption respectively.
*Note 2: The dependent variable is poverty index. Notes 3: *, **, and *** indicate significance at 1%, 5%, and 10% level, respectively.*

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V. Conclusion and Policy Recommendation

The study applied PMG estimation to analyze the effects of foreign aid and public investment on poverty level covering 14 low, 7 Lower-middle and 5 upper income SSA countries as classified using 2012 GNI per capita over the period 1990–2015.The estimated results show that foreign aid and public investment have negative impact on poverty level in upper income countries whereas in low and lower-middle income countries, foreign aid and public investment have a positive impact on poverty level. In addition, the interaction of foreign aid with public investment yields negative impact on poverty level in the three income groups. The policy implications of empirical results are: foreign aid donors should give high priority to sectors that benefit the poor such as agriculture and infrastructure development in the developing countries to facilitate poverty reduction. By doing so, such countries have a better chance of achieving sustainable transition out of poverty while promoting growth in both short and long run. Also, governments of low income, lower-middle income and upper income Sub-Saharan African countries should increase proportion of their budgetary allocation to the investment in social infrastructure which comprises investment in power, education and health, since investment in these areas can help to improve the welfare of people and reduce poverty level in both short and long run.

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Appendix

A1: List of Countries

Low income Countries	Lower-Middle income countries	Upper income countries
($1,035 or less)	($1,036-$4,085)	($4,086- $12,615)
Benin	Cameroon	Botswana
Burkina Faso	Nigeria	Gabon
Congo Democratic Republic	Mauritania	Namibia
Ethiopia	Senegal	Mauritius
Gambia	Sudan	South Africa
Guinea	Swaziland	
Kenya	Zambia	
Madagascar		
Mali		
Mozambique		
Togo		
Rwanda		
Tanzania		
Uganda		

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Labour Productivity Analysis of Private Sector Enterprises in Udaipur

By Dr. Anjum Mehtab Kathawala
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Abstract- Theory of "Productivity of Labour" expounded labour productivity as one of the basic indicators of economic development, the major detriment of national income and important tool for analysis of economic and social problems. Labour productivity is the capital utilization of human resources of a concern. Labour productivity measures efficiency of labour force, which is directly related to savings in this item and since there has always been widespread interest in labour saving, labour productivity has become more popular as well as its importance and utility in the concern. This research paper is based on Labour Productivity Analysis of private sector enterprises. The present study concludes that value generated in the form of output (Productivity) of different private sector enterprises differs from each other.

Keywords: *labour productivity.*

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Abstract- Theory of "Productivity of Labour" expounded labour productivity as one of the basic indicators of economic development, the major detriment of national income and important tool for analysis of economic and social problems. Labour productivity is the capital utilization of human resources of a concern. Labour productivity measures efficiency of labour force, which is directly related to savings in this item and since there has always been widespread interest in labour saving, labour productivity has become more popular as well as its importance and utility in the concern. This research paper is based on Labour Productivity Analysis of private sector enterprises. The present study concludes that value generated in the form of output (Productivity) of different private sector enterprises differs from each other.

Keywords: labour productivity.

I. Introduction

Labour is the most important element, which contributes relevantly to production as well as productivity. The reason to support this statement is that for procuring, producing as well as handling raw material, manpower (labour) is required. Therefore, labour occupies a key role among all elements of costs. "Labour is the one key factor, which can give unlimited productivity".[1] Therefore labour productivity can be defined as the contribution made per labour to the operational activities of the business.

The economic advantage of increased production at lower unit costs, along with rising wage rates and increasing fringe benefits, have accelerated the trend towards greater use of automatic equipment to produce more goods in fewer labour hours. Changes in utilization of labour force require changes in methods of compensating labour, followed by changes in accounting for labour costs. Labour costs are all labour expended in altering the construction, composition, conformation or condition of the product. The wages paid to skilled and unskilled labour can be allocated specifically to the particular cost accounts concerned, hence the term 'Direct Wages', which may be defined as the measure of Direct Labour in terms of money.[2]

"Reduction in costs is one of the chief objectives of the production manager, and much guidance to this end may be secured from a suitably organized costing system."[3] Sir Ewart Smith and R. Beeching have defined labour productivity as the volume of output achieved in a given period in relation to the sum of the direct and indirect efforts involved in the production of the given output.[4]

Following measures are suggested for analyzing labour productivity:

1. Labour Productivity (Units) $= \frac{\text{Output (units)}}{\text{Total Number of Employees}}$

With the help of this formula, production made per unit of labour is ascertained. Using this ratio, we can calculate the quantity of production contributed by one labour.

2. Labour Productivity (Value) $= \frac{\text{Output (Rs)}}{\text{Total Number of Employees}}$

(Here, Output = Sales + Closing Stock – Opening Stock)

This ratio finds out the value of production per employee. Higher the ratio, better it is for the concern.

3. Employee Contribution to Production $= \frac{\text{Value of Output (Rs)}}{\text{Total Wages and Salaries paid to Employees}}$

This formula finds out worth of a Rupee spent on employees. It calculates value of production in (Rs.) contributed by the employees, i.e. Value generated by Re. 1 spent towards employees. It calculates the value of output (Rs.) generated by spending Re. 1 as wages.

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$$\text{Labour Productivity Index} = \frac{\text{Total Wages and Salaries Paid}}{\text{Output}} \times 100$$

This ratio shows the percentage of wages to the value of production. Lower the percentage, better it is, for the concern.

4. $$\text{Earnings per Employee} = \frac{\text{Profit after Tax}}{\text{Total Employees}}$$

This ratio of profit to total employees calculates the earning per employee.

II. Review of Literature

Research work has been done on Productivity but not much research is available on Labour Productivity. Thus an attempt has been made to analyse the Labour Productivity of Private Enterprise.

Review 1: Productivity Measurement Evaluation and Improvement (Verter, V & Mebmet, A.E.). The authors case study based on production system gave promising results in terms of effectiveness of the measurement models.

Review 2: "Measurers of Productivity" (Mundel, ME). In this paper author emphasized that profitability increase based on productivity improvements are much reliable in the long run than the ones motivated by just increasing the output prices.

III. Objective

To analyse the labour productivity of selected private sector enterprises.

NULL HYPOTHESIS (H_0): There is no significant difference in the labour productivity of different private sector enterprises.

ALTERNATIVE HYPOTHESIS (H_1): There is a significant difference in the labour productivity of different private sector enterprises.

IV. Sample Collection

A sample of four companies' viz. Hindustan Zinc Limited (HZL), Rose Zinc Limited (RZ), Binani Cement Limited and Pyrotech Private Limited (PEPL) are chosen for the present study. The study sample was collected on convenience basis. The required data for sample units have been collected from the published financial reports and the company websites.

V. Period

A period of 5 years from 2012-13 to 2016-17 was considered for the purpose of analyzing the labour productivity of the companies.

VI. Research and Methodology

Simple statistical techniques such as Mean, Standard Deviation, Coefficient of Variance and Student *t*-Test have been used to analyse the data of sample units.

VII. Analysis and Discussion

Table 1: Value of Output to Total Employees (Metric Tonne)

Years	Hindustan Zinc Ltd	Rose Zinc	Binani Cement	PEPL(in units)
2012-13	32.33	64.66	851.31	98
2013-14	30.16	60.32	1267	108
2014-15	28.32	56.67	1413.98	115
2015-16	34.87	69.74	1338.84	117
2016-17	38.09	76.18	1695.73	126
Mean	*32.754*	*65.514*	*1313.372*	*112.8*
SD	*3.45*	*6.893*	*272.991*	*9.368*
CV	*10.53%*	*10.52%*	*20.79%*	*8.31%*

Authors own source

Table 1 shows the value of output to total employees in Units i.e. Metric Tonne. HZL shows a mixed trend; its value of output to total employees decreased in two consecutive years and then it increased in 2015-16 and in 2016-17, with the average mean of 32.754 Metric Tonne. RZ also showed the decreasing trend in the beginning of the study period and then showed a vast increase of 23.06% in 2014-15 and 9.23% in 2016-17. Binani Cement showed the increasing trend except for the year 2016-17 where

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output to total employees decreased by 5.31%. PEPL showed the continuous increasing trend throughout the study period with the minimum coefficient of variation, which shows consistent value of output to total employees. Further the trend was analyzed through *t*-Test in later part of the paper.

Table 2: Value of Output to Total Employees (Rs)

Years	Hindustan Zinc Ltd	Rose Zinc	Binani Cement	PEPL
2012-13	717557	1435114	721112	381575
2013-14	675243	1350486	881971	396410
2014-15	732554	1465108	891364	397399
2015-16	1057984	2115974	1022627	422236
2016-17	1098658	2197316	1281682	372563
Mean	*856399.2*	*1712799.6*	*959751.2*	*394036.6*
SD	*182624.268*	*365249.861*	*187226.089*	*16902.97*
CV	*21.33%*	*21.33%*	*19.51%*	*4.29%*

Authors own source

Table 2 depicts the value of output to total employees in money value (Rupees). Binani Cement showed a continuous increase in the output value generated by employees with the average mean of Rs. 3,94,036.60. HZL also showed a continuous increase in money generating efforts by increasing output except for the year 2013-14 where it's value of output to total employees reduced by Rs. 42,314 (5.89%). In the case of RZ a substantial increase in the year 2014-15 by 7.82% was consistently followed by increase during the study period. PEPL showed slow growth in the first three years followed by an increase of 6.24% in value of output to total employees in the fourth year, but decreased in the fifth year by 11.76%. Later, the trends were put through the *t*-Test.

Table 3: Value of Output to Total Wages and Salaries paid to Employees (Rs)

Years	Hindustan Zinc Ltd	Rose Zinc	Binani Cement	PEPL
2012-13	7.31	14.62	9.58	19
2013-14	6.53	13.06	10.76	20.1
2014-15	6.07	12.14	8.89	23.85
2015-16	7.3	14.6	8.7	19.71
2016-17	6.43	12.86	9.23	28
Mean	*6.728*	*13.456*	*9.432*	*22.132*
SD	*0.495*	*0.991*	*0.729*	*3.382*
CV	*7.36%*	*7.36%*	*7.73%*	*15.28%*

Authors own source

The ratio of value of output to total wages and salaries paid to employees in Rupees is illustrated in Table 3. HZL showed almost steady trend but in 2015-16 its value jumped up with an increase of 20.26%. RZ had a decreasing trend in the initial three year sample years, increased for the subsequent year then again decreased. Binani Cement also showed a fluctuating trend, with a mean of Rs. 9.432. PEPL however, showed an increasing trend, though the value of output reduced to Rs. 19.71 in the year 2015-16 but in the year 2016-17 it went up by 42.05%. PEPL showed the highest average of Rs. 22.132. The mix trend of value generated by employees in terms of wages and salaries paid was analyzed by *t*-Test.

Table 4: Value added to Total Employees (Rs)

Years	Hindustan Zinc Ltd	Rose Zinc	Binani Cement	PEPL
2012-13	353666	707332	175000	38121
2013-14	304185	608370	223000	39110
2014-15	323065	646130	234963	21511
2015-16	522663	1045326	243978	39112

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2016-17	517770	1035540	287947	18765
Mean	*404269.8*	*808539.6*	*232977.6*	*31323.8*
SD	*95990.808*	*191981.617*	*36352.552*	*9181.475*
CV	*23.74%*	*23.74%*	*15.60%*	*29.31%*

Authors own source

Table 4 shows the value added to total employees in Rupees. Binani Cement showed increasing values for continuous five years which is a good sign of labour productivity of the company. HZL had a mix trend with the highest value generated in the year 2015-16 (Rs. 5,22,663). RZ value declined in the year 2013-14 but then it showed a growth for two years then further declined slightly in the year 2016-17. RZ showed the highest mean value of Rs. 8,08,539.60. PEPL had a major decline of value in the year 2014-15 by 44.99% and in the year 2016-17 by 52.02%, which shows the poor labour productivity of the company. Trends were analyzed by *t*-Test.

Table 5: Overall Analysis

Name of Variables	SE	Calculated Table Value @5% Level of Significance	Inference
Value of Output to Total Employees (Metric Tonne)	1.224694	2.35	NS
Value of Output to Total Employees (Rs)	3.589099	2.35	S
Value of Output to Total Wages and Salaries paid to Employees (Rs)	3.847758	2.35	S
Value added to Total Employees (Rs)	2.237136	2.35	NS

- *S (Significant)*
- *NS (Not Significant)*

VIII. Conclusion

The overall analysis of Labour Productivity on the basis of different variables conclude that value generated in the form of output is not significant in the different private sector enterprises in terms of units and value added by the employees but labour productivity in terms of wages and salaries significantly differs in private sector enterprises.

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Macroeconomic Stabilization and Structural Adjustment in Latin American Countries: Real Aspects

By Sanjoy Kumar Saha, Mst. Nilufar Easmin & Partho Sarathi Laskar
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Abstract- This paper evaluates the advisability of a monetary union in Latin America applying the theory of optimum currency areas (OCA). The analysis, based on the traditional OCA criteria, suggests that there is no evidence for any monetary integration in Latin America, even at a sub-regional level. Latin American countries have evidenced a low degree of trade integration and asymmetric co-movements among their shocks. Moreover, important differences in the speed of adjustment and size of shocks are found. Higher policy coordination seems to be necessary before starting any economic integration process in Latin America.

Keywords: *monetary integration, dynamic, currency, inflation.*

GJMBR-B Classification: *JEL Code: B22*



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Macroeconomic Stabilization and Structural Adjustment in Latin American Countries: Real Aspects

Sanjoy Kumar Saha [α], Mst. Nilufar Easmin [σ] & Partho Sarathi Laskar [ρ]

Abstract- This paper evaluates the advisability of a monetary union in Latin America applying the theory of optimum currency areas (OCA). The analysis, based on the traditional OCA criteria, suggests that there is no evidence for any monetary integration in Latin America, even at a sub-regional level. Latin American countries have evidenced a low degree of trade integration and asymmetric co-movements among their shocks. Moreover, important differences in the speed of adjustment and size of shocks are found. Higher policy coordination seems to be necessary before starting any economic integration process in Latin America.

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I. Introduction

The difference between countries occurs because they have difference preferences. Some countries prefer less inflation than others and when it comes to join the monetary union, some countries to bear more costs than others. Hence, the launch of the common currency between the countries members of integration should be done after fulfilling the convergence criteria as no country is immune to some of the static and dynamic effects of the creation of a single currency covering a certain number of member nations of the monetary integration. Before looking at the implications of the inflation differentials among the countries for our concern, we have first to analyze these inflation differentials.

Looking at the fluctuation of the cyclical component of real GDP in Mexico about its trend, we observe persistency of deviations from trend. That is, if at a certain point in time you observe a deviation above/ below the trend, the deviation for the next period is more likely to also be observed above/below the trend. There is no frequency in the amplitude of the fluctuations across time. Some periods are characterized by small deviations above the trend and larger deviations below (1990-1995 for example) and others are, at the contrary, characterized by large deviations above the trend and smaller deviations below (1986-1990 for example). Overall, we observe almost the same number of deviations above the trend than below although deviations below the trend seem to be, on average, of larger amplitude.

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II. Background Study of Monetary Integration

a) Before 1980 till early 80s

During the presidencies of Luis Echeverria (1970-76) and José-Lopez Portillo (1976-82), an increase of the role of the State in the economy has been observed in Mexico. Huge government spending was sustained by revenues obtained from the exports of "brand new" oil discovered in the 70s in the Mexican subsoil. At this time, Mexican economy was mainly driven by the oil and petrochemicals sectors. The economy was highly protected with very high tariff (mainly for foodstuff).The export-led growth period will stop in mid-1981 when the country faced falling oil prices, higher world interest rates, rising inflation, a chronically overvalued peso and a deteriorating balance of payment that led to massive capital flight.

b) Crisis of the early 80s and recovery

In the first period (1980-1985), the frequency of fluctuations is lower than for the rest of the entire observed period. That is, we observe less turning points for this first period, the fluctuations are less choppy. A peak is observed in the last quarter of 1981 with amplitude of more than 6 % above the trend, probably due to the driving oil export sector. In the early 80s the country has experienced a debt crisis. The large deviation above the trend starting in the second part of 1982 is supposed to be related to this crisis of which starting point had been the Mexican government default on scheduled debt repayments. After having nationalized the banking industry, the government decided to implement austerity measures that remained the groundwork for the recovery. A trough at 4 % below the trend in the mid-1983 is observed. The economy has been less volatile between the end of 1983 and 1986, partly due to huge efforts for stabilization by government. On the other hand, the government interventionism has led to a loss of credibility of Mexican political authorities. International investors were scared

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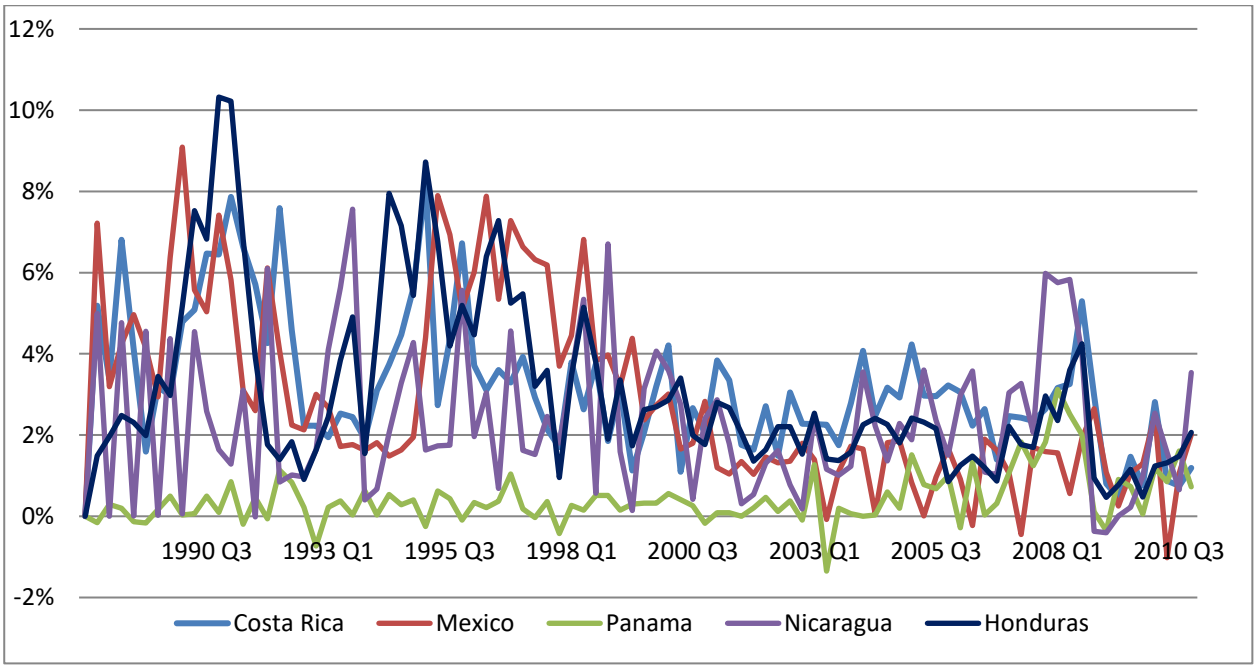
away by the high inflation and instable economic environment. The stabilization policy has generated high social costs characterized by a plummet of disposable income and employment.

c) 1986-1994

Starting form 1986, fluctuations became choppier. From 1986 till 1990 the real GDP had been mainly under its trend with maximum amplitude of more than 6 percent. Stabilization is observed between 1987 and 1988 (the amplitude of deviations became smaller). In 1986, Mexico abandoned import substitution and liberalized its trade by joining the General Agreement on Tariffs and Trade (GATT) but this strategy has been proved disappointing in terms of increasing exports and Foreign Direct Investment (FDI). This period is also characterized by political changes. The president Salinas undertook a long-term development plan in 1989 for the deregulation of the economy through the privatization of state enterprises, liberalization of foreign investment laws, deregulation of the financial service sector and reductions in tariff and nontariff barriers. Its objective was to reduce the external debt of Mexico through incentives for foreign investments. The strategy seem to have led to good results as, between 1990 and 1994, we observe a real GDP mainly above its trend with a peak in the last quarter of 1994 with amplitude of more than 6 percent.

III. Business Cycle and Domestic Indicators



Graph 1: Comparison of inflation changes among countries

Source: Calculations based on IMF data

The figure here above indicates the volatility of the inflation rates during two decades 1990-2010 for five countries Costa Rica, Mexico, Panama, Nicaragua and Honduras.

In general, the recent inflation level has decreased except for the year 2008 when the World was facing the global financial and economic crisis. Costa Rica experienced an average inflation rate of 3.16% representing 3.81% in the first decade, and 2.45% in the second decade. Hence, a decrease in the average inflation rate by 1.36%. In Mexico, the average inflation rate was 2.76% for the two decades from 1990 to 2010. However, during the first decade, the average inflation rate was 4.22% whereas in the second it has reduced to 1.65%. This indicates a decrease by 2.57% from the first to the second decade. As for Panama, the average inflation rate was 0.46% during the two decades 1990-2010. However, there was a small decrease by 0.41% in the average inflation rate from 0.27% during the first decade to 0.68% for the second. In Nicaragua, the average inflation rate was 2.33% for the two decades from 1990 to 2010. However, during the first decade, the average inflation rate was 2.60 % whereas in the second it has reduced to 2.03% and thus a decrease by 0.57%. The data for Honduras indicate that the average inflation rate was 3.16% during the two decades 1990-2010. The first decade, the average inflation rate was 4.37% and it has decreased to 1.83% during the second decade by 2.54%.

The figure above indicates also that countries with initially higher inflation rates during the year 1990, Mexico with 9.09% in the first quarter and Honduras with

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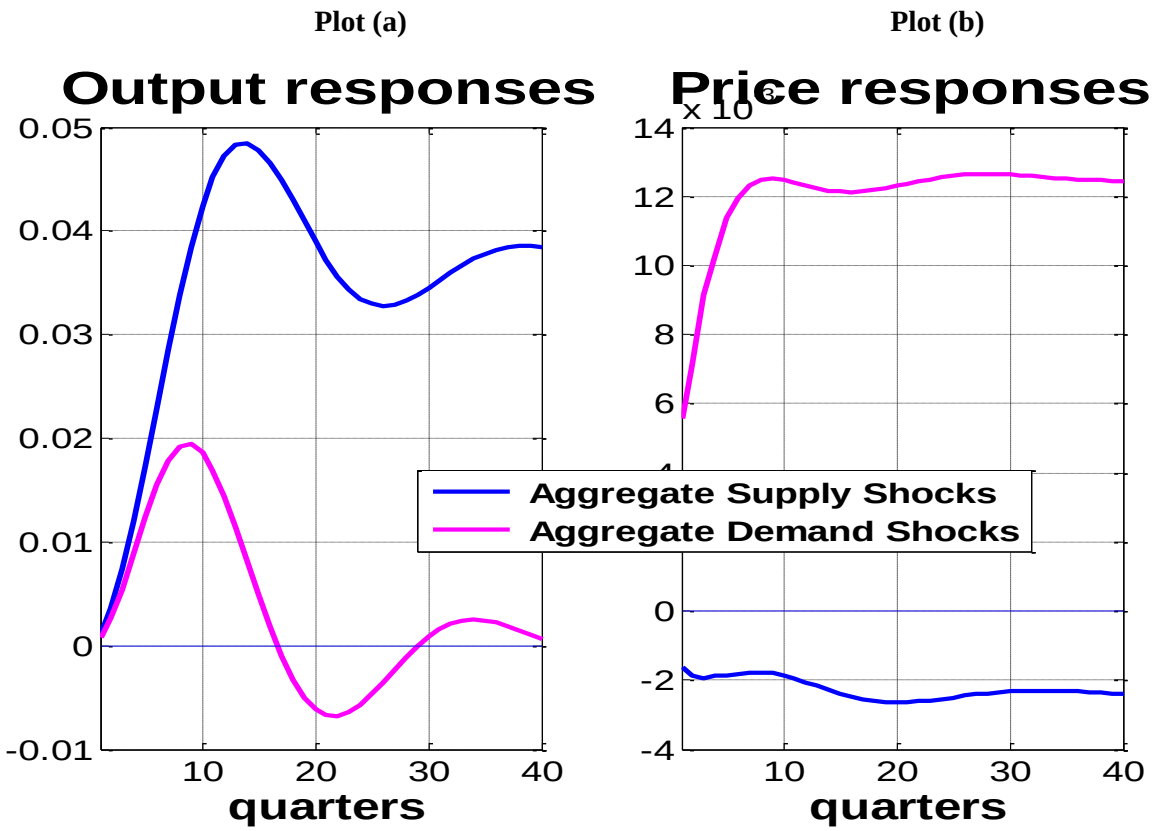
10.32% in the fourth quarter managed to reduce considerably the level of inflation as at the end of the year 2010, the rates were 2.01% and 2.06% respectively. Costa Rica has also reduced the inflation rate from 4.79% as at the beginning of 1990 to 1.19% at the end of 2010.

As persistent differences in inflation among members of a monetary union may, in fact, lead to disparities in real interest rates, given the common monetary policy, it is recommended to enter the monetary union with a lower inflation rate. These diversities may be exacerbated by cyclical considerations: a country where economic activity is relatively subdued is likely to have weak inflationary pressures and therefore experience a relatively high real interest rate; this in turn could add further to the divergence of inflation. A different view holds that, in the absence of exchange rate flexibility, inflation differentials are an adjustment mechanism: countries with higher productivity or lower wage growth than others would experience a depreciation of the real exchange rate and thus a gain in trade competitiveness.

Other factors being held constant, the inflation levels in these five countries indicate that they may constitute a monetary integration as there are no significant differences in their inflation rates as at the end of 2010. However, Panama with 0.73% inflation rate in the fourth quarter of 2010, should avoid zero inflation level by maintaining the positive measured inflation rate. The reasons are, among others that, there may be situations where a negative real interest rate is required to get the economy going. However, when the inflation rate is zero, negative interest rates are impossible as negative real interest rates would then require negative nominal interest rates. In addition to this, in light of nominal price rigidities, some inflation is needed to allow for a decline of relative prices and to provide the economy with the necessary flexibility to accommodate structural changes.

a) Panama



Source: Calculations based on IMF data

The figure above shows the output and price impulse response functions for Panama. The impulse response functions for output illustrated in plot (a) illustrate that aggregate demand shocks have only temporary effects on the level of output while supply shocks have permanent output effects. Positive aggregate demand shocks produce a rise in output initially, which then gradually returns to its baseline level. The plot indicates that it will require 40 quarters or 10 years for the aggregate demand to return to its baseline level after the occurrence of the shock. Whereas, the positive aggregate supply shocks do not return to their

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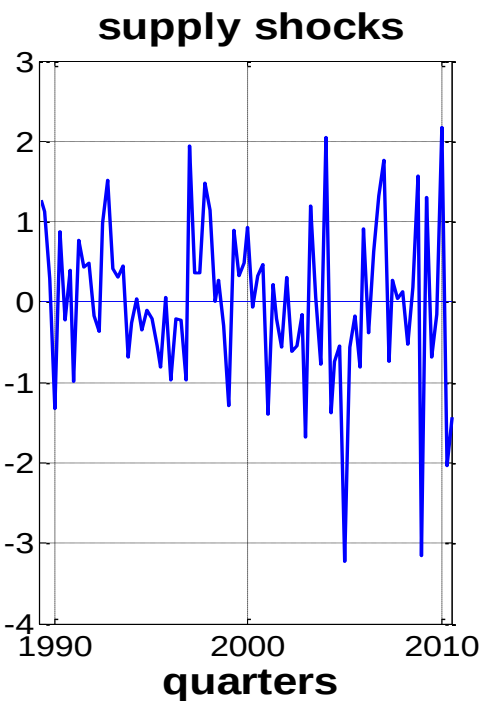
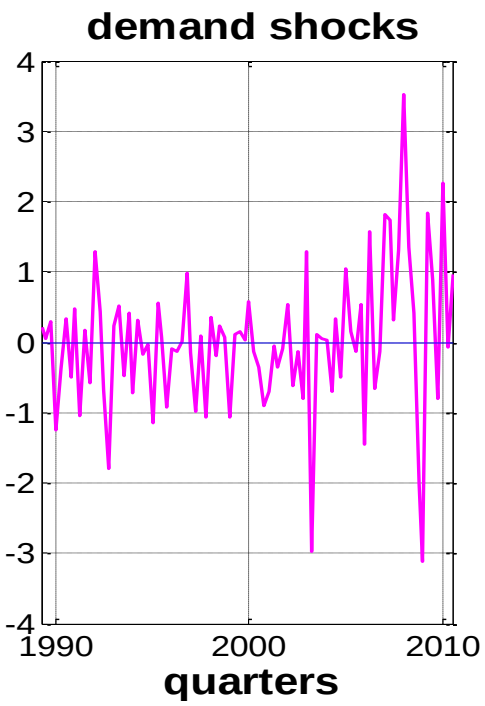
initial baseline levels but instead, they produce a steady rise in output to a new higher equilibrium level. The impulse response functions for prices illustrated in plot (b) indicates that while both aggregate supply and aggregate demand shocks have long run effects on the price level, demand shocks produce a gradual rise in prices over time up to 8 quarters (2 years) and thereafter they tend to stabilize at the same level over the time, while supply shocks produce a steady decline in prices, as predicted by the Aggregate Demand (AD)-Aggregate Supply (AS) framework.

b) Honduras

Plot (a)



Plot (b)



Source: Calculations based on IMF data

The figure above in plot (a) shows the fluctuation in supply shocks and in plot (b) shows the fluctuation in demand shocks of Panama over the period from 1990 to 2010.

Over the period from 2000 to 2003, the demand contraction caused a large increase in unemployment. The cause was a combination of capital flight and a non-accommodative policy response: the exchange rate was not allowed to fall, or could not fall because of dollarization. Strong aggregate demand was reflected in the inflation rate, which rose over 2003–2004 despite Panama's dollarization and leading to a negative demand shock. Over the period from 2003 to 2007, Panama experienced an output growth and unemployment fell rapidly. A confluence of increased Foreign Direct Investments (FDI) in fixed capital and improved investment productivity has helped to catalyze macroeconomic growth in Panama. Canal expansion and a housing boom have accelerated investment in fixed capital and, in turn, boosted gross fixed investment. Labor productivity has also been faring well and accelerating thus, positive supply although, in the year 2005, capital flight consistently caused a negative supply shock. The collapse in world trade and the global financial and economic crisis. There was then a contraction in exports and domestic demand, and in particular in investment leading to both supply and demand shocks over the period 2008-2009. FDI flows started to recover in the last quarter of 2009 and continued to trend upwards in 2010, leading to positive supply and demand shocks.

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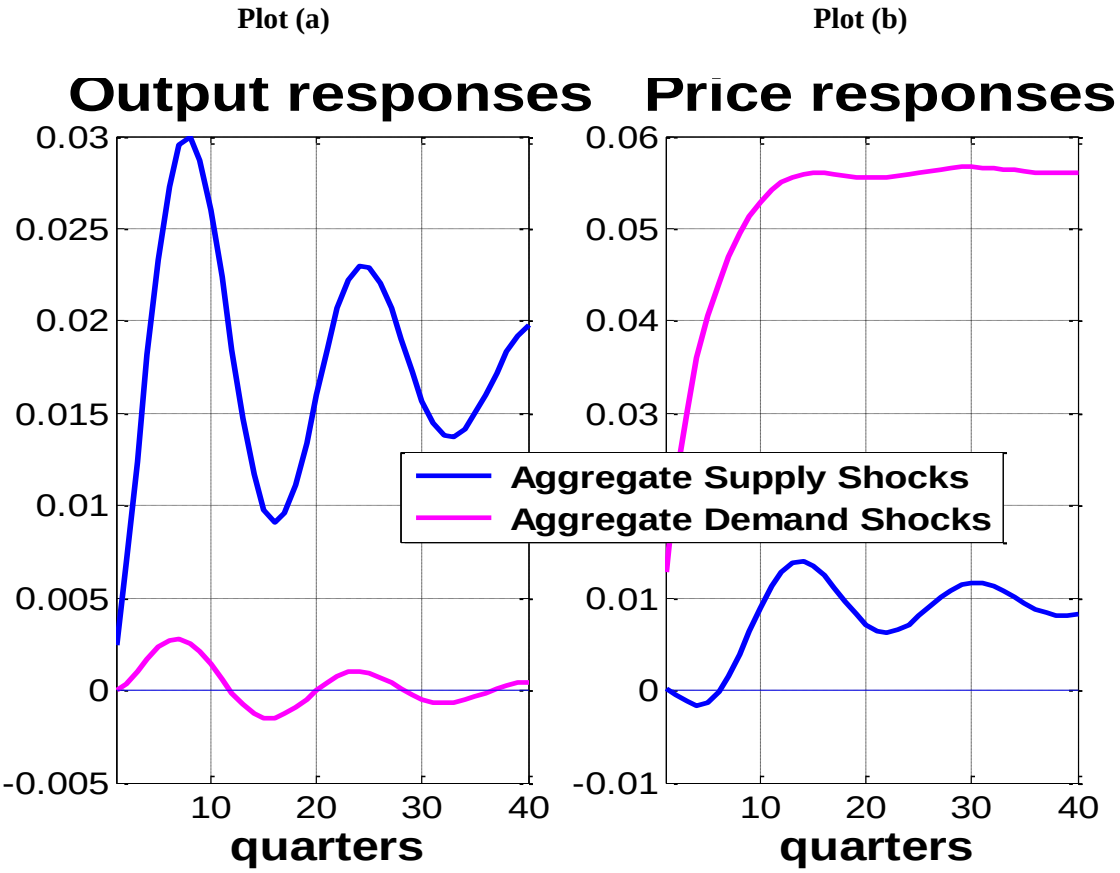
c) Nicaragua



Source: Calculations based on IMF data

The figure above shows the output and price impulse response functions for Panama. The impulse response functions for output illustrated in plot (a) illustrate that aggregate demand shocks have only temporary effects on the level of output while supply shocks have permanent output effects. On one side, positive aggregate demand shocks produce a rise in output initially, which then gradually returns to its baseline level. They will tend to stabilize after the 40th quarter (or 10th year). On the other side, the positive aggregate supply shocks will not be back to their initial levels but instead, they will produce a steady rise in output to a new higher equilibrium level. The impulse response functions for prices illustrated in plot (b) indicates that while both aggregate supply and aggregate demand shocks have long run effects on the price level, demand shocks produce a gradual rise in prices over time up to the 12th quarter (3rd year), while supply shocks produce a decline in prices in the first three quarters, and thereafter, there are alternations of rises and declines in prices over time such that the prices will stabilize after the 40th quarter.

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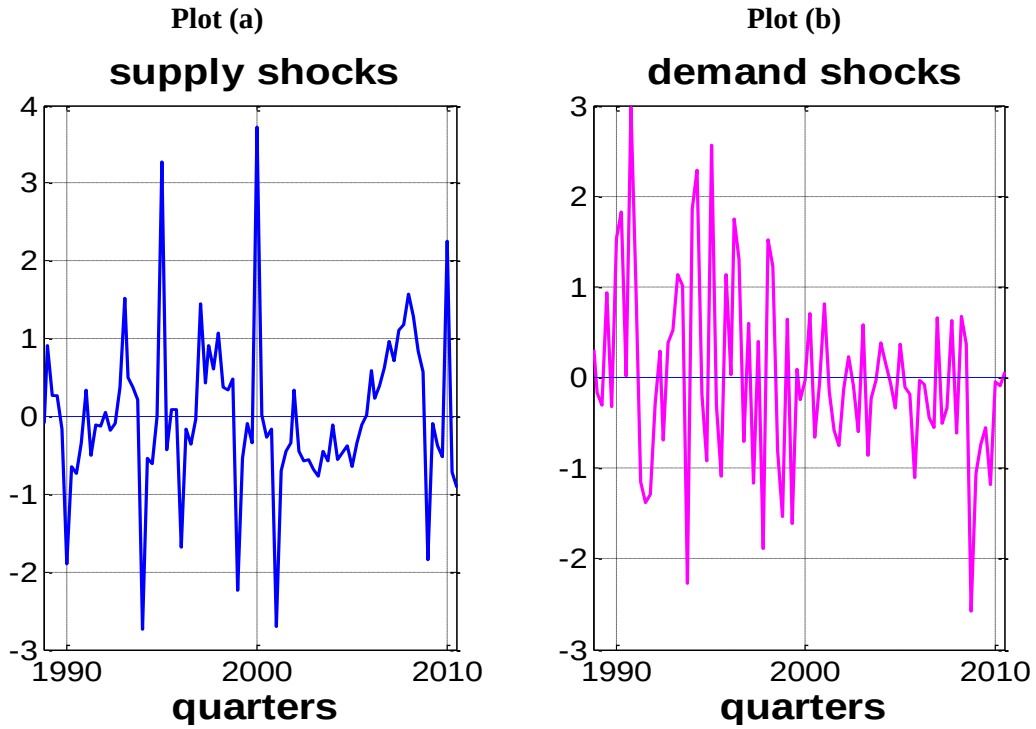
d) Mexico



Source: Calculations based on IMF data

The figure above in plot (a) shows the fluctuation in supply shocks and in plot (b) shows the fluctuation in demand shocks of Mexico over the period from 1990 to 2010.

Leading variable to GDP, the majority of significant coefficient and the highest correlation is observed after four lags (0.468) in the right-side column of the table(the correlation appears stronger between the CC of the variable and the CC of real GDP when we take into account the current CC of real GDP and the CC of the variable computed four lags before. From the figure, the household consumption has been mainly procyclical to real GDP. However, this trend is not observed during the PESO crisis. At the end of 1993 the household consumption collapsed then reversed in 1995. From the figure 5 we mostly observe a procyclical trend and the leading character of the household consumption is quite intuitive as the household consumption represents generally a large part of the GDP. Moreover, this correlation is strong.

The real GDP has been growing more from 2003 to 2007. During 2006 and 2007, the rates of GDP growth were higher than they had been during the previous four years. The economic growth that occurred during that period was due to a significant reduction of the lending rate (from 18.5% in December 2005 to 16.5% in 2007) which encouraged vigorous growth of credit to the private sector, in real terms. It also contributed to a significant reduction in the open unemployment rate in the urban sector over the same period. Hence, this resulted in a positive supply shock. However, the labor instability and uncertainty in the business sector caused the volatility of the demand over the period from 2000 to 2007. In 2008 the expansion slowed down as a result of the international financial crisis and world recession which led to a scarcity of international funding that, in turn, also contributed to the rise in lending rates. This reflects the negative supply and demand shocks which occurred over the period 2008 to 2009. As in other small and open economies, commodity and oil prices were among the most important determinants of inflationary pressures in 2008 and 2009 which the central bank attempted to control by raising the policy interest rate. In response to the international financial crisis and world recession, the government of Honduras pushed down to zero the legal reserve requirement for loan requests where at least 60% of the lending resources would go to production activities. This led to a positive supply shock in 2010 and prices have grown at a much slower pace in the same year.

IV. An Overview of the Functioning and the History of Government Bond Market in Latin Countries

a) Panama

i. *Primary Issuance in the Domestic Market*

The government issues standardized public debt with maturity terms of up to 10 years via a public auction process.

The Office of Public Debt (*Dirección de Crédito Público*—CP) is responsible for the integrated management of public debt. As part CP issues treasury bills at three, six, and 12 months, and treasury notes with fixed interest at maturities of two to 10 years.

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Interest is paid semiannually on a 30/360-day basis. The current maturities are three, four, six and eight years. Both bills and notes are completely fungible and have homogenous characteristics (standardized).

Domestic public debt is issued in a series of electronic multiple-price auctions with competitive and noncompetitive bidders.

Treasury bills are auctioned on the third Tuesday and treasury notes on the first Tuesday of each month according to an annual auction schedule. The auction is administered by the national stock exchange (BVP), for which the primary placement of government debt securities has become an important activity. The CP usually announces the (indicative) auction volume, the maturity, and the day of liquidation eight days prior to the auction date. Any national and foreign natural and legal entity can participate in the auction via authorized and registered brokerage firms *(casas de valores)* or dealers *(puestos de bolsa)* only. Interested parties may present either competitive or noncompetitive bids. However, nonfinancial public institutions, such as Social Security Agency, can only submit noncompetitive bids (via BNP as agent). After the auction closes, the bids are categorized into private competitive bids, private noncompetitive bids, and noncompetitive bids by public entities. The issuer then decides on the minimum acceptable price and allocates the issue to all successful competitive bids at their individual bid prices (discriminatory price). If the cut-off price results in oversubscription, allocations to competitive bidders are prorated. Unless the available auction volume is exhausted, the residual is offered to private noncompetitive bids before public bidders receive any allotment. Noncompetitive auctions are allocated at the average price of successful bids. Settlement occurs at T+3 through the clearing system of the *Central Latinoamericana de Valores* (LatinClear), the exclusive custody system for clearing and settlement of securities traded at BVP. The transfer of ownership happens via book entry.

The BVP fee structure for primary issuers requires marginal registration and listing fees.

The debt issuers pay BVP a one-time registration fee of $250 plus a basic (or listing) fee of $50 for each series of debt listed, plus an annual fee of $100 and $25 for each outstanding series as long as the debt instruments are listed. In addition, primary issuers pay fees ranging from 1/8 to 1/32 of 1 percent, depending on the issue volume. Currently there are 15 brokerage houses registered with BVP, of which nine are authorized to receive and present bids for both treasury bills and notes. All brokers are privately owned, with the exception of BNP, which intermediates bids from public sector entities.

Public sector investors have substantial influence in determining auction rates in the primary market for public debt.

The price formation in the auction process of public debt differs for short- and medium-term debt instruments. The auction results of 2005 suggest that both treasury bills and notes attract comparable levels of demand of around $50 million on average, against an indicative offer volume of $17 million and $32 million of treasury bills and notes, respectively. While bills were sometimes under allocated (i.e., the issued amount was lower than the indicative amount), both bills and notes are consistently oversubscribed. Moreover, bidders are on average more than twice as likely to be successful in auctions of notes (54 percent) than in auctions of bills (24 percent).

Despite their restriction to noncompetitive participation in the primary market, public sector bidders influence price formation.

Large public sector demand allows the government to curtail competitive bids at a high cut-off price (i.e., a low offered interest rate). Although both auctions of bills and notes are heavily oversubscribed, noncompetitive public sector bids receive an above-average allocation rate at the average auction price.

The authorities believe that external finance is generally less costly than domestic public funding.

There is the spread difference between domestic and external debt, which, according to market participants, has averaged approximately 60 basis points over the last year (after adjustment for different issuance costs) for comparable maturity terms. In 2005, bills and notes sold at respective spreads of about 19 and 144 basis points over the equivalent U.S. Treasury rate. Given that the last external bond issuance of 30-year global bonds on January 17, 2006 generated a spread of 230 basis points over the U.S. Treasury 30-year benchmark rate, medium term domestic funding via the notes program indeed appears costly. This might encourage the government to abandon the local market for more externally issued debt.

Panamanian authorities face an important choice in balancing the objectives of securing least cost funding and developing domestic debt market.

The lower secondary market yields of global bonds versus domestic bonds (to the limited extent such comparisons can be made) may be explained by a variety of factors including the much larger volume and higher liquidity of global bonds, larger and more international investor base, and the preference for international settlement, governing law, and jurisdiction. These advantages are likely to persist. Moreover, as Panama is formally dollarized, avoiding currency risk is not a reason for domestic issuance. Treasury bills would have to be issued domestically for several obvious reasons. But potential reasons for domestic issuance of

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bonds would have to be essentially long term and strategic, such as developing a domestic institutional and retail investor base, supporting local exchange and brokerages, and encouraging greater issuance by Panamanian corporations in the local exchange. While Panama enjoys good market access, exclusive reliance does carry some risk of sudden stops of capital flows and changes in risk appetite for the emerging market assets. For strategic risk reduction and domestic financial sector development, it may be reasonable for Panama to maintain a significant domestic issuance, as envisaged in its fiscal responsibility laws.

If it decides to do so, it may be useful to focus on specific maturities, say, up to 5 or 10 years, while relying on global bonds for other maturities. Panama may also be able to reduce the cost of such domestic funding by seeking both domestic and foreign investors in such locally issued debt, issuing such bonds domestically in volumes that would attract foreign investors, and incorporating the standard provisions of Eurobonds into its local issuance to the maximum possible extent.

ii. *Secondary Market for Public Debt*

Secondary market trading is organized by the national stock exchange.

BVP was created in 1989 by Resolution No. 349 of the National Securities Commission (*Comisión Nacional de Valores or CNV*) and commenced operations on June 26, 1990 as the national stock exchange. As the sole securities market regulator in Panama, the CNV acts as an autonomous unit of the Ministry of Economy and Finance subject to the control of the General Comptroller's Office. However, national law in Panama does not bestow exclusive rights to the BVP as the only authorized stock exchange. The BVP handles dematerialized equity and debt securities (including public debt) under the custodianship of Latin Clear. Investors can obtain Latin Clear's services through any of the 23 participant organizations (brokerage houses, licensed banks, and other qualified financial institutions). With the exception of government debt, all exchange-listed securities must be registered with the CNV. Latin Clear operates on a continuous netting system for all transactions conducted through the electronic trading system (*Sistema Transaccional Electrónico*—SITREL).

While market capitalization continues to rise, it fails to stimulate more trading.

The market capitalization of securities traded on the BVP almost doubled from $4,702 million in 2002 to $8,061 million in 2005. BVP is small and limited in offerings, with a total of 83 authorized issuers of shares or debt instruments. Securities traded in the secondary market of the BVP are charged an annual trading fee of 1/16 of 1 percent. Notwithstanding a sound exchange-trading infrastructure, a comprehensive trading platform and low trading costs, secondary market trading of public debt either via the BVP or the interbank over-the-counter market is low, at a turnover rate of only 5.6 percent of market capitalization. While reported overall trading volume has risen from $1.05 billion to $1.68 billion over the last five years, secondary trading without primary issuance dwindled from $512 million to $454 million from 2002 to 2005.

Most exchange-based secondary market activity centers on equity and medium term government debt, but trading in corporate bonds remains thin.

Based on primary issuance and secondary market trading at BVP, government notes and bonds ($672.9 million, or 50 percent of exchange-based trading) were the most frequently traded securities in 2004, with corporate debt/commercial paper ($296.4 million, or 22.1 percent of exchange-based trading) and equity ($293.7 million, or 21.8 percent) accounting for the remaining trading activity. However, once exchange-based primary issuance is excluded, equity ($202.9 million, or 44.6 percent) was the single most traded asset class, followed by public debt securities ($120.2 million, or 26.8 percent of total trading) and private debt securities ($74 million, or 16.3 percent). Private debt securities tend to be thinly traded and only play a minor role in terms of primary issuance at the BVP. As opposed to the larger exchanges in Costa Rica and El Salvador, where most of exchange-based trading is on short-term securities (86.1 and 96.3 percent of total trading, respectively), the BVP conducts most trading on securities with maturity terms beyond one year (64.4 percent). Repo trading, which used to account for bulk of the secondary trading, has declined substantially in recent years.

The current organization of the primary market restricts the development of a liquid secondary market for public debt.

The limited issuance of public debt has resulted in frequently oversubscribed and under-allocated primary market auctions. The large allocation to noncompetitive public bidders has curtailed greater private sector participation and impedes greater diversification of demand across the financial system. Moreover, the short-term nature of public debt encourages a large investor base of nonfinancial public agencies, insurance companies, and private pension funds to hold public debt until maturity ("buy and hold"), which prevents secondary market trading and the development of a liquid yield curve.

b) Honduras

i. *Primary Issuance*

At the beginning of each year, Congress authorizes the total annual issuance volume of public debt.

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However, this decision does not set the overall debt ceiling or maturity profile of debt within an integrated debt management strategy or desired level of indebtedness. Congress frequently authorizes new debt issuance at a later stage if the need for more funding arises during the year.

Public debt issuance in Honduras is mostly limited to short-term, negotiable certificates issued by both the BCH and the Ministry of Finance.

While the government desires to issue medium- and long-term debt, at the moment, it issues debt only to the extent of amortizations (i.e., no net increase in debt stock), and such issuance currently is short term. In addition, long-term government bonds are issued annually to cover the losses of the central bank, but outside the normal auction process.

Domestic government debt issuance is rare and considered a last resort to raising external finance.

In contrast, issuance by the central bank for monetary policy purposes is frequent and more significant in volume than the debt issuance by the finance ministry.

The BCH made efforts to modernize its monetary operations beginning in 2004 with the adoption of the new Central Bank Law.

The central bank relies mainly on open market operations as the appropriate instrument to control monetary aggregates in terms of liquidity and net international assets.78 Key elements of the new monetary policy are the market-based primary auctions of negotiable central bank securities and an interest rate corridor for an overnight (collateralized) loan facility to commercial banks, with the interbank reserve loan rate (i.e. deposit facility) as the floor (at 4 percentage points below the monetary policy rate (*tasa de política monetaria* or TPM)) and a new Lombard facility (*facilidad permanente de crédito*) as the ceiling (at 4 percentage points below the TPM). The monetary policy rate is allowed to fluctuate within a band and sets the maximum rate permitted in the weekly auction of seven-day CAMs.

A rather large number of competing sovereign securities are issued in Honduras.

The BCH conducts auctions for both central bank and finance ministry issues. The central bank issues two types of standardized, short-term public debt instruments, through a discriminatory price auction. The central bank issues zero-coupon discount Absorption Certificates in domestic currency (CAM), with maturities of either 7 days (only for financial institutions) or 21, 28, 91, 182, and 364 days (for all eligible investors), and U.S.-dollar denominated Absorption Certificates (CADD), with maturities of 98, 182, and 364 days. The Ministry of Finance Debt Management Office (*Crédito Público* or CP) uses the same auction platform to issue standardized, short-term government notes (*valores gubernamentales en moneda nacional* or VG), with maturities of 98, 182, and 364 days every two weeks and to issue three-year government bonds a few times a year.

The auctions of public debt follow a preannounced calendar.

Prior to adoption of Government Securities Trading Rulebook (RNVG), auctions of central bank debt securities (in local currency and U.S. dollars) were scheduled alternately on a weekly basis. After RNVG came into effect in July 2005, the central bank switched to weekly and bi-weekly

CAM auctions, while CADD auctions continued to be taken place once every two weeks. The auction of seven-day CAMs is held every Tuesday afternoon and may be attended only by financial institutions. The central bank uses this auction to absorb excess liquidity in the banking system. The bi-weekly auction of CAMs with a maturity of three months or longer is held on Tuesday mornings and may be attended by representatives all public and private financial institutions that buy directly and by intermediaries that represent the investing public. Until their recent suspension, weekly auctions for CADDs were scheduled every Wednesday and were meant to provide an investment outlet for dollar deposits. Although Honduran banks may invest their sizable dollar deposits abroad, dollar rates in the United States were below the cost of their dollar deposits.

Government debt is always auctioned on the same day and in parallel with the auction of either CAMs or CADDs of the central bank with the same security characteristics.

Only the auctions of VGs are reopening of existing series. All auctions are competitive, but public auctions of VGs also allow noncompetitive bids86 by public sector entities and government agencies, which receive an allocation at the average rate of successful competitive bids.

RNVG and Resolution No. 154-4/2005 establish the auction procedure.

Bids for public debt securities are accepted until 11 a.m. on auction day (except CAM/IFs, for which a deadline of 10:30 a.m. applies) and are submitted to the BCH's Debt Management Department. The auction closes at 11 a.m. after all the bid envelopes are opened. The central bank only registers bids if they comply with RNVG, the minimum bid requirement, and the preannounce indicative interest rate for each type of security tendered. The highest acceptable interest rate (cut-off rate) is set by the board of directors of the central bank and is meant to signal the market as to the central bank's interest rate targets. In auctions of VGs, this decision is taken by the CP of the Ministry of Finance. Noncompetitive bids receive the average rate of successful bids (Article 28 of Resolution No. 154-

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4/2005). The auction is declared void *(subasta desierta)* if only one valid bid is received. BCH acts as custodian of the auction process, while the Central American Stock Exchange (*Bolsa Centroamericano de Valores*—BCV) usually administers the settlement and clearing on the same day of the auction.

Participants in the primary auction are mainly banks and exchange brokers.

Any natural and legal person, resident or nonresident, is eligible to participate in the primary market. According to RNVG, private financial institutions and the Honduran Bank for Production and Housing (BANHPROVI), a public second-tier bank, participate directly and commission-free in all auctions. All other investors (mutual funds, private and public pension funds, state-owned banks, and individual investors) may submit bids via authorized intermediaries (brokers) of public debt on a commission basis. Recently, public entities have been allowed to also submit bids directly.

As of February 2006, brokerage firms were able to implicitly control market access of public sector and nonfinancial bidders to the primary public debt market.

Honduras has 11 brokerage firms, nine of which are active participants in the auction process of public debt. More than two-thirds of all registered brokerage firms are subsidiaries of large banking groups. Since brokerage firms are largely owned by banks, which can access the primary market themselves, the legal restrictions on primary market participation by nonfinancial investors and public entities (other than BANHPROVI) profits banks. Brokers charge semiannual commissions in the range of 0.07 to 0.25 percent to their clients (both in primary and secondary market).

Conscious of the commission fees public entities pay to brokerage firms, the BCH on March 2, 2006 the BHC revised the existing provisions regulating primary market access (Article 13 of RNVG) and allowed public sector institutions to directly participate in primary auction of public debt.

This policy change is likely to result in substantially lower revenues for brokers and ends indirect primary market control by commercial banks. Nonetheless, brokers retain the right to charge fees if they serve as intermediaries

Primary issuance is dominated by local currency-denominated, short-term certificates issued by the BCH.

CAMs represent 95 percent of the primary market issuance of $2,864 million (2005), with the rest of the issuance volume being attributable to CADD (3 percent) and government bonds (2 percent). Banks and investment funds (mostly public, such as large government pension funds) are dominant investors in VGs, while only banks (by virtue of regulatory restrictions or organizational nature) invest in CAMs and CADDs. In 2005, most CAMs were issued at maturities of 7 days (29.4 percent) and 364-days (33.7 percent). The average auction volume of all CAMs was $80.1 million. Sporadic auction of VGs in 2005 resulted in large variations in issuance volumes of government debt—as much as $7.9 million and as little as $54,295. New issuance volume for 2006 was expected to exceed $2.5 billion.

Despite structural differences in the execution of the auction process for CAMs and VGs, both types of public debt are priced the same.

Auctions for CAMs are more competitive than VG auctions and attract more private and smaller bids. Issuance volumes for CAMs are much larger. Successful bids for CAMs also tend to be roughly twice as large as unsuccessful bids, which, at high aggregate allocation rates, suggests less price sensitivity of larger bidders. CAM auctions also show more efficient price formation and greater market consensus on a single price, given the small difference of mean/median bid prices between successful and unsuccessful bids. Notwithstanding these structural differences, the refinancing costs of both the central bank and the finance ministry are about the same. Spreads of VGs concur with those of CAMs for almost all maturity terms.

There are several problems associated with the primary auction process.

Although the auction process is transparent, it results in frequent auction failures and deviations from the announced auction volumes. There are also some problems with the timing of the auction process. Moreover, BCH is exposed to high roll-over risk from the large-scale issuance of very-short term CAMs.

Concurrent issuance by both the government and central bank has led to an excessive frequency of small issuances at short maturities, inefficient price formation, and auction failures.

The average auction volume offered ranges from $7.4 to $26 million for CAMs and from $800,000 to just shy of $8 million for VGs, with average indicative amounts between $200,000 and $34.8 million for CAMs and $200,000 and $15.1 million for VGs. Moreover, undersubscribed auctions are frequent, and first-time auctions of VGs are routinely declared void. Bids for VGs are never rejected, yet occasional rationing takes place. In 2005, only about 70 percent of all announced auctions (and only at the most popular maturity terms of three months and longer) solicited sufficient demand to be declared valid. On average, demand falls consistently short of the indicative issuance amounts of both central bank and government debt and varies widely by maturity term. Only 28-day and 364-day CAMs (or 20.9 percent of offered CAMs) as well as 28-day VGs (or 0.2 percent of offered VGs) attracted sufficient investor demand for market clearing. At the same time, bidders can almost be certain to receive a full allocation (at a probability of 90 percent or more) across all

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maturities of CAM and VG issues, indicating that low demand for the announced volume coincides with little price competition. This problem is also compounded by the lack of a binding commitment on the part of the Ministry of Finance and the BCH to the indicative offered volume. In case of some incomplete auctions, the available issue amount is altered after the auction. Such ex-post changes in auction parameters reduce the perceived transparency of the process.

The primary market auctions are conducted without complete ex ante coordination of fiscal funding with liquidity operations by BCH.

In 2005, the government perceived no immediate fiscal funding need and yielded its allocation of bids to the central bank about half of the time. More generally, the simultaneous issuance of identical debt securities may not be ideal for each issuer.

There is also a problem of delayed disclosure of auction results.

The results of the Tuesday morning auction of CAMs with a maturity of three weeks or longer are not published before the afternoon auction of seven-day CAMs. Hence, bidders lack essential information about their success rate for CAMs at longer maturities before entering the afternoon auction of CAMs. While the central bank believes that there is an effective cash yield curve for 7, 28, 98, 182, and 364-day maturities, some banks believe that only central bank debt with a maturity of one year is efficiently priced.

Auctions of debt securities with maturities of one month or more entails reveal a substantial maturity premium, which may reflect a convergence of market views on yields.

While the Ministry of Finance attempts to avert auction failure by sounding the market about current yields prior to the auction, the absence of liquid trading prevents adequate convergence on market clearing rates. Between 1 and 12 months, yield premia rise by nearly 380 basis points which might be explained by investor uncertainty in the absence of a liquid yield curve. The recent cancellation of a government bond issue for the national energy company (*Empresa Nacional de Energía Eléctrica)* (Box 3) underscores this problem.

The large liquidity operations by the decapitalized central bank carry potentially high rollover risk.

Open market operations have resulted in a stock of short-term central bank securities (seven-day CAMs) of only about $47 million (as of April 2006), which is less than 6 percent of the monetary base and about 2 percent of net international reserves. However, last year, BCH issued more than $815 million of seven-day CAMs (or more than 92 percent of total domestic central bank debt) at an average weekly auction volume of $22.6 million (or almost half of the current stock of seven-day CAMs). All of central bank issuance is short term, and the sleep yield curve may partly explain the preference for large issuance at very short term maturities. Although the central bank has sufficient discretion in choosing desired maturities up to one year, when reserves decline, the overall refinancing needs of the decapitalized central bank may imply large rollover risks.

ii. *Secondary Market for Public Debt*

Secondary market trading is largely limited to short-term debt securities, virtually all of which is public debt.

The BCV administers the secondary market for exchange-traded securities in Honduras. Public debt constitutes 99.8 percent of secondary market trading, which dwarfs the secondary trading in financial sector bonds. Commercial paper and long-term corporate debt issued by financial institutions are insignificant in size and trading, and are limited to Certificates of deposit (*certificados de depósitos a plazo* or CDP). An exchange-based repo market is virtually nonexistent. Capital market-based corporate finance does not have a large following among the mainly family-owned businesses, which are reluctant to comply with public disclosure requirements for corporate bond listing.

Central bank-issued certificates are most frequently traded.

In 2005, the total trading volume of public debt and other securities at the BCV was $2,038 million. CAMs were the most heavily traded (94.2 percent or $1.92 billion), followed by CADDs (3.14 percent or $63.89 million), some medium-term government bonds (2.48 percent or $50.59 million) and CDPs (0.2 percent or $4.36 million). Traded government bonds had maturities of between 657 and 1,096 days and traded at an average yield of 12.31 percent, whereas debt certificates issued by the central bank recorded maturities of between 98 and 364 days (the dollar denominated CADDs) and 82 and 180 days (CAMs), at average yields of 3.15 and 9.57 percent, respectively. Secondary trading volume in 2005 suggests that the outstanding stock of these BCH-issued, open-market-operation securities ($867.2 million of CAMs and $13.2 million of CADDs) is turned over at least twice annually.

The absence of significant volumes of medium-term government-issued debt and very small trading therein has prevented the development of a sovereign term structure beyond one year.

Notwithstanding the extension of the maturity term of CAMs and VGs in 2005 up to one year, almost all public debt securities are still short term. Currently, the absence of new issues of medium- and long-term government debt is due to the current standby agreement with the IMF, which requires total domestic debt issuance to be equal to zero.

Systemic constraints have limited secondary market development.

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Private interbank trading of public debt (to circumvent listing and registration fees) and the expedience of a "buy-and-hold" investment strategy for short-term debt have foiled broad secondary market development. Moreover, retail investors prefer certificates of deposit with local banks, which participate in the primary and secondary public debt markets. Although the secondary market is still incipient and lacks liquidity, the recent introduction of three-year, fixed-rate government debt and greater investor sophistication indicate an ongoing progress of market deepening.

c) NICARAGUA

GDP & Public Consumption in Nicaragua.

Public consumption is a lagging variable to GDP, the highest correlation is observed after one lag (-0.473) in the left-side column of the table (the correlation appears stronger between the CC of the variable and the CC of real GDP when we take into account the current CC of the variable and the CC of real GDP computed four lags before). From the figure we can say that from 1990 to 2010 Mexican real government consumption was procyclical to GDP except from very short periods of time. It means that government had been amplifying fluctuation because when GDP decreases, government consumption also decreases that can deteriorate situation in time of recession. Moreover, this correlation is strong.

GDP & Real wage in Nicaragua.

Real wage is coincident to GDP, the highest correlation is contemporaneous (0.485). Probably the shock in real wage can be transmitted rapidly to GDP or reverse. From this figure, we can understand that Mexican real wage is procyclical to GDP most of the years from 1990 to 2009. Moreover, this correlation is strong.

GDP & Real credit in Nicaragua.

Real credit is a lagging variable to GDP, the highest correlation is observed after two lags (0.675) in the left-side column of the table (the correlation appears stronger between the CC of the variable and the CC of real GDP when we take into account the current CC of the variable and the CC of real GDP computed two lags before). In general the variable is procyclical except for the mid-90s. The correlation between real GDP and Credit to private sector is very strong in this case. This could mean that private investment remains an important factor influencing US's economy.

V. Conclusions

As a matter of conclusion, we would like to give the following policy recommendations to Latin American Countries.

- Improve its institutional setting and give policy-makers incentives to enforce quickly countercyclical policies.
- Increase the links with its trading partner, but on the condition that Mexican policy-making institutions are sound in order to protect the domestic economy from foreign shocks and recessions.
- Policies which foster human capital and technology development in order to reduce the negative impact of Chinese competition and diversify the national economy.
- Focus on fostering the exports which were so far one of the few countercyclical indicator.
- Achievement of internal political stability through e.g. the international cooperation in the fight against the drug cartels.
- Redistribution policies to reduce inequality within the country and reinforce the domestic market.
- Reduction of extremely high level of inflation because of the huge social and welfare costs which inflation brings about. Moreover, the inflation was also counter-cyclical in the last few years and decrease of inflation could have a positive impact on the stabilization of the Mexican economy (at any case the issue is not settled yet whether far lower inflation rate could have in Mexico the same counter-cyclical impact or perhaps change to be pro-cyclical. This dispute could be resolved only empirically).
- Policies to give incentives to people which are credit-constrained to startup businesses.

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Effect of Capacity Utilisation on Manufacturing Firms' Production in Nigeria

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Abstract- Despite the significance of capacity utilisation in the production process, it received little attention from development economists especially in Nigeria where capitals were both scarce and under utilised. This present study examined the effect of capacity utilisation on manufacturing firms' output in Nigeria using time series data covering the period of 1981 to 2016 through an Autoregressive Distributed Lag (ARDL) model approach. The study found positive but insignificant relationship between capacity utilisation and manufacturing firms' output since capacity was grossly under utilised in virtually every productive firm in Nigeria. Thus, the study concluded that there was substantial under utilisation of capacity in Nigerian manufacturing firms and this under utilisation made positive effect of capacity utilisation less significant in explaining manufacturing firms' output growth in Nigeria. The study therefore recommended that government and policymakers should make policies that would increase capacity utilisation in manufacturing firms by ensuring appreciation in foreign exchange rate, discouraging uncoordinated imports of goods and services, facilitating access to modern machineries with affordable cost implication, and making stable power supply a priority in Nigeria.

Keywords: capacity utilisation, manufacturing firms, production, actual and potential output, autoregressive distributed lag (ARDL).

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Abstract- Despite the significance of capacity utilisation in the production process, it received little attention from development economists especially in Nigeria where capitals were both scarce and under utilised. This present study examined the effect of capacity utilisation on manufacturing firms' output in Nigeria using time series data covering the period of 1981 to 2016 through an Autoregressive Distributed Lag (ARDL) model approach. The study found positive but insignificant relationship between capacity utilisation and manufacturing firms' output since capacity was grossly under utilised in virtually every productive firm in Nigeria. Thus, the study concluded that there was substantial under utilisation of capacity in Nigerian manufacturing firms and this under utilisation made positive effect of capacity utilisation less significant in explaining manufacturing firms' output growth in Nigeria. The study therefore recommended that government and policymakers should make policies that would increase capacity utilisation in manufacturing firms by ensuring appreciation in foreign exchange rate, discouraging uncoordinated imports of goods and services, facilitating access to modern machineries with affordable cost implication, and making stable power supply a priority in Nigeria.

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I. Introduction

Capacity utilisation rate plays a crucial role in evaluating economic performance of manufacturing firms. Capacity utilisation is an important factor to be considered when an increase in productivity and expansion of firm's production become necessary. Also, the need to consider capacity utilisation is vital in many developing countries especially in Nigeria where capital is very scarce and mostly under utilised (Adeyemi & Olufemi, 2016). Theory of economies of scale stipulates that a cost-minimizing firm has a tendency to increase the utilisation of its capital if the returns to scale decreases as its production increases (Afroz and Roy, 1976). That is, the rate of capacity utilisation could be determined endogenously.

Moreover, the level of capacity utilisation does not only determine how much more output obtained by greater utilisation of existing capital but also defines expansion of capacity of a firm for a targeted level of output (Afroz and Roy, 1976).In view of this, the rate of capacity utilisation is directly related to the level of employment but inversely related to per unit capital service cost. Thus, an increase in capacity utilisation means a reduction in the average cost of production Afroz and Roy, 1976).

As crucial economic indicator as it is, capacity utilisation has not received due attention from development economists especially in most developing countries, Nigeria inclusive. Though not greatly dealt with, capacity utilisation does not only explain the relationship between actual output and maximum or potential output, but also imply the level of market demand. Over- orunder-utilisation of plant capacity can reduce plant competitiveness by increasing operating costs (Seguin and Sweet land, 2014). When market demand grows, capacity utilisation will rise. By contrast, if demand weakens, capacity utilisation will slacken. In the short run, capacity utilisation is important to determine the elasticity of supply. For a firm that is close to 100% of capacity utilisation rate, then supply will be very inelastic since there will be no room for capacity expansion to meet the required increase in supply. That is, regardless of changes in the price, supply remains relatively the same in the short run. Though, firms can increase productive capacity and increase the amount of capital in the long runto cope with excess supply.

In theory, capacity utilisation is measured in 100% efficiency level, however, in practical sense, capacity utilisation may not exceed 90% maximum level especially in developing economies due to some setbacks in the production process such as lack of proper labour monitoring and supervision, wastages in the process and machine breakdown (Afroz and Roy, 1976).In other words, each firm will choose its level of utilisation based on the principle of cost minimization and then explores how such will determine its normal rate of utilisation (Nikiforos, 2012).

Thus, the rate of capacity utilisation remains an important concept, though often neglected, in the production process because the presence of idle resources that can be readily engaged in production activities constitute a big problem in explaining fluctuations in firm output in Nigeria where under utilisation of some productive equipment have become rampant in almost all productive firms. Though, under utilisation of resources in productive firms is not only peculiar to Nigerian firms. For instance, Bresnahan and Ramey (1993) in a microeconomic evidence found that the most usual way of adjusting production is to shut the

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plant down for a week in the American automobile industry. Similar, surveys of business activities showed in most Western European countries that an important proportion of firms run excess capacities from time to time (Fagnart, Licandro and Portier, 1999).

In Nigeria, most manufacturing firms have been faced with capacity under utilisation and this had constituted a threat to firm productivity and production growth, and served as an impediment to economic growth and development of the country. The emphasis of the present government to promote local production has motivated further research in the area of capacity utilisation and firm production in Nigeria which is often neglected in manufacturing firms.

In literature, the sources of productivity change is divided into four, namely: pure technical efficiency change, technical change, scale efficiency change (Coelli *et al*. 2005; Kumar & Basu 2008; Melfou*et al*. 2009) and capacity utilisation change. Capacity utilisation change is another important factor that affects productivity growth (Basu & Fernald, 2001; Gu & Wang, 2013), however, few studies have examined the contribution of capacity utilisation change in the production process of Nigerian manufacturing firms. Despite the important contribution of manufacturing firms to Nigerian economy, there is limited literature focusing on the capacity utilisation and production in this sector. Few studies that have delved into this area focus on the determinants of capacity utilisation in the Nigerian manufacturing sector (*see* Adeyemi & Olufemi, 2016). In developed countries for instance, Gu & Wang (2013) examined Canadian manufacturing industries and found that manufacturing industries' productivity slowdown was largely associated with a decline in capacity utilisation. Thus, measuring the level of capacity utilisation and most importantly examining the effect of capacity utilisation on manufacturing firms' production is therefore an important step towards improving the manufacturing firms' production in Nigeria.

The rest of the study is organized in the following ways. Section 2explains concept of capacity utilisation; section 3 presents review of relevant literature; section 4presents empirical methodology and data sources; whilesection5has to do with interpretation of empirical results of the study. Finally, conclusion and policy recommendations were presented in section 6.

II. Concept of Capacity Utilisation

Capacity of a plantis seen as the maximum output that can be produced using the given technology and the fixed input when the variable input vector may take any non-negative value. Hence capacity utilisation is equal to the ratio of observed output to the capacity of the plant (Coelli, Grifell-Tatje & Perelman, 2002). Thus, capacity utilisation refers to the ratio of actual output to the maximum or potential capacity output from a quasi-fixed inputs. Technically, Johansen (1968) defined capacity output as the maximum output that can be produced from a specific bundle of the quasi-fixed inputs even where there is no restriction on the availability of variable inputs.

In this present study, capacity refers to the maximum outflow which could be achieved from the installed capital stock in a given period. In other words, capacity is the amount of output a firm can produce which depends upon the amount of labour, buildings, machinery and other forms of capital stocks it has available for production process. Utilisation on the other hand means actual amount of capacity which is being employed to get output in the same period (Afroz and Roy, 1976). Hence, capacity utilisation in economic term implies the ratio of actual output to the level of optimum output beyond which the average cost of production begins to rise. That is, capacity utilisation expresses output as a percentage of total potential output. In other words, capacity output can be defined either in economic term (Cassel 1937, Klein, 1960, Berndt & Morrison, 1981) or in technical term (Johansen, 1968). Thus, the economic definition was adopted in this study. However, pure technical efficiency relative to full capacity measures the difference between actual outputs to capacity output. It is caused by both inefficient utilisation of the variable inputs and fixed inputs. Deb (2014) denotes it as gross capacity utilisation and divides capacity utilisation into net capacity utilisation and gross capacity utilisation. Net capacity utilisation measures the difference between frontier output and capacity output. It is caused by only inefficient utilisation of the fixed inputs.

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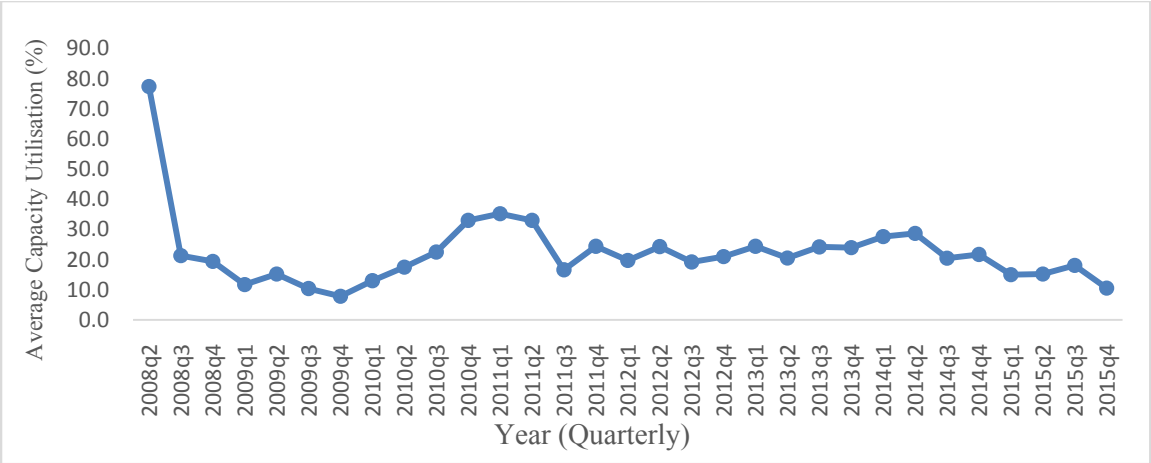

(Source: CBN Statistical Bulletin, 2015)

Fig. 1: Average (Total) Capacity Utilisation in Nigeria

Generally, Fig. 1 shows that average (total) capacity utilisation (ACU) decreased from 77.4% in the second quarter of 2008 to about 21.3% in the third quarter of the same year. This quarter connotes the period when economic and financial crisis began to manifest in Nigeria and other developing countries. The crisis affected virtually every sector of the economy. However, the effect of this crisis was largely significant and more pronounced in financial and manufacturing sectors. Average capacity utilization decreased 21.3% in second quarter of 2008 to 7.8% in the fourth quarter of 2009 when the crisis was at its prime in the country. After this time, Nigeria and most other developing countries had started devising mechanisms to come out of the quagmire coupled with other international measures put in place such as bail outs and so on. This was reflected in the increase in the average total capacity utilisation in Nigeria that started to increase in the first quarter of 2010 which was around 13.0% and increased to 35.2% in the first quarter of 2011.From the second quarter of 2011, the trend shows that average total capacity utilisation in Nigeria assumed an oscillatory movements and it was decreasing unstable, 33.0% in second quarter of 2011, 24.3% in first quarter of 2013, 27.6% in first quarter of 2014, 15.0% in first quarter of 2015 and finally 10.5% in the fourth quarter of 2015. However, the average total capacity utilisation was volatile during these years and volatile capacity utilisation may present a challenge for stable economic development. The capacity utilisation in Nigerian manufacturing firms follows a similar volatile pattern as total rate.

III. Literature Review

In Nigeria, Adeyemi and Olufemi (2016) investigated the determinants of capacity utilisation in the Nigerian manufacturing sector between 1975 and 2008, by administering structured questionnaire to assess the operational materials and the performance of the selected firms. The study employed co integration and Error Correction Model(ECM) as the estimation techniques and found a positive relationship between consumer price index, fixed capital formation in manufacturing sector and capacity utilisation. However, negative relationship between electricity generation, real manufacturing output growth rate and capacity utilisation were found.

Deb (2014) confirmed that utilisation of a plant capacity is a possible channel through which economic reforms enhanced the productivity growth in total manufacturing sector in India. The study estimated capacity utilisation rate in Indian manufacturing sector. The result showed that the annual average capacity utilisation rate in Indian manufacturing was lower over the pre-reform periods, and in the post-reforms era, the capacity utilisation rate grew faster. Moreover, the result of regression analysis confirmed that economic reforms exerted positive impact on productivity growth in total manufacturing sector more than the positive impact of improved capacity utilisation. Nikiforos (2012) examined the endogeneity of the rate of capacity utilization in the long run at the firm level by considering the factors that determine the capacity utilisation of resources of the cost minimizing firm. The study concluded that the cost minimising firm has an incentive to increase the utilization of its capital if the rate of the returns to scale decreases as its production increases.

Also, Coelli, Grifell-Tatje and Perelman (2002) measured the contribution of capacity utilisation to profitability along with measures of technical inefficiency and allocative inefficiency. Using data from 28 international airline companies for empirical illustration and the result showed that airline companies achieve profit levels which were on average US$815m below potential levels, and that 70% of the gap may be attributed to unused capacity. Jessica (2004) investigated the effects of foreign competition on the level of capacity utilisation of a firm using firm-level data

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of twelve countries. The results showed that capacity utilisation was higher for exporter firms, and an increased level of exports also affected capacity but at a decreasing rate. The study also indicated that if exports increased more than 49 or 51 percent of total sales, capacity utilisation starts decreasing. Moreover, more flexibility to make factor choices affected capacity utilisation positively. Thus, the study concluded that policy makers can move beyond reducing barriers to trade by trying to build around other incentives that increase capacity utilisation.

In a study of productivity performance and capacity utilisation in the Indian food processing industry over 1988 and 2005, Kumar & Basu (2008) found that the Indian food processing industry performed far below its potential and concluded that lack of development of technological progress was responsible. With respect to productivity, the productivity performance of 453 United State manufacturing industries from 1976 to 1999 based on firm level data was investigated by Abraham & White (2006) and found remarkable heterogeneity and disparity exists within industries and between industries. Similarly, Syverson (2004) explored productivity performance in 443 U.S. manufacturing industries and found evidence of large variations within and among industry plants.

IV. Methodology

a) Measure of Capacity Utilisation Rate

Capacity utilisation can be measured using technical or economic approach. The later describes capacity utilisation as the ratio of observed output to the capacity of the plant. In line with Sahoo & Tone (2009), the optimal rate of capacity utilisation of variable inputs can be obtained as given below:

$$\phi_{io} = \sum_{j \in I_N} x_{ij} \lambda_j^* / x_{io} (\forall_i \in I_V) \quad (1)$$

Where ϕ_{io} is the capacity utilisation rate for optimal output, x_{ij} / x_{io} is the input set given its optimal level and λ_j^* is the optimal scaleI_N and I_V are individual firm inputs and individual firm's variable inputs respectively. Capacity utilisation could therefore be given as in equation 2. In this measure, capacity utilisation will take a value between zero and one. A value of one indicates that the plant is operating at full capacity.

$$\phi = \frac{Y}{Y^C} \qquad (0 \leq \phi \leq 1) \quad (2)$$

Where ϕ is the capacity utilisation rate, Y is the actual annual output and $Y^C$is the observed or potential output. In literature, majority of previous studies used survey methods or *ad hoc*proxies to measure capacity utilisation, for instance Solow (1957) and Basu (1996)used unemployment rates and growth rate of materials respectively, while Basu and Fernald(2001)employed hours worked per worker to measure capacity utilisation. In this present study, capacity utilisation is viewed and measured from economic perspective.

b) Model Specification

The economics of firm behaviour is first examined by showing the production function, which is the relationship between the firm's output and its inputs, which are all the factors of production necessary to produce the product. Obviously, for a firm to be profitable, the cost of its inputs must be less than the revenue received for the output. Moreover, economic capacity output of the firm is the level of production where the firm's long-run average cost curve reaches a minimum point and because long-run average cost is considered, no input is held fixed (Deb, 2014).

Production functions describe a technical relationship between all physical inputs (be it capital, labour, energy and material) used in a production process and the maximum amount of outputs that can be obtained from the production process (Fagnart, Licandro and Portier, 1999). Individually, a firm could design its future productive equipment by choosing simultaneously a quantity of capital goods and a blueprint employment level according to a given Cobb–Douglas production function:

$$Y_t = A_t K_t^{\alpha} L_t^{1-\alpha} \quad (3)$$

Where Y_t represents the manufacturing output at time t, L is the amount of labour hours used, K includes both physical and human capital employed, but there are no diminishing returns to capital, and A, the efficiency factor or total factor productivity (TFP) is intended to represent any factor that affects technology. α and 1- α are the elasticities of output with respect to inputs. For the purpose of this present study, the functional relationship between manufacturing output and capacity utilisation is expressed below:

$$MANO_t = f(CU_t, GCF_t, LAB_t) \quad (4)$$

Where, $MANO_t$ represents manufacturing output at time t, GCF_t is the gross capital formation at time t. while LAB_t represents labour force participation rate at time t CU_t represents capacity utilisation rate at time t. Capacity utilisation rate affects efficiency level or rate of technology of production.

However, there is an evolution in the economic behaviour of countries over time and a dynamic model is therefore required to explain the relationship among variables (Ellahi, 2011). Thus, an Autoregressive Distributed Lag (ARDL) model was developed to explore the effect of capacity utilisation on manufacturing firms' output. Pesaran, Shin & Smith (1997, 1999, 2001) have developed Autoregressive Distributed Lag (ARDL)

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model which has more advantages than the Johansen cointegration approach and other previous approaches. The ARDL approach can be applied irrespective of whether the regressors are purely I(1) or purely I(0) or the combination of I(1) and I(0). It also avoids the problem of biasness that arise from small sample size. Based on this, the autoregressive distributed lag model from equation 4 is specified below:

$$\Delta \ln MANO_t = \alpha + \sum_{j=1}^{p} \theta_j \Delta \ln MANO_{t-j} + \sum_{j=0}^{p} \beta_j \Delta \ln CU_{t-j} + \sum_{j=0}^{p} \delta_j \Delta GCF_{t-j} + \sum_{j=0}^{p} \sigma_j \Delta \ln LAB_{t-j} + \lambda_1 \ln MANO_{t-1} + \lambda_2 \ln CU_{t-1} + \lambda_3 \ln GCF_{t-1} + \lambda_4 \ln LAB_{t-1} + \varepsilon_t \quad (5)$$

c) Technique of Analysis and Sources of Data

It is essential to determine the order of integration of each of the variable series in order to avoid spurious regression; and to employ autoregressive distributed lag (ARDL) method. Although, the ARDL test does not necessarily require the pretesting of variables but the unit root test provides guidance as to whether ARDL is applicable or not because it is only applicable to the analysis of variables that are integrated of order zero [I(0)] or order one [I(1)] or combination of both, but not applicable when higher order of integration such as I(2) variable is involved (Nyasha and Odhiambo, 2014). Thus, the Augmented Dickey-Fuller (ADF) of Dickey and Fuller (1981) and Phillp-Perron techniques were used to investigate the stationarity of the variables. To achieve the objective of the study, equation (7) was analysed to examine the effect of capacity utilisation on manufacturing firms' output in Nigeria.

Annual data on manufacturing value added as a percentage of GDP (a proxy for manufacturing firms' output), gross capital formation, labour force participation rate were sourced from World Development Indicator (WDI), 2016 edition while capacity utilisation rate was sourced from the Publication of Central Bank of Nigeria's (CBN) Statistical Bulletin, 2016 edition.

V. Results and Interpretations

a) Descriptive Statistics

The statistical description of the variables has become vital to observe the distribution, variability and normality of the variables with a view to overcoming the likely problems associated with time series data. Table 2presents the descriptive characteristics of the variables. In Table 1,the mean and median values lie within their maximum and minimum values for variables which indicate a good level of consistency. Manufacturing firm's output (MANO) is the least volatile variable while labour force participation rate (LAB) is the most volatile variable.

Moreover, the skewness statistics reveal that only labour force participation rate (LAB) is negatively skewed while other variables are positively skewed. The kurtosis statistics show that only gross capital formation (GCF) exceeds 3, meaning that the series is leptokurtic (peaked) relative to normal distribution while other variables are platykurtic since their respective kurtosis is less than 3, which implies that its distribution is flatter relative to normal distribution. Finally, the overall probability that the Jarque-Bera statistic exceeds5% (in absolute value) significance level for all the series suggests the rejection of the null hypothesis of normal distribution at 5% significance level as the observed values are generally low for all the series.

Table 1: Descriptive characteristics of Data set

	Mano	Cu	Gcf	Lab
Mean	6.235459	47.17258	2.83E+12	42.18691
Median	5.727706	46.75000	2.43E+11	55.80000
Maximum	10.65402	73.30000	1.61E+13	57.70000
Minimum	2.410130	29.29355	7.99E+09	0.000000
Std. Dev.	2.639774	11.04581	5.00E+12	24.71454
Skewness	0.158520	0.095055	1.641042	-1.151220
Kurtosis	1.782473	2.122804	4.042237	2.330663
Jarque-Bera	2.374328	1.208422	17.78750	8.623863
Probability	0.305085	0.546505	0.000137	0.013408

Source: Author's Computation, 2017

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b) Unit Root Test

The results of the unit root test for the variables used in the study are as shown in table 2. The table shows the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests results.

Table 2: Unit Root Test Results

	ADF			PP		
Variable	Level	First Diff	Status	Level	First Diff	Status
LMANO	-1.3213	-5.7517*	I(1)	-1.5307	-5.7755*	I(1)
LCU	-1.8082	-3.5055*	I(1)	-2.1435	-3.5055*	I(1)
LGCF	0.6264	-4.7605*	I(1)	0.5847	-4.8047*	I(1)
LLAB	-1.7533	-5.8292*	I(1)	-1.7459	-5.8297*	I(1)

Source: Author's Computation, 2017

The results of the unit root tests in table 1 shows that manufacturing value added as a percentage of GDP, gross capital formation, labour force participation rate and capacity utilisation rate are all stationary at first difference in both Augmented Dickey-Fuller and Phillips-Perron tests.

c) Lag Length Criteria

Table 3 presents the maximum lag length selected by Information Criteria. All information Criteria depict optimal lag length of 1 except Akaike Information Criterion (AIC) which indicates optimal lag length 2. However, the stability of the model was tested via inverse root of AR polynomial and cumulative sum, and the model was found to be stable at lag length 2 (*see figure 2 and 3*), therefore Akaike Information Criterion (AIC) prediction was adopted for the purpose of our estimation.

Table 3: Lag Order Selection Criteria

Lag	Logl	LR	FPE	AIC	SC	HQ
0	-10.83306	NA	2.89e-05	0.898973	1.080368	0.960007
1	126.8966	233.7230*	1.82e-08*	-6.478579	-5.571605*	-6.173410*
2	143.1563	23.65052	1.88e-08	-6.494321*	-4.861767	-5.945016
3	151.6781	10.32948	3.35e-08	-6.041098	-3.682965	-5.247658

*Source: Author's Computation, 2017 Note: * indicates lag order selected by the criterion; LR, FPE, AIC, SIC and HQ indicate sequential modified LR test statistic, Final Prediction Error, Akaike Information Criterion, Schwarzt I nformation Criterion and Hannan-Quinn respectively.*

d) Effect of Capacity Utilisation on Manufacturing Firm's Output in Nigeria

In order to examine the effect of capacity utilisation on manufacturing firm's output in Nigeria, ARDL Model in equation 5was estimated. The results of the estimation was depicted in the Table 4. The result in Table 4 showed that capacity utilisation rate (CU) and labour force participation rate (LAB) did not conform to a priori expectation while gross capital formation (GCF) was positively related to manufacturing firm's output in Nigeria (MANO).

Table 4: Result of ARDL Model (1,1,1,2)

Dependent Variable: LMANO				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LMANO(-1)	0.827359	0.118696	6.970403	0.0000*
LCU	1.156706	0.973014	1.188787	0.3382
LCU(-1)	0.703021	0.421922	1.666233	0.1081
LGCF	0.304734	0.141556	2.152742	0.0412*
LGCF(-1)	-0.193940	0.146645	-1.322507	0.1980
LLAB	-0.067723	0.058740	-1.152943	0.2598
LLAB(-1)	0.076954	0.072851	1.056316	0.3009
LLAB(-2)	-0.119101	0.060335	-1.973984	0.0595
C	-0.277132	0.296300	-0.935309	0.3586
R-squared	0.854126	Adjusted R-squared		0.807447
F-statistic	18.29765	Prob. (F-statistic)		0.000000
Durbin-Watson stat	2.360693			

Source: Author's Computation, 2017. indicate significance at 5%,*

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Contrary to a priori expectation, capacity utilisation rate has an nsignificant positive effect on manufacturing firm's output in Nigeria (t=1.1888; p>0.05). Other things being equal, a 1% increase in the capacity utilisation rate should lead to about 1.16% increase in manufacturing firm's output in Nigeria. Moreover, though not significant also, the previous year's capacity utilisation rate is positively related to present manufacturing firm's output in Nigeria (t=1.6662; p>0.05). Similarly, gross capital formation (GCF) has a positive effect on manufacturing firm's output in Nigeria (t=2.1527; p<0.05). An increase of 1% in GFC will lead to about 0.31% increase in manufacturing firm's output in Nigeria. However, labour force participation rate has a negative effect on manufacturing firm's output though not significant (t=-1.1529; p>0.05). The result shows that, 1% increase in the labour force participation rate reduces manufacturing firm's output by about 0.0677% in Nigeria.

The R^2 reveals the explanatory power of the independent variables. The result indicates that about 85% variations in the dependent variable are explained by independent variables in the model while the F-statistic shows that the independent variables are jointly significant in explaining the dependent variable (F-stat =18.29765, P-value=0.0000). The Durbin-Watson statistic showed that the model is free of serial correlation problem when compared to R Squared value [DW (2.360693) $>R^2$ (0.854126)].

e) Discussion of Findings

This result showed that Nigerian manufacturing firms are characterized with under utilisation of capacity which reflect in its insignificant effects on manufacturing output, and a number of factors might be responsible. Among these factors are foreign exchange shortage, preference for foreign products, high cost of equipment and machinery, power failure and maintenance culture. rejected. Thus, this necessitates the acceptance of null hypothesis and therefore concludes that the model has equal variance (homoscedastic). Also, Ramsey RESET test shows that the model is free of specification errors, The shortage of foreign exchange constitutes a significant problem towards the purchase of necessary raw materials and spare parts which could aid manufacturing firms and undermine their ability to run in full capacity. Preference for foreign product and uncoordinated imports of goods and services at the expense of locally produced goods is another important problem. Also, failure in power supply constitutes a substantial source of under utilisation, and moreover, a considerable loss of production is attached to power failure from time to time. Moreover, the negative relationship between labour force participation rate and manufacturing output reveals the consequence of moving towards a more capital intensive technique of production in an economy with overwhelmingly growing labour supply.

f) Diagnostic Tests

Testing for serial correlation, heteroskedasticity and stability of the model has become necessary in time series analysis to ensure a stable model, and to avoid making spurious inferences. Autocorrelation, simply put, explains a situation where a variable is influenced by its lagged values while heteroskedasticity has to do with the circumstance in which the variability of a dependent variable is unequal across the range of values of an independent variable that predicts it.

The Breusch-Godfrey Serial Correlation LM test result in Table 5 shows that the probability values (0.4386 and 0.3086) are greater than 0.05 levels of significance which imply that the null hypothesis of no serial correlation cannot be rejected. Thus, this necessitates the acceptance of null hypothesis and therefore concludes that the model has no serial correlation problem. Similarly, Breusch-Pagan-Godfrey heteroskedasticity test result in Table 5 shows that the probability values (0.4035, 0.3549 and 0.9719) are greater than 0.05 level of significance, and this implies that the null hypothesis of homoscedasticity can not be that is, relevant variables were not omitted, the functional form of the model is correct, and there is no serial correlation between the independent variables and disturbance term.

Table 5: Diagnostic Test Results

Breusch-Godfrey Serial Correlation LM Test			
F-statistic	0.85442	Prob. F(2,23)	0.4386
Obs*R-squared	2.35141	Prob. Chi-Square(2)	0.3086
Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	5.36333	Prob. F(8,25)	0.4035
Obs*R-squared	21.4828	Prob. Chi-Square(8)	0.3549
Scaled explained SS	17.4049	Prob. Chi-Square(8)	0.9719
Ramsey RESET Test	Value	Df	Prob.
t-statistic	1.404639	24	0.1729
F-statistic	1.973011	(1, 24)	0.1729

Source: Author's computation, 2018

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g) Stability Test

The stability of the model is tested via Cumulative Sum of Recursive Residuals (CUSUM), Cumulative Sum of Squares of Recursive Residuals (CUSUMSQ) and Inverse Root of AR Characteristic polynomial tests.In Figure 2 and 3, the blue line is between the upper and lower limits (the two red lines), this implies that the model is stable when estimated at lag 2. Similarly, no root lies outside the unit circle (modulus), that is, all of the modulus of the complex root values are less than 1 in Inverse Root graph in Figure 4, it can therefore be concluded that the model at lag 2 satisfies the stability condition.

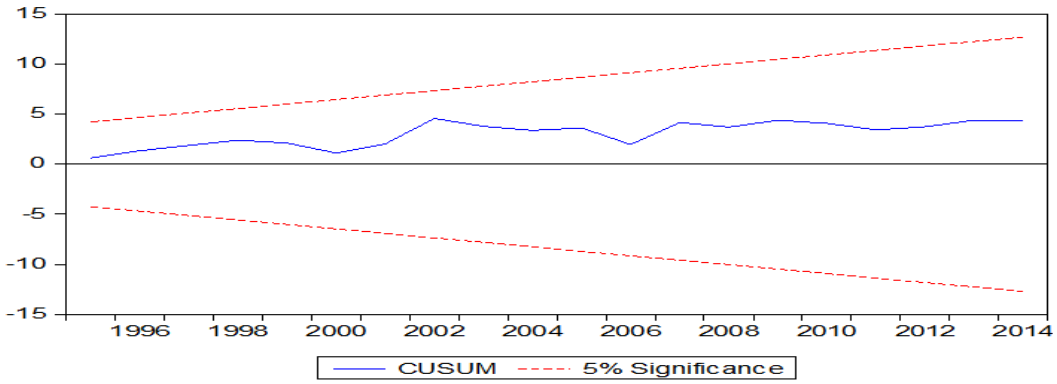

Figure 2: CUSUM test for Stability

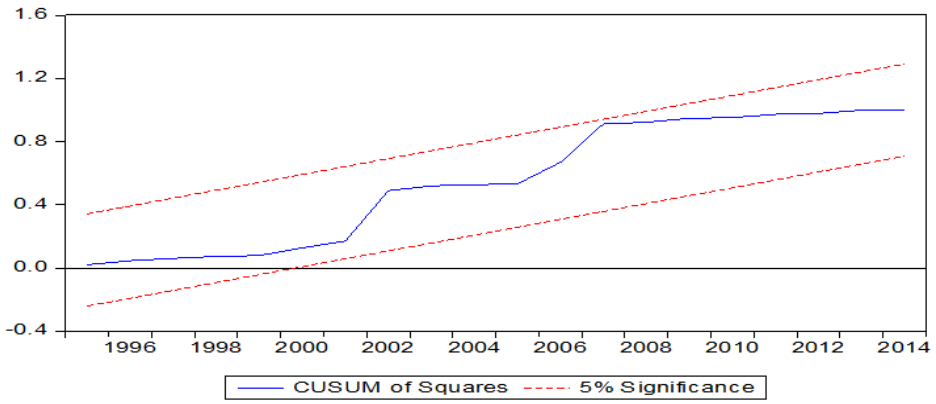

Figure 3: CUSUM of Square test for Stability

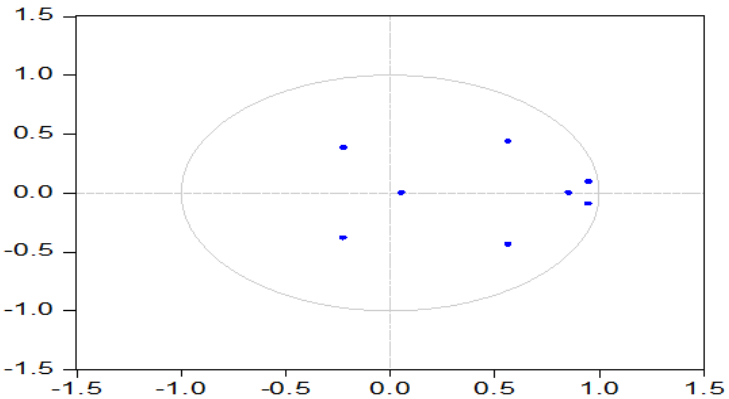

Figure 4: Inverse Roots of AR Characteristic Polynomial

VI. Conclusions and Policy Recommendation

The major conclusion of this study is that there is significant under utilisation of capacity in Nigerian manufacturing firms and this under utilisation makes positive effect of capacity utilisation less significant in explaining manufacturing firms' output growth in Nigeria. A number of factors have been responsibly identified for present under utilisation in the manufacturing firms. In

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line with the findings of this study, it is recommended that Nigerian government and policymakers should make policies that will ensure appreciation in foreign exchange rate to discourage uncoordinated imports of goods and services, to facilitate access to modern machineries with affordable cost implication, and make stable power supply a priority. These will increase capacity utilisation, and its positive effects will translate to increase in manufacturing firms' production in Nigeria.

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Impact of Financial Speculation on Commodities Prices' Volatility through Commercials Risk Aversion "Application for Wheat Prices"

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Abstract- This working paper aims to explain the phenomenon of prices volatility and the significant impact of financial speculation in cereal market. Knowing that a great number of researchers have been investigating the relationship between speculation activity and commodity prices volatility since 2007/8 crisis, our study is particular when it analyzes this impact by introducing the behavior of commercials. Thus, we have tried to identify this effect through risk aversion of commercials.

Findings reveal that variables used in the econometric model (Lpx "historical price values, Lal" long speculators' position all, Sal "short speculators' position all") are borderline I (1).

In cereal market, Commercials are very sensitive to prices evolution, and the long/short speculators' position variation have an important impact on the behavior of commercials, which engage them in herd behavior, hence the soaring or the sharp drop of cereal prices.

Keywords: *financialization, speculation, uncertainty, herd behavior, volatility, wheat prices.*

GJMBR-B Classification: *JEL Code: E60*



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Impact of Financial Speculation on Commodities Prices' Volatility through Commercials Risk Aversion "Application for Wheat Prices"

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I. Introduction

Commodity prices have been very volatile in the most recent years, particularly grains, they reached an exceptional peak in the year 2008, and then they declined sharply, but started rising again in 2010.Volatility must be distinguished from variability, volatility is a measure for scale and speed of prices evolution, it includes variability and uncertainty, and it describes prices evolution that we cannot expect using forecasting models, it refers to the unpredictable changes in prices. Whereas variability refers to changes in prices due to the variation of fundamentals, it can be predictable.

It has commonly admitted that the mid-2000s marked the start of a trend of steeply rising commodity prices, accompanied by increasing volatility. This period was characterized principally by an increased demand, in particular, in emerging economies (China, India, Brazil…etc), and the use of cereals in the production of bio fuels, at the same time, supply was declined sensibly as a result of the adverse effects of climate change and a decline in the productivity of agricultural lands.

Although this volatility cannot be explained only by these factors, another major factor is the phenomenon of financialization of commodity markets, volumes of financial investments in commodity derivatives markets has increased significantly since 2004.

In fact, producers have been very risk averse in this situation, and they find in future markets the mean to hedge their positions against uncertainty that lead to sharply prices changes. From the other side, investors have been engaging in commodities markets for diversification ever since it becomes evident that commodity futures contracts exhibited the same average returns as investments in equities, while over the business cycle their returns were negatively correlated with those on equities and bonds. The attractiveness of commodity futures contracts also relates to the good hedging properties against inflation.
All these changes in the ten recent years led to the increasing role of the financial motives, financial markets and financial actors in the operation of commodity markets, hence the increased financialization of agricultural commodity markets.

Many researchers investigate the relationship between speculation activity and commodity prices volatility, while some researchers support this linkage, others do not support it for different reasons. The purpose of this paper is to identify the impact of financial speculation on commodity prices volatility through the behavior of commercials (producers) about risk.

II. Speculation: Liquidity *Versus* Volatility

Financialization is the phenomenon which characterized the agricultural future markets since 2000, from 2003 to 2008 funds allocated to commodity index replication trading strategies have grown from 15 billion dollars to 320 billion dollars, at the same time, the prices for the 25 commodities that make up these indices have risen by an average of 200%.

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In fact, speculation has been raised excessively in commodity future markets, and its impact has been hotly discussed by researchers in recent years, most of them think that the volatility which characterized commodities future markets is a consequence of excessive speculation;

Hedge fund manager M.W. Masters is the most ardent supporter of the speculation impact on commodity prices volatility; he argues that unprecedented buying pressure from index investors created a massive bubble in commodity futures prices, and this bubble was transmitted to spot prices*, so price spikes were driven in large part by a new type of speculators in commodity futures markets. It means that changes in futures prices lead changes in spot prices more often than the reverse, as noted by M. Hernandez and M.Torero. Other researchers like Irwin and Sanders, despite their antagonism towards speculation impact, use a shorthand label for this argument as "Masters Hypothesis" to describe excessive price volatility induced by financial speculation.

Ke Tang and Wei Xiong, in their work file titled "index investment and the financialization of commodities," found that commodities in the S&P GSCI and DJ-UBSCI had significantly greater volatility increases than did off-index commodities in 2008. So commodities price changes do not reflect only fundamentals changes, they argue that concurrent with the rapid growth of index investment in commodity markets, prices of non-energy commodities have become increasingly inter-correlated, and also correlated with Oil prices. This situation is a result of the speculation process started in 2000, it reflects the financialization of the commodity markets and helps to explain the large increase in the price volatility of non-energy commodities around 2008.Hence, the price of an individual commodity is no longer determined solely by its supply and demand. Instead, prices are also determined by the aggregate risk appetite for financial assets, and the investment behavior of diversified commodity index investors.

J. Cordier and A. Gohin (2012) in their analysis have been looking for an impact of speculation on cereals prices by analyzing the relationship, first, between assets under management of the commodity funds and the agricultural futures prices; second; they searched a sequential relationship between these variables through the commitment of commodity funds on related futures markets.

They concluded that significant causality exists between assets under management variability of commodity funds and prices variability, but mainly from commodity index funds. However, no significant causality was detected of commodity funds commitments on futures markets, they argue that this absence of causality is due to the ability of commodity funds to hedge their prices risk on the OTC market as a complement to the futures markets.

On June 24, 2009, a report about excessive speculation in the wheat market was presented in the US Senate by C. Levin and T. Coburn; this report unveiled some key data that confirm the impact of speculation on commodities prices volatility, particularly, in the wheat market:

"*The amount of speculation in the wheat market due to sales of commodity index instruments has, correspondingly, grown significantly over the past five years. CFTC data indicates that purchases by index traders in the largest wheat futures market, the Chicago Mercantile Exchange, grew sevenfold from about 30,000 daily outstanding contracts in early 2004, to a peak of about 220,000 contracts in mid-2008, before dropping off at year's end to about 150,000 contracts. The data shows that, during the period from 2006 through 2008, index traders held between 35 and 50% of the outstanding wheat contracts (open long interest) on the Chicago exchange and between 20 and 30% of the outstanding wheat contracts on the smaller Kansas City Board of Trade.*† »

Having realized this, the US Senate voted in 2010 the Dodd-Frank Act in order to limit speculation in commodity markets, this law has faced some critics believing that the act will ultimately hurt economic growth, like limitation of the bond market-making role that banks have traditionally undertaken, this situation, in turn, can lead to lessen market liquidity.

Researchers like S. Irwin, S. Sanders, Gilbert, Stoll and Wally, Hamilton and Wu, consider that speculation activity is source of liquidity in agricultural commodity market, and, based on normal backwardation theory, they think also that it is a condition *sine qua non* to reach equilibrium between spot and future prices in these markets, thus, they do not support the Master's hypothesis. Gilbert has used time-series test, such Granger causality test to analyze the impact of speculation on cereal prices; findings report that there is no significant time-series relationship between weekly financial index trading and returns in wheat, corn, and soybeans markets.

As notified by the FAO in the treaty of Rome (23 Juin 2010), Large commodity funds now hold about 25-35 percent of all agriculture futures contracts and, with other investors, have become an important source of liquidity to the market Futures contracts involving the formal obligation to sell or buy a given amount of a commodity at a specified time and price. They thus provide farmers and traders with an important defense

*NM.Aulerich, S.Irwin, P.Garcia, "Bubbles, food prices, and speculation: evidence from the CFTC's daily large trader data files", October 2012, P2.

† C.Levin, T.Coburn "Excessive speculation in the wheat market," United States Senate, 24 June 2009, P 5

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or "hedge" against price risks. However, it is very important to note that only two percent of futures contracts end in the delivery of the physical commodity as they are traded, generally, before their expiration date. As a result, such contracts, or obligations, are drawing growing numbers of financial speculators and investors, especially as they can provide attractive returns when equities and bonds may become unappealing*.

Irwin and Sanders think that bubble argument does not withstand close scrutiny, and excessive speculation is not an argument for the volatility of agricultural commodities prices volatility for four reasons*:

1. The arguments of bubble proponents are conceptually flowed and reflect fundamentals and basic misunderstandings of how commodity markets actually work.
2. Some facts about the current situation in commodity markets are inconsistent with the existence of a substantial bubble in commodity prices.
3. Available statistical evidence does not indicate that positions for any group in commodity futures markets, including long-only index funds, consistently lead futures price changes.
4. There is historical pattern of attacks upon speculation during periods of extreme market volatility.

All arguments against speculation impact does not support the Master's hypothesis, but it's very important to note that all empirical studies have faced data limitations;

- Some researchers (Sanders and Irwin, Brunetti, Morris) note that speculation has grown most rapidly before the year 2006, whereas data on speculation positions are not available before 2006.
- The aggregation of public data on index positions across all futures contract maturity months may obstruct linkage between changes in prices and index positions by contract maturity month.
- The impact should be more evident in a shorter time. Nonetheless, the CFTC provides only weekly data about financial index positions in agricultural futures markets, and for this reason, the impact of changes in index positions will be less clear, hence reducing the power of time series methods to detect its impact.

It's well known that the role of information flows is crucial for prices formation, the EMH (*efficient market hypothesis)* postulates that all publically available information is immediately reflected in prices, even private information available only to individual market participants is reflected in the price through the effects of the transactions of the persons in possession of the information, for this reason, commodity price developments would reflect nothing but information on fundamentals. However, market participants make trading decisions based on factors that are totally unrelated to the perspective commodity, such as portfolio considerations, or they may be following a trend, ignoring changes in fundamentals. Thus, the trading decision process is characterized by considerable uncertainty, particularly in agricultural markets, most of the traders follow other participants in trading decisions, witch leads to creating the so-called "intentional herding," and this behavior is accused of creating a speculative bubble that cannot be justified by changes in fundamentals.

III. Herd Behavior in Agricultural Future Markets

Market participants continuously update their expectations about prices evolution from the inflowing public and private information. As a result, prices move upward or downward when new information is publicly available or when private information leads to transactions that affect prices. It means that market participants evaluate their assets based on fundamentals, that is what we call an act fully rationally, but when they ignore their own information and variations in fundamentals to follow other market participant's decision, market efficiency will not be reliable, and prices evolution cannot be explained solely by fundamentals variation.

In fact, traders can engage in herd behavior in some circumstances, particularly when the market is characterized by a big uncertainty, this behavior consists to mimic the action of a dominate group of investors, it can be qualified as an irrational behavior as it may also be fully rational.

For example, an investor who is ready to invest in the securities of an issuer, ignoring other market participant's decision, but he changes opinion when he realizes that other investors have decided to abandon.

Some recent models consider that the herd behavior is a deviation of rationality, this behavior is known as a "noise trading," it means that traders decisions are affected by a pseudo-signals, some market participants take a sell or buy decision only to assign supply and demand, which lead to affect prices.

Noise trading can be also described by changes in beliefs and sentiments. As a result, traders can, for example, take decisions based on an algorithmically software independently of any changes in fundamentals, like selling after prices fall, and buying after prices rise.

*http://www.fao.org/news/story/en/item/43412/icode/

*S.Irwin, R.Sanders "devil or angel? The role of speculation in the recent commodity prices boom (and bust)", Southern Agricultural Economics Association Meeting, Atlanta, Georgia, January 2009, PP 3,4,5.

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Herd behavior can be rational, in this context spurious herding must be distinguished from the intentional herding, as it described by Bikhchandani and Sharma, this behavior consists to take the same decision unintentionally when traders face the same circumstances independently from the other market participants decision. This behavior does not contradict the *EMH*, for example, banking panics.

Unlike the previous, intentional herding may be described by following other market participant's decision because of a psychological impact, and they behave so for four motives:

- Imitation that arises when traders and their employers doubt their own abilities to take a right decision.
- When agents invest on behalf of others, herding can be a result of a compensation incentive; Thus, they align their positions with benchmark portfolios.
- Conformity-based herding relates to an alleged intrinsic performance of individuals for conformity.
- Imitation based on believing that market participants can glean information by observing the behavior of other agents.

In spite of this distinction between various herding types, if all these acts lead to affect price movements, early moves will benefit the most. Imitation by followers will gradually become less profitable the larger it is delayed, and the greater becomes the probability that newly arriving public information will alter the informational cascade, thus, motivation to engage in herding behavior decline progressively until it ended, and the extent to which herding affects prices depend on the degree of uncertainty. Within that period, it will be difficult to distinguish the well informed from the uninformed agents, called the followers. In this situation, market participants may believe mistakenly that most agents possess accurate information, hence the dramatic effects on prices that can lead to bubbles and excessive volatility because of the ensuing confusion, which allows the uninformative herd behavior to affect drastically prices.

This analysis shows that market participants can react for some reasons, whether they are rational or irrational their behavior can instantaneously push prices to deviate from fundamentals for a long period creating a big uncertainty. Therefore the decision process became more complicated for a risk-averse agents, in particular, producers and customers, this effect was more obvious in cereal market in 2007 until 2012.

It has become very difficult to predict and analyze agent's behavior, empirical work files realized cannot sufficiently provide evidence about this phenomenon, and some findings are in favor others against of the presence of this herd behavior and its impact on prices. It is for this reason that we conclude that prices movements depend in general on fundamentals changes, and financial investor's game in the market (spoofing*, layering*…etc).

According to normal backwardation theory*, the difference between the forward prices and the expectation of spot prices can be justified by a speculator remuneration called risk premium, this remuneration can change proportionately to the degree of risk aversion that can be different from an agent to another. In this situation, it can be more evident, under uncertainty, ensuing by a herd behavior, that we can expect an indirect but significant impact of speculation on prices through excessive risk aversion of producers and customers.

IV. The Decision Under Risk and Uncertainty

Act in a situation where the information is available and symmetrically distributed is not a problem for the various market participants, because the ensuing price would be right, it is an equilibrium price. However, if the market is characterized by great volatility (described by variability and uncertainty), the ensuing price may not reflect supply and demand tendency, and the future price cannot be explained based on a future spot price expectation. Therefore market cannot regulate itself.

The economic theory developed in XIX century was static. It assumed that information is perfectly and symmetrically distributed, and this was not the case for the cereal market in the last decade, risk and uncertainty were a principal characteristic of the market that results from the various wrong market signals due to strong speculation and blind herd behavior. Consequently, decision-making would be complicated in such circumstances.

*An illegal practice, it is also a form of market manipulation in which investors use visible non-bona fide orders to deceive other traders as to the true levels of supply and demand.

*Layering is a form or variant of spoofing where the trader places several orders a few ticks apart to give the appearance of buying or selling, which cause the midpoint of the spread to move away from those orders, and the same trader executes a trade on the opposite side of the market.

*Developed by J.M Keynes, based on this theory, a market is said to be in contango when future prices lie above spot prices, and it said in backwardation when the future prices are below the expected future spot prices. This theory is used to explain the relationship between the future prices and the expected value of the spot prices of the commodity at some future date. Normal backwardation suggests that the future prices will be bid down to a level below the expected spot price, and will rise over the life of the contract until the maturity date. On the maturity date, future prices are equal to spot price.

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It was only in the early 1950s that uncertainty took in account in the general equilibrium theory, in this way, K. Arrow, H. Debreu, J.V.neumann, O.Morgenstern, Savage, and others, proposed a new model of the general equilibrium theory under uncertainty, this model represents the crucible of modern economic theory. In this context, producers, customers, and financial investors know approximately possible results.

a) Utility and Moral expectation theory

It all started with the St. Petersburg paradox, a question brought forward for the first time by N. Bernoulli in 1917, this dilemma was resolved later by D. Bernoulli in his publication titled *"The new theory of risk and game"*, then, later in the 1950s, this new theory was developed by Von Neumann and Morgenstern to create the game theory.

St Petersburg game is played by flipping a fair coin until it comes up tails, and the prize is determined based on the total number of flips, *n*, which equal to 2^n monetary units. For example, if the coin comes up tails the first pitched, the prize would be 2^1 *MU**, if it comes up tails the second time, the prize would be $2^2 = 4MU$,and if it comes up tails the *n* time, the prize would be 2^n *MU*. Knowing that probability of a consequence of *n* flips is:$\frac{1}{2^n}$, the expected value of the game(*E(x)*) is the sum of the expected payoffs of all the consequences;

$$E(x) = \left(\frac{1}{2}\right)2^1 + \left(\frac{1}{2}\right)^2 2^2 + \ldots\ldots\ldots\left(\frac{1}{2}\right)^n 2^n + \left(\frac{1}{2}\right)^{n+1} 2^{n+1}$$

$$= 1+1+1+1\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots N= +\infty$$

If it refers to mathematical analysis, taking into account mathematical expectation as it is justified by Pascal and Fermat, this game may not contain any contradictions. However, the expected value of the game is an infinite number of dollars, which lead us to believe that the game organizer cannot reward the winner if *E(x)*tend towards $+\infty$, he should have established a higher price for the lottery. And from the other side, the rational gambler would not accept to pay even 100 MU, for example, to enter such a game knowing that the prize could be only 2 MU. Then something has gone wrong with this way of thinking about the game, which has become, following this logic, not playable. This paradox has questioned the concept of mathematical expectation.

D. Bernoulli claimed that two analysis criteria ignored in the previous analysis:

- Behavior and individual characteristics.
- The evaluation method of the results, which calculated, based not on monetary units, but on utility-based units.

The utility theory postulates that people behave as if they make a decision by assigning imaginary utility values to the original monetary values, and knowing that any agent reaches a saturation point for utility. There is a decline in the marginal utility that person derives from consuming each additional unit of any product, and the saturation level may differ from agent to another. Thus, someone may be interested in a prize of 100 MU, but the same prize cannot be interesting for another agent, and there is no gambler who can continue to play until *E(x)*tend towards $+\infty$.

D. Bernoulli argues that any slow increase of wealth (Δw), the increasing in utility (Δu) is given by:

$$\Delta u \approx \frac{1}{w}\Delta w \Rightarrow \frac{du}{dw} = \frac{1}{w} \Rightarrow u = \ln w$$

For Bernoulli this hypothesis is valid for a most of agents, hence in St Petersburg game, the mathematical expectation is becoming a moral expectation, and this does not tend to infinity, but to a finite number:

*Monetary unit

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$$EU(w) = E(\ln w) = 1/2\ln 2 + 1/4\ln 4 .....1/2^n \ln 2^n + 1/2^{n+1}\ln 2^{n+1} = \sum_1^{\infty} 1/2^{n+1}\ln 2^{n+1} = 1.38$$

This means that, when *n* (number of flips) tend towards infinity, the moral expectation may tend to a finite number. Thus, there is no gambler who can continue to risk until infinity. This idea was carried forward later in 1944 by E. Borel, J.V. Neumann and O. Morgenstern, concretized in a theory of games and economic behavior, based principally on realistic hypothesis, particularly uncertainty, asymmetrical information and the probability of results.

b) Expected utility theory (VNM)

According to VNM analysis, if economic agents evaluate results based on their utility, not by a monetary unit, the situation of uncertainty can be described as follows:

Let *E* be the finite set of possible events, and *P* a set of the probability distribution on this set *E,* $e_1, e_2 .....e_n$ as possible events, and $r_1, r_2 .....r_n$ considered as the results assigned to each event, $p_1, p_2 .....p_n / \sum p_i = 1$ considered as probabilities associated to each event which lead to a result *r*.

The set of combinations $[(r_1, p_1),(r_2, p_2) .....(r_n, p_n)]$ describes an uncertain position where plenty of events are possible. However, if we refer to Bernoulli's analysis, we may introduce the utility criteria, and this situation should be described as:

$$[(u(r_1), p_1),(u(r_2), p_2).....(u(r_n), p_n)]$$

Considering possible outcomes as a wealth *(w)* of an economic agent, we obtain the following formula:

$$[(u(w_1), p_1),(u(w_2), p_2).....(u(w_n), p_n)]$$

VNM argue that, economic agents choose, in an uncertain situation, based on an expected utility carried from every situation as follows:

$$U[(w_1, p_1),(w_2, p_2),.....(w_n, p_n)] \neq \sum_{i=1}^{i=n} p_i w_i = \sum_{i=1}^{i=n} p_i u(w_i) = EU(w)$$

This equation represents the formula that describes the expected utility of an economic agent. Thus, individual faces a preference of decision-making in an uncertain situation will always prefer actions that maximize expected utility by comparing $U[(w_1, p_1),(w_2, p_2),.....(w_n, p_n)]$ to $EU(w)$,in other words, individuals make decision by comparing mathematical expectation of possible outcomes utility, and the utility of every possible outcome: *UE(W)~EU(W).* Therefore, three types of economic agents can be distinguished:

- Individual who prefers *E(wf)* to $(\tilde{w}_f)$ / $(\tilde{w}_f)$ mean the final wealth.

$$\Rightarrow UE(\tilde{w}_f) \rangle EU(w_f)$$

This behavior is considered as a risk aversion. Hence the individual utility function can be represented by a logarithmic function $U(w) = \ln w$), for example.

- Individual who prefers $(\tilde{w}_f)$ to *E(wf)*

$$\Rightarrow UE(\tilde{w}_f) \langle EU(w_f)$$

This behavior is considered as a risk- seeking. Hence the individual utility function must be represented by a positive exponential function $U(w) = e^w$, for example.

- The third type of behavior is the indifference, or risk neutral, $UE(\tilde{w}_f) = EU(w_f)$, which can be represented by a linear function $(U(w) = aw + b)$, for example.

Indeed, D. Bernoulli has explained one type of behavior; it is a risk aversion behavior, represented by the logarithmic function.

We will go further to consolidate our ideas and hypothesis, it consists to describe a commercial (producer) behavior in cereal market; this commercial (producer) is supposed risk averse under uncertainty in relationship simultaneously to a fundamentals changes and to the wrong market signals as a result of a great speculation, as it described above. Based on VNM deduction, the utility function that describes the commercial behavior is taken as *lnw*, this function can be introduced in our econometric model to seek the impact of speculation on cereal prices through commercials (producers) behavior.

V. Empirical Analysis of Wheat Prices Volatility

VAR modelling was introduced for the first time by Sims in 1980 to mitigate the failures and deficiencies of macro-econometric models, because of their incapacity to forecast economic crisis in 1973, 1979. In the same context, Granger developed a new concept of causal link well known by Granger causality. This consist plainly in demonstration if the variable X cause (in the sense of Granger) a variable Y through random shocks, looking first the extent to which past values of the variable Y explain the actual value of the variable Y, and

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see afterwards the improvement of the estimation due to the lags' values of the variable X taken into account.

Money managers, and other reportable) on the behavior of commercials, but not a direct impact on cereal prices, using VAR model. Commercials are supposed, in this study, risk-averse as long as they use hedging instruments, and they engage in herd behavior.

a) Data Description

CFTC is an institution whose mission is to regulate, control and collect information, it aims to protect market users and their funds, consumers, and the public from fraud, therefore, it provides information in periodic reports about the commitment of traders, these reports are available in both a short and long format. The supplemental reports show aggregate futures and options positions of non commercials, commercials and index traders in 12 selected agricultural commodities.

Statistical data used in this study is gathered from the Cbot market. Concerning traders position; the data is collected from weekly reports of the CFTC, monthly wheat and corn prices are available in UNCTAD and FAO web site, prices are expressed in dollars per ton.

A chosen time series are used from June 2006 until December 2015, the study period contains 115 observations. Using this data, we proceed to estimate the time series data using the ninth version of Eviews software.

b) Model Specification

In this study, it is a question of regressing historical price values on actual prices, and on the other variables that may have a significant impact on future prices evolution, the other variables taken in account in our model are: the speculation position variation (long and short position) and the spread as follows:

$$f(t) = \alpha_0 + \alpha_1(f(t-1)) + \alpha_2\Delta(lal)_t + \alpha_3\Delta(sal)_t + \alpha_4\Delta(spl)_t + \mu_t$$

($f(t)$): As utility function of a professional at the time *t* , such as *f(t) = U(x), x* represents the wealth of the professional and the price of a ton of wheat.

(lal_{t1}): As a speculator long position variation (swap dealers, money managers, and other reportables) for the period t.

$(sal)_{t_1}$: As a speculator short position variation (swap dealers, money managers, and other reportables) for the period t.

$(spl)_{t_1}$: As a spread (swap dealers, money managers, other reportables) for the period t.

Considering a risquophobe commercial (as was our hypothesis), his utility function can be as, U(x) = ln x.

Let $f(t) = \ln x \Rightarrow \Delta f(t) = \frac{d\ln x}{dx} = \frac{1}{x}$, such as, x represents the wealth of the commercial and it is considered as the price of a ton of wheat.

Before estimating the model, all variables should submit the various stationary tests, and detect if any seasonal effect exists.

c) Stationary tests

A time series stationary means that its variance and expectation are independent of time variation. Otherwise, we consider the time series as non-stationary. Thus, we cannot estimate an econometric model that its variables are not stationary, because the impact of explanatory variables on explained variables would be confused by the time variation.

A common test used is the ADF test (Augmented Dicky fuller test), based on three types of models:

- The first one does not contains any constant or time drift, this model is written:

$$\Delta X_t = \phi X_{t-1} + \sum_{i=1}^{n} \beta_i \Delta y_{t-i+1} + \varepsilon_t$$

- The second is a model with constant and time drift, this model is written:

$$\Delta X_t = \mu_1 + \phi X_{t-1} + \sum_{i=1}^{n} \beta_i \Delta y_{t-i+1} + \varepsilon_t$$

- The third model contain a constant, but not a time drift, it is written :

$$\Delta X_t = \mu_1 + \beta t + \phi X_{t-1} + \sum_{i=1}^{n} \beta_i \Delta y_{t-i+1} + \varepsilon_t$$

According to ADF test, if *H0*is selected inany model of three models, we qualify the process as non-stationary, in this situation; the estimated value of *t* of student associated to ϕ parameter exceeds the critical tabulated value of Mackinnon (ADF *tab*):

It means that:

$$H0 : \phi = 0$$

$$H1 : \phi < 0$$

We accept *H0*, and we reject *H1* if ADF *cal*>ADF *tab*. Otherwise, we accept *H1* and we reject *H0.*

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d) Application for Wheat prices case

First, we start with stationary testing of our designed model for wheat prices series as follows :

	Variable	Coefficient	StdError	Tstat	Proba	Critical value (at 5%)	Tcal
Modèl 1	Ux(-1)	-0.004862	0.007525	-0.64617	0.5195	-1.94368	-0.64617
Modèl 2	Ux(-1) C Trend	-0.087123 25.19923 -0.066158	0.034330 9.772427 0.058346	-2.53783 2.578605 -1.13387	0.0126 0.0113 0.2593	-3.45007	-2.53783
Modèl 3	Ux(-1) C	-0.081784 20.04007	0.034049 8.659792	-2.40192 2.314152	0.0180 0.0225	-2.88719	-2.40192

Source: Authors' estimations

Based on this table realized from results obtained from Eviews9 software, we have noticed that ADF *cal*>ADF *tab* for each model, therefore we accept *HO* and we reject *H1*, it means that the first, second and the third model have at least a unit root, so, we judge the series *Ux* as non-stationary, it is a kind of DS (differency stationary).

Similarly, as for the first variable, we proceed for the other variables, and we conclude that the same results and analysis are obtained. This means that all time series are not stationary for all variables at a critical level of 5%.

As the variables are not stationary at a critical level of 5%, we proceed with another alternative approach to make them stationary; this approach consists in testing the stationary of the first difference of the model.

The obtained results are presented in the following table:

1st difference	ADF *tab*($\alpha = 5\%$)	ADF *cal*
dLux	-2.887190	-8.072073
dLal	-2.887909	-8.239706
dSal	-2.887665	-8.334197
dSpl	-2.887190	-13.05321
dpx	-2.887425	-8.003018

Source: Authors' estimation

This table indicates that ADF *cal*<ADF *tab* for all variables, so, we reject *H0* and we accept *H1*. Therefore, we consider that the variables of our model are stationary for the first difference at a 5% level of freedom, and all variables are borderline *I (1)*.

We test the stationary of residuals in the following step to see whether they are stationary or not, if they are stationary we confirm that independent variables have a significant impact on the variable *U(x)* in the long run.

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Null Hypothesis: U has a unit root			
Exogenous: Constant			
Lag Length: 0 (Automatic - based on SIC, maxlag=12)			
		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-10.83789	0.0000
Test criticalvalues:	1% level	-3.490772	
	5% level	-2.887909	
	10% level	-2.580908	
*MacKinnon (1996) one-sided p-values.			

Source: Authors' estimations

Based on this table and Dicky-fuller test, we conclude that residuals are stationary, we can then estimate our model in the following step:

e) Estimation of the Mode

We proceed in what follows to the estimation of our model using Eviews 9 software in order to describe the relationship between risquophobe behavior of commercials (professionals) and the past values of wheat prices and speculators positions in the long run.

Dependent Variable: LUXb				
Method: Least Squares				
Date: 09/14/17 Time: 11:12				
Sample (adjusted): 2006M07 2015M12				
Included observations: 113 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.375001	0.179933	2.084112	0.0395
LAL	6.77E-07	2.13E-07	3.182958	0.0019
SAL	-6.35E-07	1.99E-07	-3.185841	0.0019
SPL	3.68E-07	2.52E-07	1.460827	0.1470
LPX	0.903017	0.032785	27.54363	0.0000
R-squared	0.905398	Mean dependent var		5.484722
Adjusted R-squared	0.901894	S.D. dependent var		0.225737
S.E. of regression	0.070705	Akaike info criterion		-2.417361
Sum squared resid	0.539914	Schwarz criterion		-2.296681
Log likelihood	141.5809	Hannan-Quinn criter.		-2.368390
F-statistic	258.4056	Durbin-Watson stat		1.551086
Prob (F-statistic)	0.000000			

Source: Authors' estimations

The obtained results show that the variable spread all *(spl)* has a probability which is superior to the degree of freedom (α>5%), we will then select the variables of the model by eliminating variables with a probability superior to α, after that we should proceed to the reestimating of our model as follows:

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Dependent Variable: LUXb
Method: Least Squares
Date: 09/14/17 Time: 11:26
Sample (adjusted): 2006M07 2015M12
Included observations: 113 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LAL	8.40E-07	2.01E-07	4.169776	0.0001
SAL	-4.78E-07	1.90E-07	-2.515007	0.0133
LPX	0.972169	0.009736	99.85496	0.0000

R-squared	0.900765	Mean dependent var	5.484722
Adjusted R-squared	0.898961	S.D. dependent var	0.225737
S.E. of regression	0.071754	Akaike info criterion	-2.404949
Sum squared resid	0.566354	Schwarz criterion	-2.332541
Log likelihood	138.8796	Hannan-Quinn criter.	-2.375566
Durbin-Watson stat	1.586352		

Source: Authors' estimations

f) Statistical interpretation of the obtained results

The obtained results indicate that R^2 = 0.900765, this means that variables *lal, sal, lpx*, explain the variable *U(x)* variation for 90.07%.

The variables discussed seem all significant as long as the probability is less than α for all variables.

Residuals must not be auto-correlated. Thus, we should first test the auto-correlation of residuals as follows:

H0: Residuals are not auto-correlated.
H1: Residuals are auto-correlated.

We cannot reject the null hypothesis if Chi-square probability is superior to α

Based on Eviews9 software we test the auto-correlation of residuals, and then we obtain the following table:

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	2.852092	Prob. F(2,108)	0.0621
Obs*R-squared	5.664503	Prob. Chi-Square(2)	0.0589

It can be noted that Prob. Chi-Square(2)of R^2 = 5.89% >α, so we accept the null hypothesis, and we reject the alternative hypothesis, it means that residuals are not auto-correlated (see the graphic in appendix n°3).

- The other test that we must check is a possible existing of the Heteroskedasticity in residuals series. We can also use Eviews9 software to check this test, so, we obtain the following table:

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.679337	Prob. F(3,109)	0.1757
Obs*R-squared	4.992152	Prob. Chi-Square(3)	0.1724
Scaledexplained SS	7.694497	Prob. Chi-Square(3)	0.0528

Source: Authors' estimations

From this table we not that the observed R^2= 17.24%>α, so we cannot reject the null hypothesis, this means that there is no Heteroskedasticity in residuals series.

- The third test that we must check too, is the normal distribution of residuals, for that purpose we can use a Jarque-Bera statistics test as follows:
- We confirm that the probability is superior to α, so we accept the null hypothesis and we reject the alternative hypothesis, it means that residuals are normally distributed.

g) Economic interpretation of the obtained results

The obtained results confirm our theory about the significant impact of speculative positions on wheat prices volatility through commercials (professionals) behavior. Hence, our econometric model can be written as:

$$L(Ux)b = 0.972169Lpx + 8.40Lal - 4.78Sal.$$

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Knowing that all variables are borderline I(1), this means that all independent variables (past values of prices, speculator long and short positions) have a significant impact on commercials risk aversion with a single period lag (one month).

Passed values of wheat prices are integrated into our econometric model with a positive sign, and a coefficient = 0.97, it indicates that the fact that commercials are very sensitive to prices evolution, and that is how it should have been, their decision to buy or to sell depend on the future price development, based on passed development process.

Speculative long positions are integrated with a positive sign and a coefficient = 8.40, it indicates that the long position of speculators has an important effect on utility function of commercials, thus a positive effect on their risk aversion. Therefore, any long position variation of speculators in future market can create a herd behavior wave, which stimulates the emergence of a new speculative buying wave in the commodities market, conducting to a massive increase of prices, because the market will transmit a spurious positive signal of buying.

Speculative short positions have a lower impact (coefficient = 4.78), but they are integrated with a negative sign. Consequently, the impact will be negative on commercials behavior, it means that the fact that speculators get rid of their buying positions, commercials risk aversion increases, which will affect negatively the utility function, conducting to a reticence vis a vis to buying decisions, which stimulate a sharp drop of wheat prices.

VI. Conclusion

The obtained results indicate that commercials facing financialization of commodities markets have become uncertain, because of strong speculation, and a phenomenon of herd behavior, on that point, the use of hedging techniques is a valuable argument of commercial risk aversion.

Several research studies indicate that there is no impact of speculation on prices volatility, particularly in cereal markets, however, the use of future market instruments justify the uncertainty and the risk aversion of commercials, resulting from a big wave of speculation accompanied with a herd behavior, which can stimulate, for its part, the soaring or the sharp drop of prices.

We have tried to analyze the commercials behavior in cereal market based on a VNM expected utility theory, and we concluded that the impact of speculator position variation is evident in the long run for the wheat prices, the fact that the commercials behavior is affected. As a result, our theory based on the possible effect of commercials risk aversion, which is subject to the speculation impact, on prices volatility is well verified through this econometric modelling.

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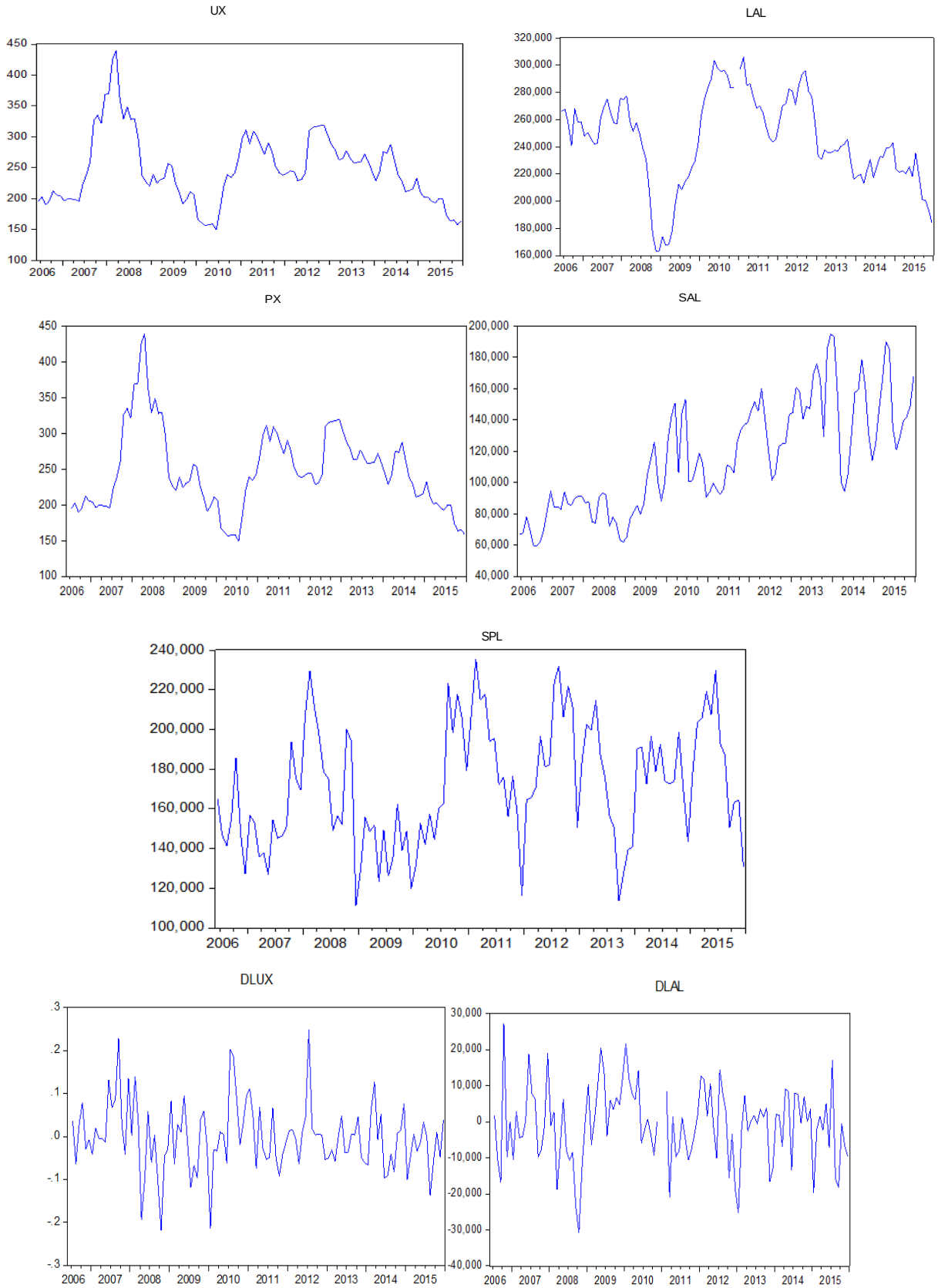
Appendix

Appendix n° 1: Evolution of discussed variables (2006-2015):



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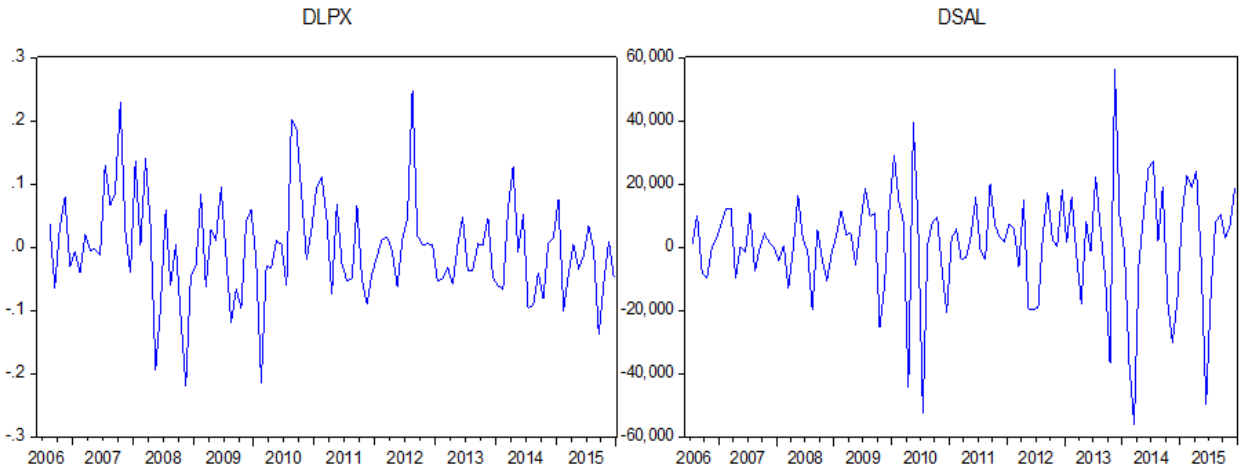
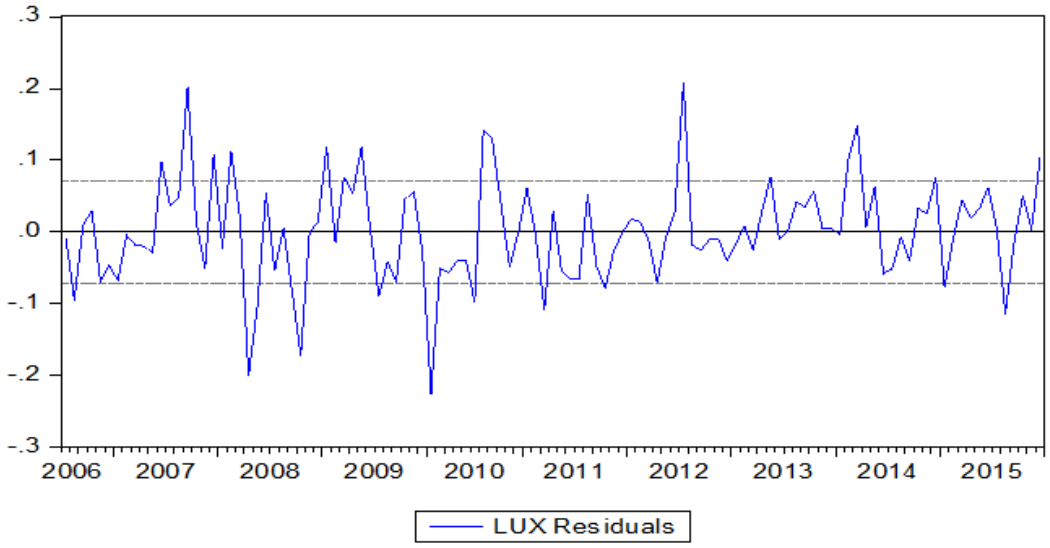


Appendix n° 3: Residuals auto-correlation test:



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The Nexus between Stock Market Prices and External Shocks: Evidence from Nonlinear ARDL on Selected Firms in the Nigerian Stock Market

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Introduction- Economic policies in favour of openness and liberalisation have open up new markets, promoted financial market globalization and bridge the gap between domestic and foreign markets (Kim, 2003) but with attendant consequences for shocks contagion among countries. Some of these external shocks come in the form of exchange rate fluctuations (see Suriani, et al. 2015) occasioned by erratic portfolio investment flows, put differently, inconsistent international capital flow (Basak, et al. 2017), and instability in the price of essential commodity traded internationally such as crude oil in the case of Nigeria. These external risks and shocks have implications on domestic macroeconomic fundamentals and as such impact on financing and investment decisions. These fluxes can feed into the domestic financial market to amplify volatility in the stock market and create uncertainties for investors and speculators in the financial markets (see Khan and Abbas, 2015)..

GJMBR-B Classification: JEL Code: H54, R53



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The Nexus between Stock Market Prices and External Shocks: Evidence from Nonlinear ARDL on Selected Firms in the Nigerian Stock Market

Ahmed S. Alimi [α] & Idris A. Adediran [σ]

I. Introduction

Economic policies in favour of openness and liberalisation have open up new markets, promoted financial market globalization and bridge the gap between domestic and foreign markets (Kim, 2003) but with attendant consequences for shocks contagion among countries. Some of these external shocks come in the form of exchange rate fluctuations (see Suriani, *et al*. 2015) occasioned by erratic portfolio investment flows, put differently, inconsistent international capital flow (Basak, *et al*. 2017), and instability in the price of essential commodity traded internationally such as crude oil in the case of Nigeria. These external risks and shocks have implications on domestic macroeconomic fundamentals and as such impact on financing and investment decisions. These fluxes can feed into the domestic financial market to amplify volatility in the stock market and create uncertainties for investors and speculators in the financial markets (see Khan and Abbas, 2015).

The foregoing has brought to fore the need to understand the role of risks associated with stock market from economic shocks as it impacts investment decisions; international investors hedging and portfolio diversification process (Aydemir and Demirhan, 2009; Kutty, 2010). This is a clear motivation to evoke research interests on the interconnection between international markets; goods, financial and foreign exchange markets. Theories suggest that stock market fundamentals respond to changes in exchange rate and pass-through shocks from the international oil market. This is particularly true for an oil dependent small open economy who takes essentials in the international market as given. There are also arguments that exchange rate respond to shocks from oil market from where it passes through to the stock market. There is therefore the need to undertake a research effort on the stock market, oil price and exchange dynamics. The role of oil shocks is evident in the nexus between stock and foreign exchange markets especially for an oil dependent economy like Nigeria that build up its foreign reserve with oil proceeds.

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This study is anchored on a three-legged theoretical footing; the asset pricing theories, the flow theory, and the portfolio balance theory. The asset pricing theories (Arbitrage Pricing theory and Capital Asset Pricing theory) connects stock market with risks from international transactions such as oil price shocks and exchange rate fluctuations. The flow model explains the dynamism of oil price shocks and exchange rate movements while the portfolio balance theory links exchange rate with stock market. A host of studies have worked in this regard with mixed conclusions (see for example Smith, 1992; El-Sharif, 2005; Aydemir and Demirham, 2009; Kutty, 2010; Tsai 2012;Zubair, 2013; Litsios, 2013; Dellas and Tavlas, 2013; Al-Shboul and Anwar, 2014; Narayan and Gupta, 2014; Narayan and Sharma, 2014; Khan and Abbas 2015; Raza, *et al*. 2016; Zivkov, et al. 2016;Salisu and Isah, 2017; Swaray and Salisu, 2017).

While the preceding empirical evidences on the impact of economic risks and shocks from international markets on the stock market adopt macro structure, the present study departs from this conventional way of inquiry to adopt a micro view to focus more on individual firms in the stock market. This is in tune with reality given that firms in the stock exchange markets are not homogenous and therefore, the shocks pass-through from international transactions may not be uniform across firms. Firms from different industries differ in terms of cost structure, competition, and regulation (see Fama and French, 1993); and as such, shocks from international oil price can have different impacts on each firm. Thus, we select firms across the banking, oil and gas, construction subsectors to examine the impact of these international risks on their stock prices. This study will assist in targeting policies appropriately to protect domestic firms against global market risk contagion.

II. Theoretical and Empirical Literature

Theoretically, stock market price orreturn has been visualised to respond to economic and financial risks such as oil price and exchange rate (see Fama and French, 2004; Salisu, *et al*. 2017). The theoretical modelling of stock return relies on the Ross (1976) Arbitrage Pricing Theory and the different variants of

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Capital Asset Pricing theories of Sharpe(1964), Lintner, 1965; Merton, 1973, 1990; Breeden, 1979; Jagannathan and Wang, 1996; Fama and French, 1993, 1995. Empirically, studies such as El-Sharif, 2005; Park and Ratti, 2008; Driesprong, *et al*. 2008; Raza, *et al.* 2016; Jiang and Gu, 2016; Salisu and Isah, 2017; Swaray and Salisu, 2017 assess the influence of oil price shocks on stock prices and report mixed findings. A number of other studies examine the influence of exchange rate risks in stock markets models (for example Aydemir and Demirham, 2009; Kutty, 2010; Zubair, 2013; Litsios, 2013; Lin, 2012; Dellas and Tavlas, 2013; Al-Shboul and Anwar, 2014; Suriani,*et al*. 2015; Raza, *et al*. 2016; Zivkov, *et al*. 2016). These studies are also polarised as regards their controversial results.

The theoretical motive for examining the risks from international commodity market is rooted in the flow model, which considers trade flows as the main determinants of exchange rate (see Dornbusch and Fischer, 1980). The trade approach suggests that the demand and supply for foreign exchange are determined by the flows of currency created by international transactions in goods and services and portfolio investment. Consequently, for an oil dependent economy, this has evoked interest to consider the risk exposure from oil price in international market; exchange rate response and pass-through to stock price via the international flow of portfolio investment. Empirical exercise in this line have shown that exchange rate responds to oil price shocks from where it transmits to the domestic economic variables (see for example Kilian, 2009; Kilian and Vigfusson, 2011; Atems, *et al*. 2015).

With the upsurge in investment flows due to financial globalisation and integration, there has been greater role for financial assets in exchange rate determination (Kim, 2003; Khan and Abbas, 2015). To conceptualise this theoretically, the financial asset theory also known as stock model comes in handy. The financial asset theory link exchange rates to the foreign and domestic demand and supply of money, bonds, stocks and other financial assets (see Fama and French, 2004). There are two variants of the asset theory in the literature; the monetary theory (see Mussa, 1976; Dornbusch, 1976; Bilson, 1978; Frenkel, 1976 among others) and the portfolio balance theory (see Branson, *et al*. 1977; Branson, 1983; Friedman, 1988; Boyle, 1990 among others). The monetary theory is a restricted version of the asset theory which single out the influence of monetary factors excluding other financial assets in exchange rate determination (see Khan and Abbas 2015; Salisu and Oloko, 2015). The theory opines that exchange rate for any two currencies is determined by relative money demand and money supply between the two countries (see Fama and French, 2004; Huy, 2016). The other variant, the portfolio balance theory underscores the influence of all classes of financial assets in international transactions for exchange rate adjustments. In the portfolio balance model, investors compose their portfolios with money and other financial assets (see Fama and French, 2004; Huy, 2016). These investors who, by rule seeks to hedge against risk, diversify their investment portfolio from countries with lower stock returns to countries with higher stock returns, leading to high demand (currency appreciation) for the currencies of the countries with higher stock return at the expense of the countries with lower stock returns (see for more details Kutty, 2010; Ulku and Demirci, 2012; Salisu and Oloko, 2015). Using this theory, a good number of empirical studies have examined the nexus between stock returns and exchange rate fluctuations (see for example Smith, 1992; Tsai 2012; Kutty, 2010; Khan and Abbas 2015; Zivkov, et al 2016).

These previous empirical evidences apply the underlying theories for aggregate study of the stock market. However, we argue that the stock market comprises of heterogenous set of firms with unique characteristics and as such deserve to be studied distinctly. Innovatively therefore, we adopt a micro framework to investigate the impact of economic shocks and risks from exchange rate and international oil price on individual firms of the stock market. The nexus between stock market and exchange rate is emphasised given that the two markets are entwined in any open economy. The focus of the study on Nigeria further accentuate the need to examine the role of oil price fluctuations given the status of the oil sector in the economy. We further make improved contribution on Nigerian specific studies by considering the asymmetric response of stock market fundamental to exchange rate and oil price changes. This allows us to see clearly the impact of positive and negative external shocks.

III. Data and Methodology

This study is centred on the Nigerian stock market. To circumvent aggregation bias, we conduct a micro analysis on specific firms cutting across various sectors (consumables, oil & gas, construction, pharmaceuticals, insurance and banking) of the Nigerian economy. We therefore obtain data on share prices of each of the firms namely, Nestle, Oando, Julius Berger, Glaxo Smith Kline, AIICO Insurance, and Access Bank to highlight the role of external shocks pass-through from international oil market and foreign exchange market on the stock market performance. We adopt 83-period daily data on the variables from 01/06/2017 to 29/09/2017. The ensuing results provide insight as to the risks exposure of the investors in the Nigerian financial market.

On the basis of the theoretical footing and empirical literature espoused in the previous section and case for nonlinearity in the stock, foreign exchange and oil markets nexus, we adopt the nonlinear ARDL

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(NARDL) framework of Shin, et al. (2014) to model asymmetric response of firm-level stock prices from oil price and exchange rate. The model specification evolves from a simple nonlinear specification to an on linear ARDL model as follows:

$$stp_{i,t} = \alpha + \alpha_0 stp_{i,t-1} + \alpha_1 exch_t^+ + \alpha_2 exch_t^- + \alpha_3 oilp_t^+ + \alpha_4 oilp_t^- + e_t \quad (1)$$

Where 'stp', 'exch', 'oilp' and 'i' are stock price, exchange rate, oil price and the ith firm (one of the six firms in the Nigerian stock market) respectively. The positive and negative superscripts are the partial sums of the positive and negative changes in oil price and exchange rate.

$$\Delta stp_{i,t} = \alpha + \beta_0 stp_{i,t-1} + \beta_1 exch_{t-1}^+ + \beta_2 exch_{t-1}^- + \beta_3 oilp_{t-1}^+ + \beta_4 oilp_{t-1}^-$$
$$+ \sum_{t=1}^{p} \varphi_j \Delta stp_{i,t-j} + \sum_{t=0}^{q} (\theta_j^+ exch_{t-1}^+ + \theta_j^- exch_{t-1}^-) + \sum_{t=0}^{s} (\vartheta_j^+ oilp_{t-1}^+ + \vartheta_j^- oilp_{t-1}^-) + \zeta_t \quad (2)$$

The equation (2) is the study specific NARDL specification of Shin, et al. (2014) on the pattern of Pesaran, et al. (2001). The estimation of the model is the fulcrum of this study.

IV. Results and Discussion

a) Preliminary Analyses

Prior to estimation of the asymmetric model, we conduct preliminary analyses on the data. These involve the descriptive statistics to reveal the salient characteristics of the series (i.e. mean, standard deviation, skewness and kurtosis) (see Table 1) and the stationarity tests (Augmented Dickey-Fuller, Pillips-Perron, and Kwiatkowski-Phillips-Schmidt-Shin) to show time series properties of the variables (see Table 2). Deducible from the analyses, oil price in the international market sells for an average of US$ 47.45 while the dollar exchanges for N338.59 for the second half of the year 2017. Among the six firms, Nestle is the most performing company while AIICO insurance is the least performing in terms of prices of their stocks. Based on this benchmark, GSK, Julius Berger, Oando, and Access Bank appear to perform below average given their relatively low share prices compared with Nestle.

Five of the eight variables are negatively skewed including those of the external shocks while AIICO, Julius Berger and Oando stock prices are positively skewed. The kurtosis statistics also turn up a mixture of leptokurtic (those with kurtosis values greater than 3) and mesokurtic distributions (those with values less than 3). Consequently, the external shocks, AIICO and Julius Berger are mesokurtic while the other four variables are leptokurtic. The variables are a mixture of stationary and non stationary series; integrated of orders one and zero. An interesting observation here is that the same variables that are mesokurtic are also integrated of order 1 while the leptokurtic series (Access, GSK, Nestle and Oando) are stationary at level. These information are contained in Tables 1 and 2 and they form the basis for adopting an ARDL framework.

Table 1: Descriptive Statistics

Variables	Mean	Standard Deviation	Skewness	Kurtosis
External shocks				
Exchange rate (N/$)	338.599	20.3841	-0.3084	1.8877
Oil price (US$)	47.4507	2.23175	-0.0483	2.4974
Stock prices				
Access bank	9.7915	0.4224	-0.4129	3.6624
AIICO	0.5707	0.0256	0.4426	2.8837
GSK	20.474	0.9766	-1.1878	5.2445
Julius Berger	35.051	3.6351	0.2840	2.3339
Nestle	1044.505	184.894	-2.0005	12.671
Oando	18.1378	99.0917	8.9440	81.001

Source: Author's Computation

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Table 2: Stationarity Tests

Variables	ADF	Status	PP	Status	KPSS	Decision
External shocks						
Exchange rate (N/$)	-11.69*** (-4.0753)	I (1)	-12.14*** (-4.0753)	I (1)	0.0842 (0.2160)	Stationary at first diff.
Oil price (US$)	-9.630*** (-4.0753)	I (1)	-9.630*** (-4.0753)	I (1)	0.0784 (0.2160)	Stationary at first diff.
Stock prices						
Access bank	-3.6303** (-3.4655)	I(0)	-3.8651** (-3.4655)	I (0)	0.1285 (0.1460)	Stationary at level
AIICO	-3.9037** (-3.4655)	I (0)	-3.6112** (-3.4655)	I (0)	0.1463 (0.1460)	Stationary at first diff.
GSK	-3.5034** (-3.4655)	I (0)	-3.5840** (-3.4655)	I (0)	0.0880 (0.1460)	Stationary at level
Julius Berger	-7.755*** (-4.0753)	I (1)	-7.815*** (-4.0753)	I (1)	0.0584 (0.2160)	Stationary at first diff.
Nestle	-6.362*** (-4.0738)	I (0)	-6.609*** (-4.0738)	I (0)	0.1518 (0.2160)	Stationary at level
Oando	-9.125*** (-4.0738)	I (0)	-9.126*** (-4.0738)	I (0)	0.0481 (0.2160)	Stationary at level

Source: Author's Computation

***, **, * represent significance at 1, 5 and 10% respectively
The null hypotheses of ADF and PP tests are that the underlying series are non stationary while the KPSS null is that the series is stationary.
Values in parenthesis are the tabulated values of the relevant test statistics at 5% significance level.

b) Asymmetric models of stock prices: positive and negative changes in oil price and exchange rate

Having shown that the variables of the study are a mixture of stationary and integrated series, we proceed to estimate the NARDL model specified in (2). Given that our study is a micro-analytical study of the specific stock prices, we estimate the NARDL model for each of the six selected firms in the Nigerian stock market to decompose the positive and negative responses of the stock prices to external risks posed by fluctuations in the international oil market and foreign exchange market (see Table 3). The results are partitioned to reveal the short run and long run effects of oil price and exchange rate on the firm-level stock prices. The results obtained from the estimations appear to be reliable given that all the error correction parameters are correctly signed (i.e. negative) and significant. For consistency, only coefficients that are statistically significant are considered in the discussion.

In the short run, positive shocks to exchange rate (dollar appreciation) seems to increase the share prices of Access Bank, AIICO insurance, GSK & Nestle while exchange rate (dollar) depreciation have limited impact on stock prices; affecting only two of the six firms' stock prices – a negative impact on Access bank and positive impact on Nestle. This implies that asymmetry does not matter in the nexus between exchange rate and Nestle stock price in the short run. Asymmetry however does matter in the Access bank stock price – exchange rate nexus.

On the short run impact of oil price shocks, increases in the international oil price appear to raise the share prices of Access bank and GSK while the negative changes to oil price exert negative impacts on the share prices. This shows that asymmetry matters in the nexus in the short run. In a different parlance, either positive or negative changes to oil price reduces the share prices of AIICO, Julius Berger, Nestle, and GSK. Thus, asymmetry does not matter in these relationships. Result also clearly indicates that asymmetry does not matter in the Nestle stock price – oil price nexus in the short run since the asymmetric changes result to the same (negative) impact.

There is no case for asymmetry in the long run relationship between exchange rate and the stock prices. The asymmetric changes in exchange rate increase the stock prices in the long run. Also, asymmetry turn out to be negligible when we consider shocks from oil price. The reason for this is not far fetched. Both positive and negative components of oil price produce positive impact on Access bank shares and negative impact on AIICO shares. Further, oil price increase appears to increase GSK and Nestle.

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Table 3: The estimated asymmetric models of firm-level stock prices

Variables	Exchange rate				Oil price				ECM
	Long run		Short run		Long run		Short run		
	Positive	Negative	Positive	Negative	Positive	Negative	Positive	Negative	
Access bank	0.01446** (0.0199)	0.01459* (0.0992)	0.00636** (0.0201)	-0.0075* (0.0942)	0.13382*** (0.0013)	0.19028*** (0.0001)	0.17723*** (0.0011)	-0.1309*** (0.0064)	-0.44015*** (0.0000)
AIICO	0.00020 (0.5538)	0.00013 (0.7795)	0.00115*** (0.0022)	0.000062 (0.7791)	-0.0086*** (0.0033)	-0.0087** (0.0133)	-0.00404** (0.0168)	0.01154*** (0.0048)	-0.46916*** (0.0000)
GSK	0.00489 (0.6588)	0.04644** (0.0183)	0.01310* (0.0613)	-0.00940 (0.1952)	0.30754** (0.0130)	0.04486 (0.7050)	0.09263*** (0.0005)	-0.1545** (0.0125)	-0.30120*** (0.0000)
Julius Berger	0.06011 (0.4972)	-0.00279 (0.9817)	0.00625 (0.5092)	-0.00029 (0.9817)	-0.35656 (0.5791)	0.59532 (0.4838)	-0.03711 (0.5998)	0.06197 (0.4520)	-0.10409** (0.0300)
Nestle	2.89443** (0.0338)	3.31514* (0.0747)	2.27206** (0.0409)	2.60231* (0.0840)	19.9197* (0.0576)	6.48575 (0.6075)	-124.13*** (0.0000)	-54.039** (0.0448)	-0.78497*** (0.0000)
Oando	0.56113 (0.4919)	1.08955 (0.3307)	0.66148 (0.4933)	1.28440 (0.3351)	-8.6875 (0.1677)	-10.5223 (0.1673)	113.133*** (0.0000)	36.5229 (0.1374)	-1.17883*** (0.0000)

Source: Author's Computation

***, **, * represent significance at 1, 5 and 10% respectively
Values in parenthesis are the probability values of the coefficients.

V. Conclusion

This study is motivated by the asset pricing, the flow, and portfolio balance theories and the controversies around studies that adopt same for to examine the nexus among stock price, exchange rate and oil price. This study is distinct in that it adopts a micro analysis to assess the asymmetric responses of firms' stock prices to positive and negative changes in oil price and exchange rate. The results are mixed across the firms but evidence reveal that the role of asymmetry is negligible in the nexus. Based on the short run dynamics, Access Bank, AIICO insurance, GSK and Nestle could expect to benefit in terms of higher share prices from dollar appreciation against the naira. In the same vein, Access bank and GSK could gain from positive shocks to oil in the international market.

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

Preparation of Eletronic Figures for Publication

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

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

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

Tips for writing a good quality Management Research Paper

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

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

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

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

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

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



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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Informal Guidelines of Research Paper Writing

Key points to remember:

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

Final points:

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

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

The discussion section:

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

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

General style:

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

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

Mistakes to avoid:

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



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

Title page:

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

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

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

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

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

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

Approach:

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

Introduction:

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

The following approach can create a valuable beginning:

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

Approach:

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

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

Procedures (methods and materials):

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

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

Materials:

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

Methods:

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

Approach:

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

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

What to keep away from:

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

Results:

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

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

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



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Content:

- Sum up your conclusions in text and demonstrate them, if suitable, with figures and tables.
- In the manuscript, explain each of your consequences, and point the reader to remarks that are most appropriate.
- Present a background, such as by describing the question that was addressed by creation of an exacting study.
- Explain results of control experiments and give remarks that are not accessible in a prescribed figure or table, if appropriate.
- Examine your data, then prepare the analyzed (transformed) data in the form of a figure (graph), table, or manuscript.

What to stay away from:

- Do not discuss or infer your outcome, report surrounding information, or try to explain anything.
- Do not include raw data or intermediate calculations in a research manuscript.
- Do not present similar data more than once.
- A manuscript should complement any figures or tables, not duplicate information.
- Never confuse figures with tables—there is a difference.

Approach:

As always, use past tense when you submit your results, and put the whole thing in a reasonable order.

Put figures and tables, appropriately numbered, in order at the end of the report.

If you desire, you may place your figures and tables properly within the text of your results section.

Figures and tables:

If you put figures and tables at the end of some details, make certain that they are visibly distinguished from any attached appendix materials, such as raw facts. Whatever the position, each table must be titled, numbered one after the other, and include a heading. All figures and tables must be divided from the text.

Discussion:

The discussion is expected to be the trickiest segment to write. A lot of papers submitted to the journal are discarded based on problems with the discussion. There is no rule for how long an argument should be.

Position your understanding of the outcome visibly to lead the reviewer through your conclusions, and then finish the paper with a summing up of the implications of the study. The purpose here is to offer an understanding of your results and support all of your conclusions, using facts from your research and generally accepted information, if suitable. The implication of results should be fully described.

Infer your data in the conversation in suitable depth. This means that when you clarify an observable fact, you must explain mechanisms that may account for the observation. If your results vary from your prospect, make clear why that may have happened. If your results agree, then explain the theory that the proof supported. It is never suitable to just state that the data approved the prospect, and let it drop at that. Make a decision as to whether each premise is supported or discarded or if you cannot make a conclusion with assurance. Do not just dismiss a study or part of a study as "uncertain."

Research papers are not acknowledged if the work is imperfect. Draw what conclusions you can based upon the results that you have, and take care of the study as a finished work.

- You may propose future guidelines, such as how an experiment might be personalized to accomplish a new idea.
- Give details of all of your remarks as much as possible, focusing on mechanisms.
- Make a decision as to whether the tentative design sufficiently addressed the theory and whether or not it was correctly restricted. Try to present substitute explanations if they are sensible alternatives.
- One piece of research will not counter an overall question, so maintain the large picture in mind. Where do you go next? The best studies unlock new avenues of study. What questions remain?
- Recommendations for detailed papers will offer supplementary suggestions.

Approach:

When you refer to information, differentiate data generated by your own studies from other available information. Present work done by specific persons (including you) in past tense.

Describe generally acknowledged facts and main beliefs in present tense.

The Administration Rules

Administration Rules to Be Strictly Followed before Submitting Your Research Paper to Global Journals Inc.

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Segment draft and final research paper: You have to strictly follow the template of a research paper, failing which your paper may get rejected. You are expected to write each part of the paper wholly on your own. The peer reviewers need to identify your own perspective of the concepts in your own terms. Please do not extract straight from any other source, and do not rephrase someone else's analysis. Do not allow anyone else to proofread your manuscript.

Written material: You may discuss this with your guides and key sources. Do not copy anyone else's paper, even if this is only imitation, otherwise it will be rejected on the grounds of plagiarism, which is illegal. Various methods to avoid plagiarism are strictly applied by us to every paper, and, if found guilty, you may be blacklisted, which could affect your career adversely. To guard yourself and others from possible illegal use, please do not permit anyone to use or even read your paper and file.

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Please note that following table is only a Grading of "Paper Compilation" and not on "Performed/Stated Research" whose grading solely depends on Individual Assigned Peer Reviewer and Editorial Board Member. These can be available only on request and after decision of Paper. This report will be the property of Global Journals.

Topics	Grades		
	A-B	**C-D**	**E-F**
Abstract	Clear and concise with appropriate content, Correct format. 200 words or below	Unclear summary and no specific data, Incorrect form Above 200 words	No specific data with ambiguous information Above 250 words
Introduction	Containing all background details with clear goal and appropriate details, flow specification, no grammar and spelling mistake, well organized sentence and paragraph, reference cited	Unclear and confusing data, appropriate format, grammar and spelling errors with unorganized matter	Out of place depth and content, hazy format
Methods and Procedures	Clear and to the point with well arranged paragraph, precision and accuracy of facts and figures, well organized subheads	Difficult to comprehend with embarrassed text, too much explanation but completed	Incorrect and unorganized structure with hazy meaning
Result	Well organized, Clear and specific, Correct units with precision, correct data, well structuring of paragraph, no grammar and spelling mistake	Complete and embarrassed text, difficult to comprehend	Irregular format with wrong facts and figures
Discussion	Well organized, meaningful specification, sound conclusion, logical and concise explanation, highly structured paragraph reference cited	Wordy, unclear conclusion, spurious	Conclusion is not cited, unorganized, difficult to comprehend
References	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring

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