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ENHANCING PUBLIC INTEGRITY SYSTEMS TO COMBAT ILLICIT FINANCIAL FLOWS AND IMPROVE FINANCIAL SUSTAINABILITY IN ZAMBIA'S MINING AND TIMBER EXTRACTIVE INDUSTRIES

Abstract: This paper presents illicit financial flows scenarios in Zambia's mining and timber extractive industries and suggests ways to enhance integrity systems to combat the apparent corrupt practices. Research reveals staggering losses of revenue in Africa as much as US\$50 billion per year through illicit financial flows. In Zambia, the picture of illicit financial flows is just as disquieting as that for the continent. The paper recommends that more comprehensive integrity systems are necessary in governing the behaviour around national resource misuse connected to illicit financial flows.

Dadson Awunyo-Vitor

FACTORS INFLUENCING CHOICE OF CLIMATE CHANGE ADAPTATION STRATEGIES BY MAIZE FARMERS IN UPPER EAST REGION OF GHANA

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Abstract: The impact of climate change on agricultural productivity and food security cannot be over emphasised. These changes in climate affect cropping systems, distribution, domestic food mix, and livelihood diversification as well as migration patterns and food security. The perceptions of farmers about climate change and their responses thereof, with regard to adaptation strategies, play significant roles in addressing low productivity and, by implication, food insecurity in the region. Thus, this paper seeks to examine maize farmer's choice of climate change adaptation strategies in the Upper East Region of Ghana. A multi-stage sampling technique was used to sample 200 farmers in three districts in the Upper East Region. Descriptive statistics, Heckman two-stage procedure, was adopted to analyse empirical data. It is found that farmers perceive that climate change does exist. The paper reveals that farmers generally used improved maize varieties, irrigation and soils conservation as climate change adaptation strategies. The regression results show that the levels of formal education, income, credit and experience are critical in farmers' using climate change adaptation strategies. In the short term, policies aimed at educating farmers about the effects of climate change on their farming activities are necessary for sustainable productivity and food security. Furthermore, improving income for the farmers and encouraging access to credit would improve the farmers' use of climate change adaptation strategies for sustainable maize productivity and food security.

Dadson Awunyo-Vitor Daniel S. Ziba

THE IMPACT OF IRRIGATION SCHEMES ON FARM INCOME: IMPLICATIONS FOR SUSTAINABLE AGRICULTURE IN THE UPPER EAST REGION, GHANA

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Abstract: The paper evaluates the impact of irrigation schemes on farmers' income in northern Ghana as a means of developing sustainable livelihood. A multi-stage sampling technique was used to obtain 180 respondents for survey. The Logit estimation was employed to identify factors influencing the respondents' decision to participate in the irrigation schemes. Propensity score matching (PSM) was applied to analyze the impact of irrigation schemes on farmers' income as a key livelihood outcome. The Logit result indicates that household size, and access to credit is the factors that significantly influence farmers' decision to participate in irrigation schemes. The PSM results reveal that irrigation schemes have positively increased farmers' income by GHC 1335.09 (US\$ 381.45) and GHC 1353.87 (US\$ 386.82), using the Nearest Neighbor and Kernel based matching algorithms, respectively. The paper concludes that irrigation schemes play a role in the development of sustainable livelihoods for farmers. The study recommends that farmers should be encouraged to participate in irrigation farming and that the existing irrigated areas should be expanded. For all-year round production and development of sustainable livelihoods, farmers' access to credit and farm inputs such as agro chemicals and enhanced seeds should also be improved.

Tlou J. Ramonyai Collins C. Ngwakwe

CORPORATE ENVIRONMENTAL EFFICIENCY AND TURNOVER

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Abstract: This paper aims to assess the relationship between corporate environmental performance and firm turnover. The environmental performance proxies are limited to carbon reduction, water reduction and waste reduction. Literature on previous empirical findings vacillates. Therefore, data for this study was collected form socially responsible firms in the JSE' Socially Responsible Index. Archived data from sustainable development reports of 2011 to 2015 of the sample were analyzed using simple regression analysis. The findings show the existence of a significant relationship between corporate environmental performance and firm turnover. The relationship is negative for water reduction and positive for other variables. Whilst this paper concentrated on sales turnover effect of environmental performance, further research is needed to understand the impact of each variable on financial performance in order to motivate managers toward engagement on environmental efficiency.

Thobeka Ncanywa Itumeleng P. Mongale Miglas P. Mphela

DETERMINANTS OF INVESTMENT ACTIVITY IN SOUTH AFRICA

Abstract: Investment activities can promote technical progress through the introduction of new technology and can reduce poverty by creating increased rates of employment. In the long run, through the production process, investment activities can create new capital goods. Investment ensures growing capital stock in the country because investing in fixed capital stock can accelerate the economic growth. Gross Fixed Capital Formation (GFCF) is commonly known as the net investment, refers to the total fixed amount of capital accumulated. This paper seeks to examine the determinants of investment activity in South Africa. It uses the Johansen Cointegration and Vector Error Correction model; and, it finds the long- and short-run relationship on the time series data. It establishes that there is positive relationship between economic growth, interest rate, inflation and investment. However, taxation and investment are negatively related. This indicates that investment activity can be explained by tax, economic growth, interest rates and inflation. The paper recommends low taxation, growing economy, increasing availability of credit to boost investment activity in South Africa.

Nwobu Obiamaka Owolabi Akintola

THE INFLUENCE OF CORPORATE EXTERNAL AUDITOR ON SUSTAINABILITY DISCLOSURES: A STUDY OF INDUSTRIAL GOODS COMPANIES

Abstract: The purpose of this paper is to assess the level of sustainability reporting of companies in the industrial goods sector of Nigeria. It also examines whether the sustainability disclosures of companies can be influenced by their audit firms. The results show that, on average, the level of sustainability disclosures increased from 2010 to 2014. Further, the results show that companies having one of the Big Four audit firms as financial auditor, have higher sustainability disclosures than companies that do not. Based on the 95% confidence level, a significant difference between big four and non-big four audited companies is found on the combined dependent variables namely economic, environmental, governance and social disclosures. This implies that the difference in the disclosures of companies audited by one of the Big Four and those audited by others was significant. The present study contributes to the existing literature on sustainability reporting. The findings of this paper might be useful to accounting firms as well as regulators and practitioners involved in providing sustainability information to users. The paper recommends that there is a need for regulation of companies in the industrial goods sector in order to improve reporting in environmental and social issues particularly those on climate change, suppliers' assessment based on environmental risks, gross direct greenhouse gas emissions, organic pollutants and suppliers' assessment for impacts on society.

Chibunna Onyebuchi Onwubiko

IMPACT OF ENVIRONMENTAL AND SOCIAL COSTS ON THE PERFORMANCE OF QUOTED MANUFACTURING COMPANIES IN NIGERIA

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Abstract: Environmental and social cost accounting offers an alternative account of significant economic entities. It has the potential to expose the tension between pursuing economic profit and the pursuit of social and environmental objectives. It is in the light of the above that this paper assesses the impact of environmental and social cost on the performance of quoted manufacturing companies in Nigeria. The data for the study were collected from annual reports and accounts of five randomly selected manufacturing companies. Multiple Regression Analysis (MRA) was used to analyze data obtained from the companies. The paper reveals significant relationship between environmental/social cost and return on capital employed (ROCE) and earnings per share of manufacturing companies. Based on this, the paper recommends, among others, that government should ensure complete adherence to environmental laws by companies in Nigeria.

Nwobu Obiamaka	THE RELATIONSHIP BETWEEN FIRM SIZE,
Owolabi Akintola	FINANCIAL PERFORMANCE AND CLIMATE CHANGE
Iyoha Francis	DISCLOSURES IN NIGERIA: A STUDY OF
Nnadi Matthias	INDUSTRIAL GOODS COMPANIES .
Abstract: The paper assess	as the determinants of climate change disclosures of industrie

Abstract: The paper assesses the determinants of climate change disclosures of industrial goods companies in Nigeria. The objectives of the paper are to examine the effects of firm size and profit on climate change disclosures. Secondary data was gathered from annual reports of 11 companies from the industrial goods sector of the Nigerian Stock Exchange for the period 2010 to 2014. The results indicate that company size predicts the likelihood that companies would disclose climate change information. Also, the results reveal no evidence of the ability of company profitability to predict the likelihood that companies would disclose climate change information. These results have implications on stock market regulators as 70.9% of the companies have no climate change disclosures. The study recommends that regulation is imperative for companies in the industrial goods sector to give attention to climate change disclosures.

Johannes Tsheola Tlou Ramoroka Mokoko Sebola

SOUTH AFRICA'S "STRUCTURAL POWER": "COMPETITION" STATES IN THE GLOBALITY OF PRIVATE ECONOMIES OF SELECTED COUNTRIES

Abstract: The capitalist system, which started with individual capitalists and proletariats, has evolved into a sophisticated system of large financial institutions seeking for profits through complex management of money, amalgamation and investments in the environment of business globalisation and offshore financial markets. Rather than replace the state sovereignty, the latter two phenomena have paradoxically precipitated the invention of a "competition" state that is required to regulate capitalism itself, which evolves through continual slumps of stagnation, destruction, restructuring and contradictions, as a mode and materialistic structure of production. Under business globalisation, societal institutions such as offshore financial markets have taken prominence in the global arena; and, "competition" states are necessary in order that countries may establish the required "structural power" to influence the operations of global markets in ways that secure purchasing power, investment for the creation of products and generation of employment for "national" private economies. This paper argues that South Africa has not established a "competition" state necessary for possession of "structural power", with the result that its participation in business globalisation has not served the "national" private economy through creation of employment. The paper recommends that South Africa should prioritise the establishment of "structural power" through deliberate state interventions because the emergence of business globalisation and prominence of offshore financial markets is at heart, the outcome of "the exercise" of "competition" states' self-selection.

Johannes Tsheola Olga Makhudu

IDEALISM OF NEOLIBERALISM, ECONOMICS, EMPLOYMENT AND EARNINGS IN SOUTH AFRICA: DEMYSTIFYING "FINANCIALISATION" AND THE PRODUCTIONIST INDUSTRY

Abstract: The world economy is in the state of "chicken-and-egg" scenario wherein low economic growth is assumed to be the cause of employment problems that can, in return, be resolved by increased wages and consumption power, which are all in short supply, thereby discouraging investments due to lowered business confidence. There is a notion that national and local measures such as imposition of austerity would not resolve the problems because they require reordering of the global economy, which is itself difficult as no single state would be willing to be the first to act amidst content and despondent international institutions. Adherence to neoliberalism and establishment of strong institutional frameworks have seen a democratic South Africa run a full circle as its experiences provide illustrations related to these world economy conundrums. The South African economy has increasingly divested from all other sectors for concentration into the financial industry in a phenomenon denoted "financialisation". This paper contests the suggestion that the emergence of "financialisation" has implied that earnings would remain an uncontrollable instrument for the perpetration of poverty and inequality in emerging economies. Instead, it asserts that the dominance of the financial sector in emerging economies is an inherent paradoxical self-serving character of capitalist development. The paper concludes that downgrading of South Africa's profile, banks and corporations into junk status does undermine the phenomenon of "financialisation" itself, which provides for one of this country's largest employment and earnings as of 2016 and 2017. It corroborates the idea that educational training of employees in the productionist sector, rather than financialisation itself, is the core problem of the South African economic system. The paper uses the statistical data on industrial disputes, employment and earnings, organised according to the Standard Industrial Classification, to demystify the blame on "financialisation" as the cause of destruction of the "productionist" industry.

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EDITORIAL

I am very pleased to offer this special issue on the very important contemporary topics dealing with Africa. Prof. Mokoko Sebola and Prof. Johannes Tsheola from the University of Limpopo in South Africa are to be congratulated for developing such an excellent collection for our readers. All of the manuscripts are very insightful and thought provoking. These articles will add immensely to the growing body of knowledge.

Research points to staggering losses of revenue in Africa, as much as US\$50 billion per year, through illicit financial flows. The **1**st **paper by S. Makwembere & E. Kangamungazi** uses the mining and timber industries to present the illicit financial flows situation in Zambia's mining and timber extractive industries and gives an overview of integrity systems that have a bearing on the Illicit Financial Flows (IFFs) situation in these industries. The paper examines illicit financial flows scenarios in Zambia's mining and timber extractive industries and suggests possible ways of enhancing integrity systems to combat the apparent corrupt practices. Zambia, with its wealth in the mining and timber extractive industries, would not be construed as an exception to the norm. Indeed, the paper establishes that the picture of illicit financial flows in Zambia is just as disquieting as that for the continent largely due to the collapse of the governance integrity systems.

The paper suggests that the integrity systems play an important role in different industries; and, that they are moderately developed in Zambia. At present, there are no comprehensive frameworks used by government that serve as tools to evaluate ethical compliance in the sectors holistically. There are various key elements that have a bearing on integrity systems in the industry, inclusive of the following:

- Organizational strategy on ethics this refers to the embeddedness of ethics in organization vision, mission, values, strategic objectives and operational plans;
- Leadership commitment to ethics this relates to the express commitment by organizational leadership to improve and maintain a culture of ethical conduct;
- The existence of formal structures implementing an ethics function this element concerns the presence of formal structures that support ethics and the ethics function in the organization;
- The existence of an ethical culture this concerns an organizational culture that focuses on ethical conduct through its vision, mission, strategy and structure as well as values, attitudes, management styles and employee behaviour;
- A code of ethics this refers to the document that contains the prescripts on expected ethical conduct should employees find themselves in ethical dilemmas;
- Compliance programmes these assist in early detection of wrong doing and create opportunities for internal handling of unethical practices;
- Training and education programmes in ethics these involve providing training and education in ethics and a means to combat unethical practices;
- Communication of ethical issues these refer to the communication strategies on ethical issues to raise awareness on ethical matters;
- Reporting systems of unethical conduct these refer to the reports on unethical behaviour that are produced; and
- Disciplinary and reward procedures these procedures would outline how ethical conduct would be promoted through performance appraisal.

The authors suggest that strengthened integrity systems supported by evaluative frameworks can assist the country in reducing corruption in the mining and timber industries, thereby avoiding IFFs. The following are recommended:

- Zambian government needs to synergise efforts among the stakeholders in tackling IFFs and improving platforms of information sharing and public education.
- Development of a mining tax regime that is stable, progressive and seals the loopholes of IFFs, especially transfer pricing.
- Zambian government needs to review and/or terminate tax incentives given to mining companies, especially those proven to address the tax dodging tactics.
- Create comprehensive frameworks for evaluation of integrity compliance in a broader manner.

The **2nd paper by D. Awunyo-Vitor** is dealing with the research question relating to the impact of climate change on agricultural productivity and food security, in order to identify the factors that influence the choice of climate change adaptation strategies among the maize farmers in the Upper East Region of Ghana. Evidence shows that changes in climate affect cropping systems, distribution, domestic food mix and livelihood

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diversification, as well as migration patterns and food security. Therefore, perceptions of farmers about climate change and their responses thereof, with regard to adaptation strategies, play significant roles in addressing low productivity and, by implication, food insecurity in the region. Thus, this paper examines maize farmer's choice of climate change adaptation strategies in the Upper East Region of Ghana. It discusses formal education, experience, income and credits as the primary preconditions for African farmers' capabilities to productively adopt and implement climate change adaptation strategies, especially in regard to sustainable maize production in the Upper East Region of Ghana. The thrust of this contribution is that the four factors, formal education, experience, income and credits, are strongly correlated in shaping maize farmers' decisions to use climate change adaptation strategies in improving productivity and food security.

A multi-stage sampling technique was used to sample 200 farmers in three districts in the Upper East Region. Descriptive statistics, Heckman two-stage procedure, was adopted to analyse empirical data. A three-stage sampling procedure was employed to select respondents for the study. In the first stage, a purposive sampling procedure was used to select two districts based on harsh climatic condition, severity of food security and the level of agricultural activities, especially maize production in the area. The second stage employed simple random sampling technique to select five communities from each district. At the third stage, simple random sampling techniques were used to select 20 maize farmers in each community as respondents. A semi-structured questionnaire was used to collect data from the 200 respondents.

Farmer's adaption to climate change and the choice of adaptation strategies was conceptualised in farmer's decision-making process, which is itself a two-stage process. At the stage one (1), a farmer may decide to adapt to climate change or not which may result in two mutually exclusive alternatives. At the second stage, a farmer may decide on the type of adaptation strategies to use which may result in a number of mutually exclusive alternatives. The paper computes the farmer's decision to use climate adaption strategies through regression model, which is established through a series of equations, the empirical model for estimation, costbenefit assessment, multinomial logit model, coefficient, probity estimate, inverse mills ratio, probability density function, cumulative distribution function and standard normal distribution.

The paper suggests that farmers perceive that climate change does exist. It reveals that farmers generally used improved maize varieties, irrigation and soils conservation as climate change adaptation strategies. The regression results show that the levels of formal education, income, credit and experience are critical in farmers' using climate change adaptation strategies. In the short term, policies aimed at educating farmers about the effects of climate change on their farming activities are necessary for sustainable productivity and food security. Furthermore, improving income for the farmers and encouraging access to credit would improve farmers' use of climate change adaptation strategies for sustainable maize productivity and food security.

Based on the descriptive statistics, the author concludes that the majority of respondents are aware of the rising temperatures and low erratic rainfall pattern over the past 10 years. Generally, they believe the changes in the climatic condition are partly responsible for low agricultural productivity in the region. Three major adaptation strategies are used by the farmers as coping mechanisms, and they are: improved maize variety; irrigation and soil; and, water conservation methods. Based on the multinomial logit results, education and access to funds can play a key role in the farmer's choice of climate change adaptation strategies. The paper recommends as follows:

- To ensure sustainable agricultural productivity, farmers need to be educated on the changing climatic conditions and the appropriate adaptation strategies, particularly the use of improved maize varieties.
- Create demonstration farms in order to showcase the yields of improved maize varieties and how effective they are as responses to climate change.
- Enhance farmer's access to funds either through increased income or credit in order to support the use of adaptation strategies for sustainable agricultural production.
- Link farmers to secure and ready market for their produce.
- Reduction of the fluctuation in prices of both inputs and produce to ensure stable profit for farmers.
- Encourage lending institutions, particularly rural banks, to offer credits for farmers and to support their use of adaptation strategies, particularly that for improved maize varieties.

The **3rd paper by D. Awunyo-Vitor & D. Ziba** evaluates the impact of irrigation schemes on farmers' income in northern Ghana as a means of developing sustainable livelihood. It identifies factors that influence farmers' decisions to participate in the irrigation schemes as well as the latter's impact on their income in

northern Ghana. Having identified household size and access to credit as key factors in influencing farmers' decision to adopt the irrigation schemes, the paper reveals that the latter has a positive impact on farmers' income.

A multi-stage sampling technique was used to obtain 180 respondents for survey. At the first stage, two districts namely, Kansena-Nankana and Bongo Districts were purposively selected for the study. The selections of the districts were guided by the level of irrigation farming activities present. At the second stage of sampling, three (3) communities noted for irrigation farming were randomly selected from each of the two districts. The third stage of sampling involved the use of simple random sampling to select 30 respondents from each community. Respondents were randomly selected from both irrigators and non-irrigators. A total of 90 respondents were sampled in each of the two districts, computing to an overall total of 180 elements for the study. The Logit estimation and Propensity Score Matching (PSM) were applied to analyse the impact of irrigation schemes on farmers' income as a key livelihood outcome.

The Logit result indicates that household size, and access to credit is the factors that significantly influence farmers' decision to participate in irrigation schemes. The results show that labour availability is not an important factor influencing households' decision to participate in irrigation farming in the study area. Also, years of experience are critical in decision-making about participation in irrigation farming. Furthermore, the results suggest that there is a significant difference in the average inputs used by the two groups of farmers, irrigators and non-irrigators, at 5% level.

The Logit model was used to generate propensity scores for the matching algorithm, which is statistically significant at a *P*-value of 0.000. The Logit regression revealed that variables such as the household size, years in schooling, family labour, land acquisition, cultivated land size, access to credit and produce price affect the probability of participation in irrigation farming significantly. The paper finds that family labour has negative but significant relationship with farmer's decision to participation in irrigation farming. Farmer's perception on land acquisition process also has negative but significant relationship with their decision to use irrigation facility. The result shows that farmers who perceived acquisition of irrigated land as cumbersome are less likely to use irrigation facility. Also, market access for inputs is statistically significant, at 5% level of significance, and it positively affects the irrigation participation of farmers. Furthermore, the paper suggests that access to credit had a positive and statistically significant, at 5% significance level, relationship with irrigation participation, suggesting that farmers with credit availability have higher opportunities to be engaged in irrigation schemes than otherwise. Finally, PSM results indicate that irrigation has a significant impact on the farmers' income of irrigators.

Both the Nearest Neighbor and the Kernel matching methods indicate that irrigation schemes play an important role in farmers' income and livelihoods, a conclusion supported by the Propensity Score Method (PSM). Comparing the results across the different matching methods indicates that the estimated irrigation impact is robust. The authors recommend the following:

- Expansion of the irrigation area.
- Encouraging farmers to participate in irrigation farming.
- Improved access to credit and farm inputs for farmers.

The **4**th **paper by T.J. Ramonyai & C.C. Ngwakwe** points out that corporate environmental responsibility has been under discussion for many years; however, there is still no clear global understanding of what it means. Even with evidence that environmental investment is beneficial to corporations there is still hesitation and reluctance from some corporations. Also, there are limited studies in South Africa on the relationship between environmental performance and corporate turnover in the SRI index companies. This paper holds that the worsening environmental changes, due to industrialisation and human activities, threaten life and the entire ecosystem. The following research questions were formulated:

- What is the relationship between carbon emission reduction and corporate turnover?
- What is the relationship between water reduction and corporate turnover?
- What is the relation between waste reduction and corporate turnover?

Data for this paper was collected from socially responsible firms in the Johannesburg Stock Exchange's Socially Responsible Index. Archived data from sustainable development reports of 2011 to 2015 of the sample, were analysed using simple regression. Environmental performance is represented through proxies such as carbon, water and waste reduction.

Corporation eligibility criteria for inclusion and analysis in this paper is that firm has to be:

- a corporation in business within South Africa;
- JSE-listed; and,
- top performing in corporate social investment.

The target population includes all the 61 corporations listed in the JSE responsible investment index. Judgmental or purposive sampling was chosen because the paper needed information from the top performing corporations in SRI in JSE-listed companies for year 2015. The sample was made up of the top 30 performing companies out of the 61, which is about 49% of the entire population. Data collection method was archival; and, it included carbon emission, water usage, waste reduction and firm turnover.

The findings show the existence of a significant relationship between corporate environmental performance and firm turnover. Through the Johannesburg Stock Exchange's Socially Responsible Index, the paper establishes that the relationship between corporate environmental performance and firm turnover is significant and negative for water reduction whilst that for carbon and waste reduction is positive.

The paper concludes that financial performance could be the driver for corporate environmental efficiency. Also, it shows that the relationships between variables analysed are generally significant with a *p*-value of less than 0.05. The statistical analysis of the data from the five sample companies reveals a negative relationship between water reduction and corporate turnover as well as a positive one between carbon dioxide and waste reduction on firm turnover. Importantly, the paper highlights the fact that sectorial differences play an important role in shaping these relationships. The paper recommends that:

- Corporations should take responsibility for their actions;
- Balance to be struck between pursuing economic growth and preserving the environment;
- Conducting further studies that are qualitative and/or a combination of both; and
- Studying of carbon reduction, waste reduction and water reduction against a variety of financial performance variables, beyond firm turnover.

Investment activities can promote technical progress through the introduction of new technology and reduce poverty by creating increased rates of employment. In the long run, investment activities can create new capital goods. Investing in fixed capital stock can accelerate economic growth. The **5th paper by T. Ncanywa**, **I. Mongale & M. Mphela** investigates the determinants of investment activity in South Africa on the backdrop of the generally accepted assumption that investments in new technologies create new capital goods, grow the fixed capital stock, improve technical progress and production process, accelerate economic growth, generate employment and reduce poverty.

The paper uses the Johansen Cointegration and Vector Error Correction model; and, it finds the longand short-run relationship on the time series data. Times quarterly data (1994-2015) was sourced from the South African Reserve Bank (SARB). The paper estimates the linear model wherein the ratio of GFCF to GDP was used. The stationarity test is estimated with Augmented Dickey Fuller (ADF). Phillips Perron (PP) test were also employed to confirm the results of Augmented Dickey Fuller (ADF).

The paper suggests a positive relationship between economic growth, interest rate, inflation and investment, as well as a negative relationship between taxation and investment. However, the relationship between taxation and investment is negative, indicating that investment activity can be explained by tax, economic growth, interest rates and inflation. The Johansen cointegration analysis indicate that there is one cointegrating equation, implying the presence of a long run relationship amongst the variables and that in the long run, investment will be expressed by an explanatory variable in the model. The Vector error correction model (VECM) trace test shows that there is at least one co-integration equation, allowing for the distinction between short and long term effects of variables to be made.

The estimated equation derived from the normalized co-integration coefficient reveals that interest rate and investment have a positive long run relationship. However, the flexible accelerator theory of investment indicates that when the cost of capital is high, private investors do not go for borrowing which will discourage investment. However, the paper shows that in South Africa when interest rate increases, the level of investment tend to increase. Furthermore, the paper shows that there is a positive relationship between investment and availability of credit, inflation rate and economic growth in South Africa, in line with studies on determinants of investment.

The paper concludes that low taxation would allow for increased availability of credit facilities, enhanced investment activity and improved economic growth. Corporate income tax increases the cost of capital

and, simultaneously, discourage the level of investment. The paper recommends that:

- The South African government should ensure availability of credit in the economy;
- Government should ensure that the economy is growing in order to attract potential investors; and
- Government should put in place a reasonable tax rate, as low as possible because low taxation would mean growing economy and increasing availability of credit to boost investment activity.

The purpose of the **6th paper by N. Obiamaka & O. Akintola** is to assess the level of sustainability reporting of companies in the industrial goods sector of Nigeria as well as the influence of audit firms on sustainability disclosures. It also examines whether the sustainability disclosures of companies can be influenced by their audit firms. The paper finds that companies with big financial audit firms have higher levels of sustainability disclosures in economic, environmental, governance and social domains. Regulation of companies is portrayed as the necessary intervention for improving environmental and social sustainability reporting.

A number of studies assess the extent of sustainability reporting using internationally recognised guidelines such as Global Reporting Initiative (GRI) and United Nations Global Compact (UNGC). The majority of the existing studies focus on developed countries, and there is dearth of research on developing economies. Nigeria is a developing country and there is an obvious need for research on sustainability reporting due to transparency and disclosure issues of companies that have been the subject of debate since the financial crisis. Studies on sustainability reporting could provide useful information about environmental, economic and social performance of organizations. Accordingly, this study attempts to achieve two main objectives. The first objective is to assess the level of sustainability reporting of industrial goods companies in Nigeria over the sustainability reporting of industrial goods companies in Nigeria over the same period.

The paper is focused on the 24 companies in the industrial goods sector of Nigerian Stock Exchange (NSE), which produce goods for commercial purposes. Eleven of these companies were sampled. The level of sustainability reporting was determined using disclosure occurrence method, a form of content analysis, where indicators of economic, environmental, governance and social disclosures were identified from corporate annual reports. A one-way between-groups Multiple Analysis of Variance (MANOVA) was used to examine whether companies audited by big four accounting firms and non-big four accounting firms differ in terms of the four aspects of sustainability reporting. Preliminary assumption testing was conducted to check for normality, linearity, univariate and multivariate outliers and multicollinearity.

The results show that, on average, the level of sustainability disclosures increased from 2010 to 2014; and, companies having one of the big four audit firms as financial auditor, have higher sustainability disclosures than companies that do not. Based on the 95% confidence level, a significant difference between big four and non-big four audited companies is found on the combined dependent variables, namely: economic, environmental, governance and social disclosures. This implies that the difference in the disclosures of companies audited by one of the big four and those audited by others was significant.

The paper suggests that Nigerian industrial goods companies disclose an average of 22.36 out of 43 disclosure items. Companies reported very few information about environmental indicators of sustainability; and, they reported more economic and governance disclosures in scope and details unlike social and environmental disclosures. The paper points to the need for mandatory sustainability reporting guidelines for industrial goods and manufacturing companies in general. Therefore, the paper recommends that the Securities and Exchange Commission (SEC) needs to monitor companies' reporting to ensure that stakeholders have adequate information on sustainability performance.

Environmental and social cost accounting offer an alternative account of significant economic entities. It has the potential to expose the tension between pursuing economic profit and the pursuit of social and environmental objectives. The **7th paper by C.O. Onwubiko** assesses the impact of environmental and social cost on the performance of five randomly selected manufacturing companies in Nigeria. The paper presents environmental/social cost accounting as an alternative to financial accounting because it exposes the entrapments with economic profits. The paper sets out to determine the significance of the relationship between Environmental and Social Costs (ESC).

The data for the study were collected from annual reports and accounts of five randomly selected manufacturing companies for 2013. Content analysis and Multiple Regression Analysis (MRA) were used to analyze data obtained from the companies. The paper reveals a significant relationship between

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environmental/social cost and return on capital employed (ROCE) and earnings per share of manufacturing companies.

It can be deduced that apart from Return on Capital Employed and Earnings per share, all other predictor variables have no significant influence on the Environmental and Social Cost of the organizations. The paper asserts that realisation of this relationship is dependent upon government enforcement of adherence to environmental laws among companies. In Nigerian, most of the companies, especially quoted companies disclose environmental and social cost incurred during the year in their directors' report. Others include them under corporate social responsibility. The author recommends that:

- Government has to ensure complete adherence by companies to disclose their environmental and social elements in their financial reports;
- Government should ensure complete adherence to environmental laws by companies in Nigeria;
- Director/CEOs of companies should ensure that their entities comply with the environmental laws of our country; and
- Merit awards should be given to directors and companies who comply with the environmental laws.

The **8th paper by N. Obiamaka, O. Akintola, I. Francis & N. Matthias** examines the relationship between firm size, financial performance and climate change disclosures. The authors assess the determinants of climate change disclosures of industrial goods companies in Nigeria, with the objective of examining the effects of firm size and profit on climate change disclosures. The research question asked is: What factors predict the likelihood that companies would disclose information pertaining to climate change?

Secondary data was gathered from annual reports of 11 sampled companies, out of a total of 24, from the industrial goods sector of the Nigerian Stock Exchange for the period 2010 to 2014. The criteria for including companies in the sample are: company was not delisted from the NSE during 2010 to 2014 period; company published a full annual report; and, company was listed on the NSE in year 2010. Data pertaining to climate change disclosures were collected from annual reports of the eleven companies. The annual reports accessed for each company was for 2010, 2011, 2012, 2013 and 2014 periods.

Content analysis was used to analyse the sampled companies' annual reports and climate change disclosures were measured using eight indicators: risks or opportunity posed by climate change; financial implications of the risk or opportunity posed by climate change; costs of actions taken to manage the risk and opportunity; materials used that are from recycled materials used to manufacture the organization's primary product and services; fuel consumption, fuel consumption from renewable energy, electricity/heating/cooling/steam consumption; gross direct GHG emissions in metric tons of CO2 equivalent; NOx, SOx, Persistent organic pollutants, Volatile organic compounds, Hazardous air pollutants, Particulate matter, other standard categories of air emissions identified in relevant regulations; and, waste and disposal method. Also, logistics regression was computed to assess the impact of company size and profitability on the likelihood that companies would disclose information pertaining to climate change.

The results indicate that company size predicts the likelihood that companies would disclose climate change information. Also, the results reveal no evidence of the ability of company profitability to predict the likelihood that companies would disclose climate change information. The authors conclude that companies need to disclose climate change information irrespective of their size because during business operations both small and large companies are involved in contributing to climate change problems. Larger companies have financial resources to embark on innovative ways to disclose corporate information. The paper recommends regulation and enforcement of the disclosure as a requirement.

The **9th paper by J.P. Tsheola, T.M. Ramoroka & M.P. Sebola** holds that participation of developing economies, such as that of South Africa, in business globalisation and offshore economy is compromised and predetermined because they do not possess "structural power". The latter, the authors argue, is necessary for securing purchasing power, investments for creation of products and generation of employment for the "national" private economies. Under the contemporary capitalist mode and materialistic structure of production, business globalisation and offshore economies, countries are required to establish themselves as "competition" states in order to influence global financial markets and to serve their selfish "national" private economy interests of employment creation. This paper argues that South Africa has not established a "competition" state necessary for possession of "structural power", with the result that its participation in business globalisation has not served the "national" private economy through creation of employment.

The paper has conveniently selected 15 countries, inclusive of South Africa, across the four Human Development Index (HDI) categories, as determined in the 2015 United Nations Development Programme, of "very high", "high", "medium" and "low". Together with the 15 observations, 28 variables covering a wide spectrum of the "national" economy were selected for Principal Component Analysis (PCA). The linkages of business globalisation and offshore financial markets with the geographic enclaves of "competition" states for the establishment of "structural power" as well as investments, creation of products and generation of employment within "national" private economies, involve such complexities.

The authors note that the predominance of business globalisation and offshore financial markets has led to the redefinition of state sovereignty in ways that allowed for the existence of spaces that are not regulated by governments. The paper recommends as follows:

- That South Africa establishes itself as a "competition" state because the environment of business globalisation and offshore financial markets is ubiquitous and imperative.
- That South Africa uses state intervention to invent its "structural power" in order to lead in the creation of improved business confidence and support of a conducive investment climate.

Finally, the 10th paper by J.P. Tsheola & S.O. Makhudu seeks to address the question whether South Africa's high unemployment, low economic growth, suboptimal investment and less than ideal business confidence are a result of "financialisation" of the economy. The world economy is in the state of "chicken-andegg" scenario wherein low economic growth is assumed to be the cause of unemployment problems that can, in return, be resolved by increased wages and consumption power, which are all in short supply, thereby discouraging investments due to lowered business confidence. There is a notion that national and local measures such as imposition of austerity would not resolve the problems because they require reordering of the global economy, which is itself difficult as no single state would be willing to be the first to act amidst contend and despondent international institutions. Adherence to neoliberalism and establishment of strong institutional frameworks have seen a democratic South Africa run a full circle as its experiences provide illustrations related to these world economy conundrums. The South African economy has increasingly divested from all other sectors for concentration into the financial industry in a phenomenon denoted "financialisation". The authors contest that the suggestion that the emergence of "financialisation" has implied that earnings would remain an uncontrollable instrument for the perpetration of poverty and inequality in emerging economies. Instead, it asserts that the dominance of the financial sector in emerging economies is an inherent paradoxical self-serving character of capitalist development.

The paper uses a combination of research techniques, inclusive of literature review, scholarship synthesis and descriptive statistics to demystify the role of "financialisation" in the "national" economy. Through scholarship synthesis, the paper examines the debate on "financialisation" in the contexts of neoliberalism, the economics of capitalism, employment, earnings as well as industrial disputes. Literature review techniques are used to source existing secondary data, which is then manipulated for presentation in graphs and analysed in descriptive statistics.

Discounting community services, which is dominated by the public-sector employees, the mining sector remains one prominent consideration of note in terms of the "productionist" economy and the involvement of employees in industrial strikes over wages, bonus and such other compensation. With the exception of community services, it could be argued that mining industry with its fewer employees as per 2016 and 2017 employment statistics has experienced the second most industrial disputes to transport in the rest of the South African economy during 2014 and 2015. Given that the Department of Labour reports that industrial strikes were largely caused by wage, bonus and other compensation disputes, the analysis provides for the deduction that the four largest employers (community services, finance industry, wholesale and retail trade and manufacturing) offer relatively reasonable wages. This deduction could be more valid for the finance industry where in 2015 there were no strikes nor loss of working days and hours, owing to wage, bonus and compensation disputes. Being the second largest employer in the rest of the South African economy, the finance industry has evidently absorbed employees with "financialisation". To this extent, "financialisation" of the economy is not necessarily the primary reason for the South African society's unemployment and inequality. Therefore, "financialisation" in itself is not a problem because investment in the financial sector are associated with relatively significant employment numbers in the South African economy as a whole.

The authors conclude that the notion of unemployment, poverty and inequality being caused by "financialisation" of the South African economy insinuates that these social ills are new to capitalist society. The paper corroborates the observation that the organisation of capitalism is, by its nature, based on the separation of the owners of capital from the proletariats in ways that allow for selective discrimination of the

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latter in order to source their social value for profit. The paper, therefore, characterises "financialisation" as a hybrid of capitalist reflexivity and offers three fundamental recommendations:

- That the state has to take full responsibility of providing appropriate educational training for old labour force in order to create abundance of a cohort for the "productionist" base of the economy.
- That the state invests directly in the "productionist" economy and desist from continued wasteful bailouts of "luxury" SOEs such as SAA.
- That the state moderates the public discourse rhetoric that has the potential for naturalisation and constitutive effects of creating artificial realities such as "radical" in economic transformation.

N. Delener, Ph.D. Editor-in-Chief

NOTE FROM THE EDITORS

As an interdisciplinary indexed journal, *The Journal of Global Business and Technology (JGBAT)* serves academicians and practitioners in the fields of global business and technology management and their related areas. JGBAT is also an appropriate outlet for manuscripts designed to be of interest, concern, and applied value to its audience of professionals and scholars.

Readers will note that our attempt to bridge the gap between theory and practice has been successful. We cannot thank our reviewers enough for having been so professional and effective in reiterating to contributors the need to provide managerial applications of their research. As is now obvious, the majority of the articles include a section on managerial implications of research. We wish to reiterate once again our sincere thanks to JGBAT reviewers for having induced contributors to answer the "so what?" question that every *Journal of Global Business and Technology* article is required to address.

Thank you for your interest in the journal and we are looking forward to receiving your submissions. For submissions guidelines and requirements, please refer to the Manuscript Guidelines at the end of this publication.

N. Delener, Ph.D., Editor-in-Chief Dana Lascu, Ph.D., Managing Editor

NOTE FROM SPECIAL ISSUE EDITORS

The Special Issue is framed on the notion of the irony of Africa being one of the wealthiest continent whilst it is simultaneously home to the poorest people in the world. Generally, Africa's wealth is measured through its natural endowment, which is not necessarily realised in the value-adding processes. The Special Issue's primate contribution to the literature is that value-addition processes that have historically guaranteed plundering of Africa's wealth have continued unabated, albeit in variously modified forms. The Issue sets out to examine the matrices within which this wealthy continent is pauperised through illicit financial flows, sustainability accounting and reporting, as well as "financialisation" of the economy, among other processes and factors. Also, the Special Issue analyses the relationships of formal education, experience, income and credits with farmers' capabilities of adopting and implementing climate change adaptation strategies for productivity and food security. It further examines the use of Africa's natural capital, such as land for farming, in generating income.

Makwembere & Kangamungazi's paper examines illicit financial flows in order to demonstrate that they impose a heavy cost on African nations' resources. It uses the case of mining and timber extractive industries in Zambia to highlight the absence of systems integrity and corruption that condone, if not promote, widespread illicit financial flows.

Awunyo-Vitor discusses formal education, experience, income and credits as the primary preconditions for African farmers' capabilities to productively adopt and implement climate change adaptation strategies, especially in regard to sustainable maize production in the Upper East Region of Ghana. The thrust of this contribution is that the four factors, formal education, experience, income and credits, are strongly correlated in shaping maize farmers' decisions to use climate change adaptation strategies in improving productivity and food security.

Awunyo-Vitor & Ziba's paper identifies the factors that influence farmers' decisions to participate in the irrigation schemes as well as the latter's impact on their income in northern Ghana. Having identified household size and access to credit as key factors in influencing farmers' decision to adopt the irrigation schemes, the paper reveals that the latter has a positive impact on farmers' income.

Ramonyai & Ngwakwe examine sales turnover effect of environmental performance, wherein the latter is represented through proxies such as carbon, water and waste reduction. The paper uses the Johannesburg Stock Exchange's Socially Responsible Index to establish that the relationship between corporate environmental performance and firm turnover is significant and negative for water reduction whilst that for carbon and waste reduction is positive. The authors are satisfied that financial performance could be the driver for corporate environmental efficiency.

Ncanywa, Mongale & Mphela investigate the determinants of investment activity in South Africa on the backdrop of the generally accepted assumption that investments in new technologies creates new capital goods, grows the fixed capital stock, improves technical progress and production process, accelerate economic growth, generates employment and reduces poverty. The paper finds a positive relationship between economic growth, interest rate, inflation and investment, as well as a negative relationship between taxation and investment. The paper concludes that low taxation would allow for increased availability of credit facilities, enhanced investment activity and improved economic growth.

Obiamaka & Akintola evaluate levels of sustainability reporting among industrial goods sector companies in Nigeria as well as the influence of audit firms on sustainability disclosures. The paper finds that companies with big financial audit firms have higher levels of sustainability disclosures in economic, environmental, governance and social domains. Regulation of companies is portrayed as the necessary intervention for improving environmental and social sustainability reporting.

Onwubiko assesses the impact of environmental/social cost on performance of fiver randomly selected manufacturing companies in Nigeria. The paper presents environmental/social cost accounting as an alternative to financial accounting because it exposes the entrapments with economic profits. In the final analysis, the paper finds a significant relationship between environmental/social cost and return on capital employed and earnings per share of manufacturing companies. However, the paper asserts that realization of this relationship is dependent upon government enforcement of adherence to environmental laws among companies.

Obiamaka, Akintola, Francis & Matthias assess the determinants of climate change disclosures of industrial goods companies in Nigeria, specifically the effects of firm size and profits on climate change disclosures. The paper finds that company size predicts the likelihood that companies would disclose climate change information and no evidence of company profitability predicting likelihood of disclosures. The observation that the majority of companies listed on the Nigerian Stock exchange had no climate change disclosures meant that the stock market regulator should enforce regulation among industrial goods sector companies.

Tsheola & Makhudu a generally accepted economic logic holds that low economic growth is the cause of unemployment problems which, in return, requires increased wages, purchasing and consumption power that are in short supply, thereby discouraging investments owing to lowered business confidence. The paper accepts that South Africa too is captivated by the "financialisation" phenomenon wherein there is increasing divestment from other industries for concentration into the financial sector, which has allowed for the conclusion that financial earnings have therefore served to perpetuate poverty and inequality in emerging economies. The 2016 and 2017 evidence demonstrate that South Africa's financial sector provided for the largest employment and earnings of all industry. The paper argues that the divestment from the "productionist" sector is directly related to the educational training challenges in society rather than "financialisation" per se.

Tsheola, Ramoroka & Sebola examine the sophisticated capitalist system of large financial institutions seeking for profits through complex management of money, amalgamation and investments under business globalisation and offshore economies in order to determine that the compromised participation of countries such as South Africa is predetermined because they do not possess "structural power". The latter, the paper argues, is necessary for securing purchasing power, investments for creation of products and generation of employment for the "national" private economies. Under the contemporary capitalist mode and materialistic structure of production, business globalisation and offshore financial markets, countries are required to establish themselves as "competition" states in order to influence global financial markets and to serve their selfish "national" private economy interests of employment creation. The paper concludes that South Africa does not possess "structural power", hence unemployment and dependence on welfarism are ingrained in the societal fabric.

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ENHANCING PUBLIC INTEGRITY SYSTEMS TO COMBAT ILLICIT FINANCIAL FLOWS AND IMPROVE FINANCIAL SUSTAINABILITY IN ZAMBIA'S MINING AND TIMBER EXTRACTIVE INDUSTRIES

Sandra Makwembere and Edmond Kangamungazi

ABSTRACT

This paper presents illicit financial flows scenarios in Zambia's mining and timber extractive industries and suggests ways to enhance integrity systems to combat the apparent corrupt practices. Research reveals staggering losses of revenue in Africa as much as US\$50 billion per year through illicit financial flows. In Zambia, the picture of illicit financial flows is just as disquieting as that for the continent. The paper recommends that more comprehensive integrity systems are necessary in governing the behaviour around national resource misuse connected to illicit financial flows.

Keywords: Integrity systems, illicit financial flows, extractives industry, sustainability, Zambia

INTRODUCTION

In recent years, there has been heightened concern with the extent of illicit financial flows in Zambia and the associated negative effects such as hampered economic development and continued financial dependency. Zambia was once counted as one of the top 10 fastest growing economies in Africa but today the economy is struggling to maintain this status. Between 2010 and 2014, the Zambian economy enjoyed an average annual growth of 7%. This has now fallen to around 3% by 2016 (Chikwanda, 2016). The present reality is that there are resource outflows occurring which are compromising economic growth potentials. There is wide consensus that Illicit Financial Flows (IFFs) are undermining and impeding accelerated human and economic development of the country (Tax Justice Network, 2016). However, comprehensive strategies to eliminate them are yet to be developed, tested and sustained. The resources that could have been invested in social and economic projects by the government instead become part of personal and company beneficiation due to inadequate controls.

Weak transparency and governance systems have contributed to inadequate democratic scrutiny on several key aspects of mining and timber. The mining sector characteristically remains shrouded in secrecy and the timber industry is poorly regulated. The existing public integrity systems face a range of limitations which,

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in the context of IFFs, have resulted in compromised development agendas. For example, Members of Parliament are not allowed access to the contents of mining contracts (sometimes referred to as Private Partnership Agreements or Development Agreements) and the government of the Republic of Zambia (GRZ) has no standard criteria for the mines it signs with, making it extremely difficult for them to influence specific items in the contracts. Further, the Ministry of Mines and Mineral Development and Ministry of Finance and National Planning have found it difficult to adequately monitor, audit and regulate the mining industry for various reasons (some legislative others structural). This has consequently provided incentives for maladies such as corruption and exacerbated tax avoidance observed in the sector (Fraser & Larmer, 2010; Organisation for Economic Co-operation and Development, 2012).

Extractive industries could contribute more to Zambia's economic development and provide opportunities for foreign investment and private sector development. Without IFFs, these industries could generate much-needed government revenues, foreign exchange earnings and quality employment. However, eliminating IFFs would mean massive transformation of the sector. Experience shows that the presence of extractive industries in a country often breeds underdevelopment, land displacement, violation of human rights, poverty, environmental degradation, health, and social problems, including conflict. Eliminating IFFs would at least increase the amount of resources for the country's use but it cannot be expected that it would get rid of the other ills associated with these industries.

This paper uses the mining and timber industries to present the illicit financial flows situation in Zambia's mining and timber extractive industries and gives an overview of integrity systems that have a bearing on the IFFs situation in these industries. The strengthening of integrity systems holds promise to contribute to reducing the channels through which resources are lost. What follows is a brief discussion of descriptions of illicit financials to provide a background to a subsequent section on the IFFs phenomenon in the mining and timber industries. The paper concludes with recommendations to strengthen existing integrity systems in light of the IFFs situation.

CHARACTERISTICS AND DRIVERS OF ILLICIT FINANCIAL FLOWS

The different descriptions offered on what illicit financial flows are suggest some ambiguities around the concept. Depending on the narrowness or broadness in a definition, this arguably impacts on the facts on the actual realities of this kind of exploitation. Already, studies admit to working with estimates as the issues of IFFs overlap with those of other complex phenomena such as corruption. Some definitions include complex concepts such as corruption in their descriptions.

The Global Financial Integrity (GFI) describes IFFs as illegal movements of money or capital from one country to another (GFI, 2016). This movement is said to be an illicit flow when the funds are earned, transferred and/or utilised illegally (GFI, 2016). Illicit financial flows are described to involve "the transfer of money earned through activities such as corruption, transactions involving contraband goods, criminal activities and efforts to shelter wealth from a country's tax authorities" (Kar & Cartwright-Smith, 2008, p.1).

IFFs and capital flight are at times used interchangeably, however, the terms are different. Capital flight relates to capital outflows in places where "distortionary impact of domestic policies and political instability" (African Development Bank & Global Financial Integrity, 2013, p.21) are occurring. These outflows are not necessarily illegal. IFFs include capital flight as well as other kinds of financial flows such as using transfer pricing to evade tax or paying for smuggled imports (Ndikumana, Boyce & Ndiaye, 2015).

Concerning the issue of illegal versus illicit activities, debates exist as to whether all IFFs can be labelled as illegal. Activities may be illegal but not necessarily illicit (Reuter, 2012) particularly where the prescripts of the law are not broad enough to capture the activities as such. This dimension adds complexity to IFF discussions. In relation to public integrity systems, the characteristics of IFFs become important to guide responses and institute systems that have pre-emptive processes because the scope of their mandate is relevant for the nature of the problem (broad or narrow) being addressed.

It is not easy to capture the drivers of IFFs. Some studies have found corruption, budget deficits and even inflation to be drivers (Kar, 2010). These drivers often interact in complex ways. Kar (2010) found that they can be economic, structural and governance related not simply policy related. The complexity of IFF

drivers therefore makes it necessary to use a combination of reforms to curb the problem. Integrity reforms are one such aspect.

ILLICIT FINANCIAL FLOWS PHENOMENON IN ZAMBIA: MINING AND TIMBER INDUSTRIES

The forms of resource losses suggest weaknesses in public integrity. These weak standards lead to choices and decisions with adverse effects.

Mining Industry Pillages

The mining industry accounts for about 12% of Zambia's GDP and almost 70% of its total export value. The country's rich mineral resources have long been a significant source of government revenue (Lumamba, 2011), however, by its own admissions, government has not been able to harness this wealth for the benefit of the people. Government has faced numerous challenges to deal with mining projects which are typically characterized by various stages and different kinds of taxes or government revenue can be collected at each stage within the existing frameworks.

According to reports, about US\$8.8bn has been illegally siphoned from the country over a 10-year period, most of it ending in offshore banks and tax havens (Kar, 2015). The High Level Panel on Illicit Financial Flows report has so far noted that Zambia is, every year, losing around \$2 billion in corporate tax avoidance, \$264 million in tax evasion and an unspecified amount in tax incentives. Most of the lost money was traced to copper mining and trade mispricing (United Nations Economic Commission on Africa, 2015). Zambia's Capital flight per capita in 2010 was at \$1,336, Trade mis-invoicing appears as a major conduit of capital flight for instance Zambia import mis-invoicing contributing to about 37.8% (United Nations Development Programme, 2013). IFF and differential treatment are the most important factors limiting the contribution of this important sector to the development of the country. There are numerous ways for the transnational corporations, in this case mining companies, to avoid tax. Two can be identified: (i) legitimately; and, (ii) via illicit means. Legitimate ways include using tax-avoidance schemes, demanding tax concessions and negotiating low royalty rates on output. Illicit ways can involve false accounting, such as falsifying invoices, mispricing the transfer of goods and services, mispricing financial transfers and illicit transfers of cash. As a result, the amount of revenue exiting the country can be vast at any point in time.

Seemingly, legitimate methods may not always be what they seem. Given the personal rewards to be made, particularly from extracting natural resources such as copper, and gold, aspects like concessionary rates can be obtained by bribing corrupt ministers and officials. In recent years, legitimate means of evasion have been scrutinised. The country has seen some ostensibly legal tax-avoidance schemes being deemed by revenue authorities to amount to tax evasion, and are therefore illegal (Hogg, 2008). The changes in approach to dealing with these were necessary one and more scrutiny is still needed to enhance the integrity of governments interactions with the mining and other sector investors.

Existing weaknesses in transparency and governance contribute to continued secrecy, corruption and fraud in the mining industry. The case of Mopani mining company. Auditor General audit reports and the Mopani report of 2011 illustrate the extent of evasions mining. It stands one of the most significant report to point out gapping exploitation of weak systems and regulations in the mining sector (Grant-Thornton, 2011). Taking the issues highlighted from the report on transfer mis/pricing and falsification of importation invoices, these will be used to illustrate how IFFs in mining can have huge consequences for economic potential and reinforce the point that stronger integrity systems are needed to limit outflows.

Mopani is one of the nine major mining companies in the country. The audit that led to the Mopani report revealed pricing problems of a vast nature. For example, it found that Glencore AG determined the price of copper and some copper was sold under old contract terms leading to, for example, copper being sold at around 25% of official prices at London Metal Exchange. Unusual hedging patterns found also related to manipulations of prices. According to the report, while a company that may want to move taxable revenue out of the country will want to 'hedge' or enter into a long trem contract at the most favourable low point, such a

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hedge or long term contract would usually be established at the bottom of the price cycle. By doing this, a company that wants to move revenues out of the tax jurisdiction can ensure that it makes losses both when prices are rising and when they coming down again. A company wanting to lock high prices on the other hand, which is normally the case for true hedges, it will usually want to capture the increasing prices on the way up, as close to the top of the price cycle as possible. Such a company will want to hedge when it feels it is closing in on the top part of the price cycle. It may lose further revenue if the prices continue to climb, but it will earn money when prices start to fall all the way down the price cycle. In the case of Mopani, the hedging pattern amounted more to moving taxable revenue out of the country than true hedging. The issue appeared to be less about tax savings and more about transfering profits that were meant to be taxed out of the country.

The current status of transfer pricing rules is that considerable progress has been made to establish transfer-pricing capability in the Zambia Revenue Authority (ZRA). This is despite the fact that transfer-pricing regulations are yet to be finalised. The regulations were drafted by the ZRA and Ministry of Finance in 2012, with the support of the Organisation for Economic Co-operation and Development (OECD). Since then, the regulations have remained as not final at the office of the Ministry of Justice due to the dismissal of state lawyers following a strike in 2014 (Readhead, 2016). The regulations are expected to be published in 2016. The regulations require taxpayers to follow the transfer pricing methods in order of priority, and where they are unable to adhere to this order they must provide adequate justification. It is anticipated that even if not perfect, the finalised regulations can set clear expectations for taxpayers and the much needed guidance on transfer pricing documentation to enhance the efficiency and consistency of audit processes. This should provide integrity mechanisms a basis on which to correct irregularities. As it stands, without a finalized document, chances of enforcement and/or adherence are negligible.

Concerning the falsification of importation invoices, this involves over and under invoicing of goods and services. It results in the transfer of value across border and is a key technique in the misrepresentation of the prices of goods and services leading to the transferring of additional value between the importer and exporter. Recent Auditor General's reports reveal that the documentation of expenses was not on original invoices and in some cases no supporting documentation of transactions was found (Office of the Auditor General, 2013; Office of the Auditor General, 2014). With this, the company appeared to be using incorrect disposal proceeds for tax purposes. There were inconsistencies in profit or loss on disposal of fixed assets. Further, Mopani was using an accounting netbook value to calculate balancing allowances instead of using the income tax written value. The falsification meant that accountability about resources would be compromised.

Numerous other illicit and illegal elements exist in mining. Investigations have found round tripping, manipulations of cash flows, manipulation of financial statements, money laundering, employment of unnecessary expatriates to manipulate financials and earnings information and preferential treatment (Zambia Alternative Mining Indaba Report, 2015; Zambia Extractive Industries Transparency Initiative, 2015). The blatant irregularities and inconsistencies in production and revenue figures in the case illustrate incapacities of verification systems and also bring to question the integrity systems overseeing the transactions and relationships with transnational corporations. What is concerning is the seeming inactiveness of the government towards reports on cases and apparent lack of government commitment to provide direction and punitive measures that will be taken against mining companies who operate in ways that promote illicit financial flows.

Timber Industry Losses

The timber industry, often overlooked in IFFs discussions, is wrought with as many problems as the mining industry despite differences in revenue potential and systems of operation. A major problem with understanding the IFFs issues in the timber industry has been failure to put in place reliable forest monitoring systems. While mining has contributed to the Zambian economy through the extraction of various natural resources, renewable resources such as timber products contribute to the economy as well. At present, the agriculture, forestry and fishery sectors contribute around 10% to national income. The urgency to address the impacts of forest depletion and negative effects of IFFs in timber should be equivalent to that in mining where there is a depletion of valuable ores and minerals.

Zambia has witnessed an incredible increase in the exploitation of timber in recent years. A study by the United Nations Programme on Reducing Emissions from Deforestation and Forest Degradation (UN-REDD) programme found that in terms of physical products, industrial Roundwood, firewood and charcoal contributed

approximately US\$395 million a year to the Zambian economy. With regards to non-wood products, it estimated a contribution of about US\$115 million to the economy. These products included different plants for use in, for example, house construction, thatching, crafts and food or medicinal use. Combined, the physical products and non-wood products contribute approximately US\$510 million and as a contribution to the country's Gross Domestic Product, this translates to around 4% for the forestry sector (United Nations Programme on Reducing Emissions from Deforestation and Forest Degradation, 2016a, 2016b).

The value-add of forests spans far and wide, hence when IFFs are considered, whilst monitoring systems are still being strengthened, the reality is that major potential losses need to be prevented. As things stand, the contributions of forestry are overlooked. For example, the contributions to other sectors such as ecotourism or tourism are overlooked, hence much relating to forestry is unaccounted for and in view of IFFs, there is much that is being overlooked that relates to Zambia's forests. Figures might suggest low levels of IFFs in timber but more effort is required to understand forestry challenges and drivers of exploitation in order to curb IFFs in the sector.

Some detail is available to point to the nature of IFFs around forestry. The illegal exploitation of timber specifically has brought to light issues around improper even illegal transactions over timber and related to this, illicit outflows. In the last five years, the demand in timber has increased and with this, illegal timber transactions have also grown. Countries like China have been identified as main consumers. The rising price of timer can be said to contribute to illegal and illicit activities. With this, forest reserves are rapidly depleting (Schmidt, 2014).

The Forestry Department recognises 19 commercial tree species. The high value species include rosewood, teak, mukwa and mukula. The rare mukula species, for example, is being harvested by local communities and exported illegally to international consumers. The Zambia Forests Act of 1973 prohibits the harvest of trees without a licence but permits local communities to harvest forest produce for domestic use. Unfortunately, this provision has not prevented exploitation of trees as buyers of trees have gone around the legislation by getting the communities to harvest the trees and then buying from the communities. A forest concession license allows a holder a maximum monthly harvest of 400m3 of timber. Holders of concession licenses prefer to limit direct timbering through sawmilling and subcontracting local pitsaw groups to find suitable trees (Schmidt, 2014). The pitsaw groups are not formally employed by the license holder but cut the timber then sell to the license holders. Consequently, exporters of indigenous timber do not have to invest a lot of resources require for a production license. Sub-contracting of local groups is a common form of transaction to evade arduous licensing processes. The inadequate legal framework and poor oversight have contributed to the undesirable situation and continued informal practices leading to the depletion of forests. Centralised licensing processes have been found to attract illicit practices. For example, in the Eastern Province of the country, it was discovered that timber was being cut and transported to Tanzania on a daily basis (International Cooperation & Development, 2014). A 2014 Common Marker for Eastern and Southern Africa report on the study of timber trade in Zambia revealed that bribery was also a major problem in the industry.

In addition to the weak legislative and regulatory frameworks, over the last five years, ministry changes have affected the planning and functioning of the structure that carries the greatest responsibility of managing the country's forests, the Forestry Department. This has compounded issues in the forestry sector. In 2011, the Forestry Department, was moved from the Ministry of Tourism, Environment and Natural Resources and placed under the Ministry of Mines and Natural Resources. Before this, it had operated under the Ministry of Tourism, Environment and Natural Resources for 10 years. In 2012, that ministry became the Ministry of Mines, Water and Energy Development. The Forestry Department was then moved to the Ministry of Lands, Natural Resources and Environmental Protection. At present, the Forestry Department is still found under this ministry.

MINING AND TIMBER INTEGRITY SYSTEM CHALLENGES

Public integrity in Zambia is regulated through various pieces of legislation and institutions. These are in place to regulate unethical practices. The legislation includes the Anti-Corruption Act of 2012, the Zambia Public Procurement Act No. 12 of 2008, the Public Interest Disclosure (Protection of Whistleblowers) Act No. 4 of 2010 and the Competition and Fair Trading Act of 1994. The institutions such as the Anti-Corruption Commission have a mandate to monitor integrity. Together, the legal provisions and institutions deal with issues of corruption and give authorities varying levels of capacity to deal with integrity issues.

Mining Industry

In the mining industry, the main law governing the sector is the Mines and Minerals Development Act No. 11 of 2015. It deals with mining rights, licences, environmental protection, large-scale mining in the country, royalties and charges. The Ministry of Mines and Minerals Development is responsible for administering the industry. The Mines and Minerals Development Act gives primary powers to the Director of Mines, Director of Mining Cadastre, Director of Mines Safety and Director of Geological Survey. The Minister acts in a supervisory role over these Directors. When licences are issued, these go through the Mining Licence Committee in the Ministry of Mines. The exploration licence enables holders to carry out their exploration and their operations as necessary. The Act has given the state fairly more control of mining operations at each stage. Unfortunately, there are capacity challenges to overseeing every stage. Another important legislation is the Mines Acquisition (Special Provisions) Act which facilitates the acquisition of 51 per centum in the main copper mining companies by the government.

Other laws that have a bearing on the industry, for example, the Environmental Management Act No. 12 of 2011, the Citizenship Empowerment Act of 2006, the Lands Act of 1995, the Zambia Wild Life Act of 2015 and the Cooperatives Societies Act of 1998. Those that have implications for revenue include the Income Tax Acts, the Value Added Tax Act, the Zambia Revenue Authority Act of 2014 and the Business Regulatory Act of 2014.

Some of the mining industry incentives to attract mining companies to the country arguably pose challenges for integrity processes as they can create incentives for corrupt activities. These include:

- 100% capital allowances deductions are permitted for the mining sector which results in a loss of revenue;
- Mineral Royalty Rate on base metals of about 6% of the gross value (although there have been fluctuations in this rate);
- There is no limit on earnings externalisation; and,
- There is a zero percent withholding tax on dividends.

The mining sector has advanced mechanisms compared to the forestry industry, however, compliance is a major challenge.

Timber Industry

The main statutory instrument is the Forests Act of 1973 and the non-operational Forest Act of 1999 (the Minister did not pass the law). The 1999 Act provides for the Zambia Forestry Commission (which replaces the Forestry Department). There is a Draft Forest Policy and a new Forest Law is under consideration. Important regulations include the Forest (Timber Export) Regulations of 1997 (introduced to limit illegal logging for export), the Joint Forest Management Guidelines of 2005 and the 2003 Forests Regulations. The National Forestry Policy of 1998 was introduced to deal with illegal activities.

Some of the key challenges of the forest sector that have a negative bearing on integrity processes can be summarised as follows:

- An absence of adequate management tools leading to an emphasis on licensing as the main tool;
- Failures to implement the improvements of the Forest Act of 1999 and other regulations;
- Highly centralised decision-making processes;
- Short-term, unrealistic and centralised licensing processes entice people to seek for corrupt ways as ways of avoiding what is perceived as bureaucratic red-tape;
- Lack of capacity to manage forests and timber trade activities;
- Lack of coordination systems that ensure proper planning and improvements to forest management;
- Bribery as a common occurrence to, for example, speed up the issuance of licences and export of timber products and to involve communities in clearing forests in violation of forest laws;
- Corruption in licensing and concessions due to poor checks and balances;
- Inadequate systems to deal with the high demand for timber products; and,

• Weak forest governance programmes.

In order to improve integrity systems such that they can better respond to ethical weaknesses which create room for practices and conduct that result in IFFs, a combination of legislative, policy, administrative and technological improvements would be needed.

IMPROVING INTEGRITY SYSTEMS

Integrity systems play an important role in different industries. In light of the situation identified in earlier sections, some recommendations can be made to improve integrity systems in mining and timber industries. A main recommendation would be for comprehensive frameworks which evaluate integrity compliance in a broader manner. At present, there are no comprehensive frameworks used by government that serve as tools to evaluate ethical compliance in the sectors holistically. Muya & Mukumbwa (2013) interrogated integrity systems in the Zambia construction industry and proposed a framework for that particular industry. They found that existing systems had been moderately developed and recommended a tool to evaluate ethical compliance in construction organisation in a more holistic manner. They identified different key elements that had a bearing on integrity in the industry and therefore created a framework that could assess these (Muya & Mukumbwa, 2013). The elements are a means to assess the presence of integrity systems and can be summarised as follows:

- Organizational strategy on ethics this refers to the embeddedness of ethics in organization vision, mission, values, strategic objectives and operational plans;
- Leadership commitment to ethics this relates to the express commitment by organizational leadership to improve and maintain a culture of ethical conduct
- The existence of formal structures implementing an ethics function this element concerns the presence of formal structures that support ethics and the ethics function in the organization;
- The existence of an ethical culture this concerns an organizational culture that focuses on ethical conduct through its vision, mission, strategy and structure as well as values, attitudes, management styles and employee behaviour;
- A code of ethics this refers to the document that contains the prescripts on expected ethical conduct should employees find themselves in ethical dilemmas;
- Compliance programmes these assist in early detection of wrong doing and create opportunities for internal handling of unethical practices;
- Training and education programmes in ethics these involve providing training and education in ethics and a means to combat unethical practices;
- Communication of ethical issues these refer to the communication strategies on ethical issues to raise awareness on ethical matters;
- Reporting systems of unethical conduct these refer to the reports on unethical behaviour that are produced; and,
- Disciplinary and reward procedures these procedures would outline how ethical conduct would be promoted through performance appraisal.

While their framework was designed for the construction industry specifically, these aspects are arguably relevant for assessing integrity in the mining and timber industries and provide direction on aspects industry can focus on in order to enhance integrity systems beyond legislative prescripts. Specifically, each of the 10 aspects should be evidenced in company strategies, policies and structures and government should insist that these be a standard in organizations it seeks to do business in these industries. Then, an expected outcome would be enhanced capacities to evaluate the extent to which practices and conduct maintain integrity. With better evaluation, better responses to address integrity problems can be crafted. As far as IFFs are concerned, the weak integrity systems which facilitate illicit activities and practices can be strengthened.

In addition, an integrity management strategy developed with different stakeholder to provide structure and coordination as far as the management of integrity issues is concerned could be developed, there could be more involvement in the industries of existing institutions such as the Anti-Corruption Commission with defined roles and specified feedback obligations and there could be enhanced guided parliamentary support to enhance parliament's ability to incorporate integrity issues in their evaluations of industry performance and accountability.

CONCLUSION

Zambia is said to be losing an estimated 3 dollars billion annually to IFFs. It is at a point in its history where it needs to maximise on political changes and deal with obstacles to economic growth. The significance of illicit financial flows cannot be overemphasised. IFFs have been found to be the reason for vast resource losses. It is a complex phenomenon and while research has enabled countries to understand the extent and nature of the losses, more still needs to be done to remedy the problems. Strengthening integrity systems could assist. Strengthened integrity systems supported by evaluative frameworks can assist the country. As the country come to grips with the complications IFFs cause, discussions on the mechanisms required to eliminate them will need to continue and hopefully the evidence of reduced losses, because viable solutions are found, will be seen in the near future. The Zambia government needs to synergise efforts among the stakeholders (private, civil society, trade unions and developmental partners) in tackling IFFs and improved platforms of information sharing and educating the public. A platform for all stakeholders should be established for the development of a mining tax regime that is stable, progressive and seals the loopholes of IFFs, especially transfer pricing. The government needs to review and/or terminate tax incentives given to mining companies, especially those proven to engage in tax dodging tactics. This is in addition to ensuring that the government enact Legislation that compel Multinational Corporations to report their business activity on a country by country basis, that compels the disclosure of Beneficial Ownership Information in the extractive sector and that provide for government to government exchange of Tax Information that is publicly accessible.

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FACTORS INFLUENCING CHOICE OF CLIMATE CHANGE ADAPTATION STRATEGIES BY MAIZE FARMERS IN UPPER EAST REGION OF GHANA

Dadson Awunyo-Vitor

ABSTRACT

The impact of climate change on agricultural productivity and food security cannot be over emphasised. These changes in climate affect cropping systems, distribution, domestic food mix, and livelihood diversification as well as migration patterns and food security. The perceptions of farmers about climate change and their responses thereof, with regard to adaptation strategies, play significant roles in addressing low productivity and, by implication, food insecurity in the region. Thus, this paper seeks to examine maize farmer's choice of climate change adaptation strategies in the Upper East Region of Ghana. A multi-stage sampling technique was used to sample 200 farmers in three districts in the Upper East Region. Descriptive statistics, Heckman two-stage procedure, was adopted to analyse empirical data. It is found that farmers perceive that climate change does exist. The paper reveals that farmers generally used improved maize varieties, irrigation and soils conservation as climate change adaptation strategies. The regression results show that the levels of formal education, income, credit and experience are critical in farmers' using climate change adaptation strategies. In the short term, policies aimed at educating farmers about the effects of climate change on their farming activities are necessary for sustainable productivity and food security. Furthermore, improving income for the farmers and encouraging access to credit would improve the farmers' use of climate change adaptation strategies for sustainable maize productivity and food security.

Keywords: Maize farmers, sustainability, climate change, Upper East Region, Ghana

INTRODUCTION

The economies of most African countries depend largely on agricultural activities of which over 70% are usually on subsistence level for economic growth and approximately 85% of household's food and nutritional security is derived from the agricultural sector (World Bank, 2008). Again, Sub-Saharan Africa's population is dependent on agriculture as their main source of food and livelihood (Badiane & Delgado, 1995). This means that more than half of the livelihood of rural population's livelihood depends on it. Food and Agriculture Organization of the United Nations in 2009 estimated that global food production must increase by 70% to meet demands in 2050. At the same time, climate change, water scarcity and land-use change are expected to jeopardize continued increases in agricultural production, thus making food security an emergency that calls for a variety of policies and creative solutions at global, regional and local levels. The most important prospects for increased food production in the near future are seen in areas where the current land productivity is significantly lower than the potential (Hassan & Nhemachena, 2008).

Climate change is expected to affect food and water resources that are essential for livelihoods in Africa where much of the population, especially the poor, rely on local supply systems which are sensitive to climate variation (Hassan & Nhemachena, 2008). Disruptions of the existing food and water systems will have devastating implications for development and livelihood, and are expected to add to the challenges climate change already poses for poverty eradication (De Wit & Stankiewicz, 2006; IISD, 2007). Hassan &

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Nhemachena (2008) indicated that the increased temperatures are likely to exacerbate the drought conditions already experienced and may in future have significant effect on water and food availability. This has resulted in erratic rainfall pattern due to heavy rainfalls leading to floods, water pollution and soil erosion.

According to the International Food Policy Research Institute (IFPRI), Ghana's agriculture system is much vulnerable to climate change, that is likely to intensify seasonal and inter-annual rainfall variation (for example, drought in one year and floods in the next year), as long-term changes and trends take place (for example, rising annual mean temperatures). Climate change may also create water and heat stress, the outbreak of pests and diseases, the loss of productive lands through the deterioration of ecosystems and additional burdens to supply chains such as increased post-harvest losses during storage and distribution. The likely consequences of such stresses include yields reduction, decreased live-stock values, post-harvest losses, and reduced food accessibility and consumption.

Several studies, see for example Hassan & Nhemachena (2008), Deressa et al. (2008), Apata (2011) and Obayelu et al. (2014), have been carried out to investigate adaptation strategies and some factors influencing farmer's choice of adaptation strategy in Africa. These have been proven to significantly reduce the impacts of climate change on agriculture. Adaptation helps farmers achieve their food, income and livelihood security objectives in the face of changing climatic and socioeconomic conditions, including climate variability, extreme weather conditions such as droughts and floods, and volatile short-term changes in local and large-scale markets (Kandlinkar & Risbey, 2000).

The perspectives of the indigenous people and the way they think and behave in relation to climate changes as well as their values and aspirations, have a significant role to play in addressing climate change (Doss & Morris, 2001). Indigenous groups are not only standby viewers of climate changes but are also actively trying to cope with the adverse climatic conditions. In some cases, farmers can draw on already existing measures for adapting to immediate adverse changing condition. Some of these responses may be indigenous knowledge applied in their normal subsistence activities, while others may be acute responses, used only in case of critical weather conditions (Scott & Kettleborough, 2002). Although, there are a lots of adaptation measures that are commonly used in agricultural production, the changes in crop variety has been regarded as the most effective adaptation method that can restore high yields and subsequently lead to increase in productivity.

The changing climate in Northern Ghana has implications for the nature of agriculture and productivity (MoFA, 2013). Thus, erratic rainfall pattern and increase in temperature has the tendency to reduce crop yields particularly cereals leading to a decrease in productivity and subsequently food insecurity. However, the promotion of technical change via the generation of agricultural technologies by research and their dissemination to the end user plays a critical role in boosting agricultural productivity in the area (Mapila, 2011). Agricultural technology can be an essential factor for improving food security and rural livelihood in the face of changing climate.

In the Upper East Region, the adoption of improved crop varieties can lead to increased agricultural productivity (Akudugu et al., 2012). Increased productivity can help reduce poverty by increasing farmers' income and therefore enhancing consumption (Simtowe et al., 2009). To increase agricultural productivity in the face of changing climate farmers must adopt the crop varieties which mature early and are drought tolerant (Akudugu et al., 2012). The benefits of these crop improvement technologies depend on household adoption patterns which are influenced by different socio-economic and farm type factors, infrastructural and institutional factors.

The impact of climate change in Ghana on agricultural productivity and food security cannot be over emphasised. These changes in climate may affect cropping systems, distribution, domestic food mix, and livelihood diversification and migration patterns (MoFA, 2013). For instance, the variability of sporadic rainfall and the increasing dry spells as reported by all the regions is causing immense disruptions to the growing season across the country especially in the northern part. These led to an increase in erratic weather events (for example, flooding, dry spells, severe droughts in the dry season, high temperatures and so on) thereby further complicating already marginalized regions. Climate change poses a great threat to human security through erratic rainfall patterns and decreasing crop yields, contributing to increased hunger (Obayelu et al., 2014). Apata (2011) reported that, climate change in the form of higher temperature, reduced rainfall and increased rainfall variability reduces crop yield and threatens food security in low income and agriculture-based economies.

FACTORS INFLUENCING CHOICE OF CLIMATE CHANGE ADAPTATION STRATEGIES

In Northern Ghana particularly Upper East Region, rainfall is quite erratic showing effects of climate change on crop production. This affects most of the cereals and legumes negatively reducing their yields. For instance, in 2012 yields of maize, millet, sorghum, cowpea and soybean recorded decreases of about 8%, 7%, 6%, 7% and 8%, respectively, over that of 2011 (MoFA, 2013). The incidence of food insecurity is quite pervasive indicating about 28% of households in the region are either moderately food insecure or severely food insecure (WFP, 2012). The decline in output and yields has the tendency to further aggravate food security status and poverty incidence of small holder farmers whose livelihood depends on agriculture.

Despite these observed decrease in yields and production associated with climate change, farmers can still reduce the potential damage by making tactical responses to these changes. The perceptions of the indigenous people about climate change effects on agriculture and their responses to climate change have significant roles to play in addressing productivity (Doss & Morris, 2001; Apata, 2011; Obayelu et al., 2014).

In this regard, various adaptation strategies have been undertaken by farmers to increase productivity and improve food security. However, some of these strategies that have targeted water and soil management, area expansion and irrigation have become a minimal source of output growth, thus growth will depend more on adoption of yield increasing varieties and crop/variety diversification (Hossain, 1989). Technical change in the form of adoption of improved agricultural production technologies has been reported to have positive impacts on agricultural productivity growth in the developing world (Nin et al., 2003). Thus availability of modern agricultural production technologies (such as improved varieties) to farmers, and the capacities of farmer to adopt and utilise these technologies are also critical.

Even though several studies have been conducted to analyse the factors influencing the choice of adaptation strategy and how farmers adapt to climate change (for example, Hassan & Nhemachena, 2008; Deressa and Hassan, 2009; Apata, 2011; Deressa et al., 2011); and, these studies have not explicitly addressed the choice of crop variety and the perceptions of farmers towards the changing climate. Understanding the goals and choice made by farmers is critical to improve agricultural productivity, food security and sustainability in the area (Malton & Spencer, 1984). Meanwhile, these are important aspect of agricultural activities and would thus require comprehensive study and analysis to inform agricultural interventions and policy direction. Examining factors influencing maize farmers' choice of climate change adaptation strategies is fundamental in developing policies that aimed at sustainable productivity which will intend lead to food security in the area. Thus the study seeks to examine factors influencing maize farmer's choice of climate change adaptation strategies in the Upper East Region.

CLIMATE CHANGE: AN OVERVIEW

The word "climate" means an average weather conditions, of any given geographic location, estimated over a long period of time, from a few weeks to infinite years, but generally for as long as 30 years or more (Dercon, 2002). Weather as used in the definition above describes the state or condition of the atmosphere at a particular time (that is, from a few minutes to few hours) and at a particular place (that is, point location). According to Hanemann (2000), both climate and weather are described in terms of the same variable conditions such as solar radiation, precipitation, temperature, rainfall, humidity, wind velocity and barometric pressure. There are no much difference between the two except that, for weather analysis the variables are considered over short periods of time say a few seconds to a few hours, at or over a small location and on day-to-day basis while in climate analysis, the same variables are considered but over a large spatial area such as a geographic region and over several years usually at least 30 years (Ferdinand & Adiku, 2013).

The Intergovernmental Panel on Climate Change (IPCC, 2007) refers to the term "climate change" as a change in the state of the climate that can be identified (for example, by using statistical tests) by changes in the mean and/or the variability of its properties and that which persists for an extended period, typically decades or longer. The change may be due to natural internal processes or external forcing or to persistent anthropogenic (human induced) changes in the composition of the atmosphere or in land use. Again, Feder et al. (1985) see the "climate change" phenomena as a long-term shift in weather conditions identified by changes in temperature, precipitation, winds, and other indicators and can involve changes in average conditions and in variability, including extreme events. It is necessary to note that, natural internal processes, external forcing and persistent anthropogenic changes in the composition of the atmosphere or in land use are the general causes of climate change (IPPC, 2007). Due to the huge impact of human activities, changes in climate are mostly seen as human-induced. The anthropogenic activities include: industry, agriculture, mining, transportation, construction,

deforestation and habitations (Ferdinand & Adiku, 2013). Over the past 50 years, climate change has been noted to be influenced by human activity through changes in the concentration of Green House Gases (GHGs) in the atmosphere, but also by aerosols and changes in land use (IPCC, 2007). Marland (2008) indicated that GHG emissions from Africa accounted for 4% of global emissions in the period 2000-2005. During this period, Africa accounted for 2.3% of global emissions from fossil fuels and 17% of global emissions from land use change, mainly due to deforestation in tropical regions.

In Ghana, climate is dominated by two major air masses: the dry and warm North-East Trade Winds (harmattan winds) and the monsoon winds and these winds influence rainfall patterns (Owusu & Waylen, 2009). This indicates that the moist maritime monsoons are associated with rainfall while the dry Trade Winds bring dry conditions. Thus the country has different dry and wet seasons depending on the dominant wind in the area. Throughout the country temperatures are typically high with annual mean generally above 24°C. Average figures range between 24°C and 30°C although temperatures ranging from 18°C to 40°C or more are common in the southern and northern parts respectively (Akudugu et al., 2012).

Yaro (2010) reported that, since the past decades (1970-2000) the country is seen to have experienced a 1°C rise in temperature. Again, rainfall generally decreases from South to North with amounts ranging from 2 000 mm in the South to 1 100 mm in the North. There has also been a decline in mean annual rainfall in the country from the period between 1951 and 1970 to the period 1981 to 2000 (Owusu & Waylen 2009). Ghana's economy is strongly dependant on agriculture and this dependence is a cause of worry if climate change is to negatively affect the agricultural sector. Climate change has become debatable topic due to its effects on human lives and the future of the world. It is observed to be one of the major threats to sustainable development because of its effects on health, infrastructure, agriculture and food security, and forest ecosystem (IPCC, 2007).

CLIMATE CHANGE AND AGRICULTURAL PRODUCTIVITY

Climate change has now been seen as a developmental issue throughout the world. Climate Change is the regional or global-scale changes in historical climate patterns arising from natural and/or man-made causes and resulting in intermittent but increasingly frequent extreme impacts (Akudugu et al., 2012). The topic has been the most debatable research area due to its effects on human lives and the future development prospects of the continent. Particularly, it affects agriculture production, food security, livelihoods and social safety negatively and in so many ways. This observation is in line with the believes of the Intergovernmental Panel on Climate Change (IPCC, 2007) that agriculture is highly vulnerable to the increased frequency, severity and unpredictability of extreme weather-related events caused by climate change such as hurricanes, droughts, floods, and rising sea levels among others. The IPCC (2007) further observed that various models have predicted a moderate impact of climate change in the next two decades globally indicating that all regions will experience increased temperatures and changes in rainfall patterns that will affect agricultural production as well as food and nutrition security. These changes in climate condition will mostly affect crop productivity and food security negatively by reducing crop yields and resulting to greater variability in yields.

Akudugu et al. (2012) revealed that the direct impact of climate change on agriculture is making most households who depend on it for their livelihoods food insecure. This is because of the fact that agriculture is vulnerable to external shocks including economic crises, food price increases and emergencies such as droughts, floods, pests and diseases outbreaks. Agriculture depends so much on the environment in the process of providing livelihoods for millions who depend on it for food and subsistence. Similarly, agriculture is considered to be among the factors affecting the environment in satisfying human needs, while climate is the primary determinant of agricultural productivity (Apata et al., 2009; Mahato, 2014). Climate change impact on agricultural inputs such as water for irrigation, amount of solar radiation for plant growth, and prevalence of pests can affect crop yield and types of crops that can be grown in some areas (Dhaka et al., 2010).

The impact of climate change on crop production and food availability should be a priority area for governments around the world if food self-sufficiency and security are to be achieved This is because changing climate affects agricultural production and food availability directly in many ways. This may result from the fact that agriculture is inherently sensitive to climate conditions and is one of the most vulnerable sectors to the risks and impacts of global climate change as indicated by many studies including (Ayanwuyi et al., 2010).

FARMER'S PERCEPTIONS AND ADAPTATION TO CLIMATE CHANGE

Farmer's perceptions of climate change are noted to mean the awareness of the changes in climatic variables such as temperature and precipitations or rainfall over a long period of time. Thus exploring farmer's taught about whether the climate is changing or not. The awareness of farmers to changes in climatic variables like temperature, precipitation and rainfall is important in climate change adaptation decision making (Maddison, 2006). For instance, the study by Enete et al., (2011) on the indigenous agricultural adaptation to climate change in Southeast Nigeria revealed that, majority of the farmers do not agree that farming contributes to climate change, but were aware of climate change and its effects on agriculture. In a study conducted by Maddison (2006) on climate change perceptions and adaptation in ten countries in Africa, was found that out that a significant number of farmers perceived and believed that temperature had increased and rainfall levels had decreased. Most farmers perceive long-term temperature as increasing, and there are pronounced changes in the timing of rains and frequency of droughts in southern Africa. This means that, increase in temperature, decrease in rainfall, frequent drought and changes in timing of rainfall is very important to farmers in terms of the climate change in developing countries.

Several studies, such as Deresaa & Rashid (2010) and Mertz et al. (2009), have stated a similar position that farmers are aware that climate is changing and have since responded by developing coping strategies to adapt or mitigate the negative impacts of the climate change on their farming systems. According to Deressa et al. (2011) majority of farmers who perceive and are aware of the changing climate adapt to it in different ways. Here the adaptation methods to climate change follows farmers' perceptions of climate change and the action they will take to mitigate the impact. Framer's response to climate change is one of the major policy options for reducing the adverse impact of climate change in Africa (Kurukulasuriya & Mendelsohn 2006). Further research work, such as that by Bradshaw et al. (2004) and Kurukulasuriya & Mendelsohn (2006), have revealed some common coping strategies in agriculture which include use of new crop varieties and livestock species that are better suited to drier conditions, intensifying irrigation use, crop diversification, water conservation techniques, planting trees, expansion of agricultural lands and changing planting dates.

In this regards, it can be concluded that increase in temperature, decrease in rainfall and other climate change risk factors (such frequent drought and change in timing of rainfall) increases farmer's awareness and perception to climate change and in the same vain farmers have highest possibility of adjusting/responding to perceived changes in so many way as indicated by literature. If the coping/responds measure are taking seriously, it could lead to improvement of farming activities through higher yields, increase in production and subsequently lead to food security in the area.

STUDY AREA AND METHODOLOGY

The research was carried out in the Upper East Region of Ghana which covers the North Eastern corner of the country between longitude 0° and 10° west and latitudes 100° and 110° N. It occupies about 8 842 sq. km (3.7%) of the total land mass of the country. The climate is characterized by one rainy season from May/June to September/October. The mean annual rainfall during this period is between 800 mm and 1 100 mm. The rainfall is erratic spatially and in duration. There is a long spell of dry season from November to mid-February, characterized by cold, dry and dusty harmattan winds. Temperatures during this period can be as low as 14°C at night, but can go to more than 35°C during the daytime. About eighty per cent (80%) of the economically active population engages in agriculture. The main crops produced are maize, millet, guinea-corn, groundnut, beans, sorghum and dry season tomatoes and onions (MoFA, 2012). The highest proportion of food insecure households is recorded in the Upper East where 28% of households are moderately or severely food insecure.

SAMPLING TECHNIQUES AND SAMPLE SIZE

A three-stage sampling procedure was employed to select respondents for the study. In the first stage, a purposive sampling procedure was used to select two districts based on harsh climatic condition, severity of food security and the level of agricultural activities especially maize production in the area. The second stage employed simple random sampling technique to select five communities from each district. At the third stage,
simple random sampling techniques were used to select20 maize farmers in each community as respondents. A semi-structured questionnaire was used to collect data from the 200 respondents.

THEORETICAL AND ANALYTICAL FRAMEWORK

Farmer's adaption to climate change and the choice of adaptation strategies was conceptualised in farmer's decision-making process. The process is also conceptualised as a two stage process. At the stage one (1) the farmer may decide to adapt to climate change or not which may result in two mutually exclusive alternatives. At the second stage the farmer may decide on the type of adaptation strategies to use which may result in a number of mutually exclusive alternatives.

• For stage one, let Y_i represent a farmer's decision to use climate adaption strategies or not to use. Y_i is assumed to be dependent on a vector of individual and household characteristics as well as climate change variables (X_i) . The relationship between dependent and independent variables is formulated as follows:

$$Y_i = \alpha + \beta' X_i + \mu_i.$$

of 1 if the farmer used climate chan

[1]

• The dependent variable Y_i is a dummy and it is assigned a value of 1 if the farmer used climate change adaptation strategies and zero otherwise. The selection of the independent variables is guided by the literature including studies such as Awunyo-Vitor (2013), Ampadu-Ameyaw & Awunyo-Vitor (2014) and Alidu (2015).

The independent variables are as described above.

Variable (X _i)	Variable description list	Expected sign
([)		
AGE	Age of respondent in years	+
GEN	Gender of the respondents Male=1 and Female=0	+
EDU	Number of years of formal education	+
EXP	Farm experience specified in years	+
CRE	Amount of credit accessed in Ghana Cedis	+
INCO	Previous years income in Ghana Cedis	+
EXT	Extension contact =1 otherwise =0	+
PTEM	Perceive changes in Temperature, with negative consequences	+
	=1;otherwise =0	
PRAIN	Perceive changes in rainfall, with negative consequences 1; otherwise =0	+

The empirical model for estimation is specified as:

 $\begin{array}{l} Y_i = \propto_0 + \propto_1 \operatorname{AGE}_1 + \propto_2 \operatorname{GEN}_2 + \propto_3 \operatorname{EDU}_3 + \propto_4 \operatorname{EXP}_4 + \propto_5 \operatorname{CRE}_5 + \propto_6 \operatorname{INCO}_6 + \propto_7 \operatorname{EXT}_7 + \\ \alpha_8 \operatorname{PTEM}_8 + \propto_9 \operatorname{PRAIN}_9 + \varepsilon \end{array}$

In the second stage, the farmers decide on the type of climate change adaption strategy to use. Three major adaption strategies have been identified in the study area these are use of improved maize varieties, irrigation, as well as soil and water conservation methods. From these strategies the farmers can be categorised into three groups. These groups are:

- 0 = soil and water conservation methods;
- 1 = improved maize varieties; and,
- 2 = irrigation.

The respondents consider the costs and benefits associated with the use of these climate change adaptation strategies based on how it would lead to maximization of their utilities. The difference in the cost and

[2]

benefits for using alternative j by farmer i is given as (Y_{ij}^*) and the factors X_i which influence the cost and benefit assessment can be represented as:

$$Y_{ij}^* = X_i \beta_j' + e.$$
^[3]

Where X_i denotes the vector of observations on the variable X for farmer i, and β_j and e are parameters to be estimated and the error term respectively. In equation 3 Y^* is not observed; instead the choice made by the respondents is observed.

• Each respondent will fall into the j^{th} categories, for j = 0, 1, ... 2

Let X_i denote the vector of observation on the variable X for respondent i, and j = 0,1, and 2Let $P_{i0}, \dots P_{i2}$ be the probabilities associated with these three (3) adaptation strategies available to the farmers to choose from. The probability P_{ij} of respondents using a particular alterative is conceptualised to depend on variable, X_i and with e assuming a logistic distribution. The probability of a respondent i using a particular option j can be presented in a multinomial logit form as:

$$P_{ij} = \frac{e^{x_i \beta'}}{\sum_{j=0}^{m} e^{x_i \beta'}} \qquad j = 0, \dots m$$
^[4]

Where m = 2. The likelihood function for the multinomial logit model can be written as:

$$L = \prod_{i=1}^{N} P_{i0}^{y_{i0}} \dots P_{i3}^{y_{ij}}$$
[5]

The above equation (5) gives multinomial density for one observation and the likelihood function for a sample of N independent observations with j alternative option is presented as:

$$L_N = \prod_{i=1}^N \prod_{j=0}^m P_{ij}^{y_{ij}}$$
[6]

The log likelihood function can be re-formulated as:

$$L = lnL_{N} = \sum_{i=1}^{N} \sum_{j=0}^{m} y_{ij} lnP_{ij}$$
^[7]

Where P_{ij} is a function of parameters β and regressors defined in equation 7, with first order condition for the MLE of $\hat{\beta}$ as:

$$\frac{\partial L}{\partial \beta} = \sum_{i=1}^{N} \sum_{j=0}^{m} \frac{y_{ij}}{p_{ij}} \frac{\partial P_{ij}}{\partial \beta} = 0$$
[8]

The probability of a farmer selecting the first option (base category) j = 0 has been normalised to zero since all the probabilities must sum up to 1 (Maddala, 1999; Green, 2003). Therefore, out of the three choices, only two distinct sets of parameters are identified and estimated. The probability of the respondent using the base category can be formulated as:

$$P_{i0} = \frac{1}{1 + \sum_{j=0}^{0} \exp\left(\beta'_{j} X_{i}\right)} \text{ for } j = 0.$$
[9]

and the probability of the respondent using any of the alternatives apart from the base category is given by:

$$P_{ij^*} = \frac{\exp(\beta_{j^*}X_i)}{1 + \sum_{j^*=1}^4 \exp(\beta'_{j^*}X_i)} \text{ for } j^* = 1 \text{ and } 2$$

$$[10]$$

The odds ratio $\left(\frac{[P_{ij^*}]}{[P_{i0}]}\right)$ measures the probability that an individual would use improved maize variety or irrigation relative to the base category of using soil and water conservation method as climate change adaptation strategies. The estimation equation is specified as follows:

$$Q_i = \beta_0 + \beta_1 AGE_1 + \beta_2 GEN_2 + \beta_3 EDU_3 + \beta_4 EXP_4 + \beta_5 CRE_5 + \beta_6 INCO_6 + \beta_7 EXT_7 + \beta_8 PTEM_8 + \beta_9 PRAIN_9 + \mu$$
[11]

The estimated coefficient for each choice therefore reflects the effect of X_i on the likelihood of the respondent's use of irrigation and soil/water conservation method relative to the reference option. The independent variables are as presented above and the dependent variable is a categorical variable specified as:

- 0 = improved maize varieties;
- 1 = irrigation; and,
- 2 = soil and water conservation methods.

The direct estimation of equation 11 may lead to biased parameter estimates because there is a potential sample selection bias here, as those who do not use climate change adaptation strategies are not represented. Heckman (1979) has shown that this type of bias is equivalent to missing variable bias and can be overcome by including a variable called Inverse Mills Ratio which is computed from the probity estimate of equation 2 as:

$$\left[\frac{\{\emptyset(-Z_i\alpha')\}}{\{1-\Phi(-Z_i\alpha')\}}\right] = \lambda_i(-Z_i\alpha') = \delta$$
^[12]

Where \emptyset and Φ are the probability density function and the cumulative distribution function of the standard normal distribution respectively.

The expression $\lambda_i(-Z_i\alpha')$ is referred to as Inverse Mills Ratio which is a ratio of the probability density function over the cumulative distribution function of a distribution in the equation for farmers' decision to use climate change adaptation strategies. The inverse mills ratio $[\lambda_i(-Z_i\alpha') = \delta]$ is computed using equation 2. The inverse mills ratio (δ) is then incorporated in equation 11 as additional explanatory variable to correct for the selectivity bias resulting in Equation 13.

$$Q_i = \beta_0 + \beta_1 AGE_1 + \beta_2 GEN_2 + \beta_3 EDU_3 + \beta_4 EXP_4 + \beta_5 CRE_5 + \beta_6 INCO_6 + \beta_7 EXT_7 + \beta_8 PTEM_8 + \beta_9 PRAIN_9 + \beta_{10}\delta + \mu$$
[13]

Equation 8 and 18 are jointly estimated using maximum likelihood estimation method.

RESULTS AND DISCUSSION: DESCRIPTIVE STATISTIC OF THE RESPONDENTS

The descriptive statistics of the respondents has been grouped into two tables. Table 2 presents the characteristic captured as continues variables while Table 3 presents the descriptions of the characteristics captured as dummy or categorical variables. From Table 2 average age of respondent in the sample is about 46 years showing that majority of the farmers sampled were within the economically active labour force.

The mean family size of respondent is 11–also indicating farmers in the sample population are responsible for an average of 11 people. Again the average year's respondent engages in education and maize farming is about 4 years and 9 years respectively. This shows that farmers have lower level of formal education. This confirm as study by Awunyo-Vitor & Al-Hassan (2014) which revealed that about 64% of maize farmers in Ghana do not have formal education. The study also reported that the mean annual income of respondents is GHS 2 072.29 which is similar to income reported by GSS (2012).

Tuble 2: Socio continic characteristics of the Respondents							
Variable Description/measurement	Min.	Max.	Mean	Standard dev.			
Age of farmer in years	23	69	46.05	10.068			
Number of family members	0	30	11.1900	5.41670			
Number of years in school	0	22	4.50	6.442			
Number of years in maize farming	2	38	9.31	4.932			
Income of farmer in GHS	150	10 400	2 072.29	1528.054			
Number of acres cultivated by farmer	2	15	3.7150	2.20353			
Amount of credit accessed	50	9 250	515.53	886.936			
Distance from farm (Km)	1	6	2.4025	1.22955			

Table 2: Socio-economic Characteristics of the Respondents

The farm size of the respondents ranges between a minimum of 2 hectares to a maximum of 15 hectares with an average farm size of 3.7 Hectares. It appears the respondents had access to quite substantial amount of credit. On the average the respondents access GhC 515.55 with a minimum and maximum amount of GhC 50 and GhC 9 250 respectively (Table 2). This result supports the result of study by Awunyo-Vitor et al. (2015) on maize farmers which indicate that the average of amount of credit received by maize farmers in Ghana is about GhC 600.

Table 3: Dummy Descriptive Characteristics						
Variables	Sub-levels	Freq.	Percent (%)			
Gender	Male	114	57.0			
	Female	86	43.0			
Access to credit	Have access to credit	115	57.5			
	Does not have access to credit	85	42.5			
Extension services	Have access to extension services	88	44.0			
	Does not have access to extension services	112	56.0			
Group membership	A member of a group	92	46.0			
	Not a member of a group	108	54.0			
Perception of temperature	Increased in temperature	159	79.5			
	Temperature does not increase	41	20.5			
Perception of Rainfall	Rainfall pattern has changed	166	83.0			
	Rainfall pattern has not change	34	17.0			

As stated above, Table 3 presents the descriptions of the characteristics captured as dummy or categorical variables. From the sampled 200 respondents, 114 respecting 57.0% were male and the rest female (Table 3). With regards to access to credit about 57% of the respondents had access to credit during the cropping season. However, only 44% had access to agricultural extension education during the period. This might be due to the fact that the government has suspended the recruitment of agricultural extension officers for some time now consequently low high farmer–extension agent ratio. These results confirm, as study by Alidu (2015) shows, that large proportion of farmers do not have access to extension services in Upper East Region of Ghana as result of inadequate staff. From the results in Table 3, 92 (46.0%) and 100 (50.0%) of farmers belong to a farmer based organisation. The association membership has a potential to improve their access to information which they can use to take critical decision with regards to adaptation to climate change for sustainable production.

The analysis of farmers' perceptions of climate change and variability indicates that most of the sampled respondents in this study are aware of the fact that temperature is increasing; rainfall is decreasing, frequency of drought and changes in the timing of rainfall during a field survey (Table 3). The findings from the field survey shows that, out of 200 farmers sampled, 159 farmers representing 79.5% interviewed indicates that

they have noticed increasing temperature over the past 10 years whereas 166 farmers representing 83.0% have mentioned that they have noticed decreasing rainfall over the past 10 years.

FACTORS INFLUENCING CHOICE OF CLIMATE CHANGE ADAPTATION STRATEGIES

The estimated coefficients of the Multinomial logit model, along with the marginal effects are presented in Table 4. The inverse mills ratio is significant in the model indicating that sample selection bias does exist, and that direct estimation of the model would have produced biased parameter estimates. The log likelihood ratio (LR) statistic is significant at 1 percent, meaning that all the variables included in the model jointly influence the climate change adaptation strategies choices made by the respondents. Given these goodness of fit measures, it can be concluded that the multinomial logit model used is appropriate.

In all out of 10 independent variables, 5 are statistically significant. The coefficient of number of years of education is positive and significant with both use of improved maize varieties and irrigation facilities. The respondents are 17% more likely use improved maize varieties and 13% more likely to use irrigation as compared with the use of soil and water conservation method. This is because due to their educational level they know this method yield better return in short time than the use of soil and water conservation method. In addition, some of them do not own the land hence it is not a prudent investment decision to invest in soil and water conservation method when they are not sure if they would be entitled to use of the piece of land next season.

Number of years of experience also has positive and significant relationship with the use of improved maize varieties and irrigation facilities. This indicates that the probability of a farmer using any of the two groups (improved maize varieties and irrigation) is higher relative to the probability of him using soil and water conservation method. This is because experienced farmers easily identify the high yielding varieties and probably has some facilities to support his farming activities. One-year increase in maize farming experience is likely to increase probability of farmer using improved maize variety by 5% and irrigation 9% as compared with reference category of using soil and water conservation method.

One of the factors which significantly influence farmer's decision to use improved maize variety and irrigation is access to credit. The coefficient of this variable is positive and significant. This might the due to the fact that farmers need money to buy improved seed and rent irrigated land. Based on the marginal effect, a unit increase in amount of credit received is more likely to increase the usage of improved maize variety and irrigation as climate change adaptation strategies by 23% and 16% respectively compared to the based category of using soil and water conservation methods (Table 4). The above results supports the finding of Awunyo-Vitor et al. (2015) when he observed that level of education, number of years of experience and amount of credit received by farmers influence their decision to use improved maize varieties as climate change adaptation strategies in Upper East Region of Ghana.

As can be seen from Table 4 the coefficient of the amount of income made by the farmers in previous year's farm sale is positive and significant. This might be due to the fact the increase income in previous season equip the farmers to be able to buy improve maize variety seed for planting and also rent irrigated land for cultivation. The marginal effect revealed that probability of farmers using improved maize variety and irrigation as climate change adaptation is 11% and 30% respectively compared to the use of soil and water conservation method. These results also support findings by Alidu (2015), who observed that income has significant influence on farmer's decision to use irrigation facilities in the Upper East Region of Ghana.

Table 4: Factors influencing choice of climate change adaptation strategies							
Independent variables	improved maize v	Irrigation					
	Coefficient	Marginal effect	Coefficient	Marginal effect			
Constant	24.2177 (18.5338)	-	42.0534 (17.6792)	-			
Age of respondents [AGE]	0.4386 (0.6511)	0.4450	0.2080 (0.6795)	0.6083			
Gender of the respondent [GEN]	0.0442 (0.0334)	0.4360	0.0075 (0.0315)	0.3627			

Number of years of formal schooling [EDU]	0.9450***	-0.1769	0 .2758 **	-0.1246
	(0.1574)		(0.1193)	
Number of years of experience [EXP]	0.3631***	0.0560	0.2687**	0.0917
	(0.1235)		(0.1168)	
Amount of credit accessed in Ghana Cedis	1.5277**	0.2394	2.5027***	0.1691
[CRE]	(0.6176)		(0.8319)	
Income from previous years [INCO]	0.2187***	0.3082	0.7489 **	0.1182
-	(0.0720)		(0.3291)	
Access to extension services [EXT]	1.1290	0.1526	0.9535	0.0834
	(0.7726)		(0.7230)	
Negative perception of temperature [PTEM]	2.9212 ***	0.1853	3.1628***	0.2640
-	(1.0223)		(0.8358)	
Negative perception of rainfall pattern	5.8212 ***	0.4640	4.1628***	0.2853
[PRAIN]	(0.0223)		(1.8358)	
invmills1	15.0898***	0.9962	10.5181**	2.5170
	(4.4231)		(4.2249)	
Number of obs $= 175$				

LR chi2(10) = 45.84Prob> chi2 = 0.0000

Figures in parenthesis stand for standard error (* Significant at 10%; ** significant at 5%; *** significant at 1%

The respondent's perception on the climatic variables that is temperature and rainfall has positive and significant effect on the use of improved maize varieties and irrigation as climate change adaption strategies. The coefficient of the temperature variable is positive and significant. This implies that farmers who perceived that the temperature is increasing the weather is becoming hotter are more likely to use improved maize verities and irrigation as adaptation strategies. Based on the marginal effect, a farmer who has negative perception about temperature changes are 18% and 26% more likely to use improved maize varieties and irrigation respectively as compared with the base category of use of soil and water conservation method as climate change adaptation method.

Similarly, the coefficient of perception of negative changes in rainfall patterns is positive and significant. Thus farmer who perceived that rainfall pattern is changing and the rainfall season is becoming shorter is more likely to use improved maize varieties and irrigation as compared to the based category of the use of soil and water conservation method. In line with the marginal effect a farmer who has negative perception about temperature changes are 46% and 28% more likely to use improved maize varieties and irrigation respectively as compared with the base category of use of soil and water conservation method as climate change adaptation method.

CONCLUSIONS AND RECOMMENDATIONS

This study reported in this paper primarily investigates the factors influencing farmer's choice of climate change adaption strategies in the Upper East Region. Majority of the respondents are aware of the changing climatic condition in the area. Based on the descriptive statistics, majority of the respondents are aware of the rising temperatures and low erratic rainfall pattern over the past 10 years. Generally, they believed the changes in the climatic condition are partly responsible for low agricultural productivity in the region. With regards to farmers responds to the change in climate, majority of the farmers adopt some strategies to adjust to the climate change. Three major adaptation strategies used by the farmers as copping strategies in light with the changing climatic conditions. These are: improved maize variety, irrigation and soil and water conservation methods.

Based on the multinomial logit results education and access to funds can play a key role in the farmer's choice of climate change adaptation strategies. Thus to ensure sustainable agricultural productivity in the areas, there is the need to educate the farmers on the changing climatic conditions and appropriate adaptation strategies particularly the use of improved maize varieties. These steps would ensure sustainable maize production in the areas. Thus, the District Agriculture officers should therefore, design an educational programme to educate farmers on the changing climatic condition strategies. Also, demonstration farms should be carried out in the area in order to show case the yields of improved maize varieties and how effective

Prob> cm2 = 0.0000 $Pseudo R^2 = 0.3278$

they are in response to climate change. This will increase its usage by farmers and increase, productivity; consequently, food security in the area would be achieved. Furthermore, farmer's access to funds either through increased income or credit would support the use of adaptation strategies for sustainable agricultural production. In terms of increased income for farmers, efforts should be made to link farmers to secure and ready market for their produce as well as reduction in the fluctuation in prices both input and produce prices to ensure stable profit for farmers. The lending institutions particularly rural banks should be encouraged to offer credit for farmers to support their use of adaptation strategies particularly use of improved maize varieties.

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THE IMPACT OF IRRIGATION SCHEMES ON FARM INCOME: IMPLICATIONS FOR SUSTAINABLE AGRICULTURE IN THE UPPER EAST REGION, GHANA

Dadson Awunyo-Vitor and Daniel S. Ziba

ABSTRACT

The paper evaluates the impact of irrigation schemes on farmers' income in northern Ghana as a means of developing sustainable livelihood. A multi-stage sampling technique was used to obtain 180 respondents for survey. The Logit estimation was employed to identify factors influencing the respondents' decision to participate in the irrigation schemes. Propensity score matching (PSM) was applied to analyze the impact of irrigation schemes on farmers' income as a key livelihood outcome. The Logit result indicates that household size, and access to credit is the factors that significantly influence farmers' decision to participate in irrigation schemes. The PSM results reveal that irrigation schemes have positively increased farmers' income by GHC 1335.09 (US\$ 381.45) and GHC 1353.87 (US\$ 386.82), using the Nearest Neighbor and Kernel based matching algorithms, respectively. The paper concludes that irrigation schemes play a role in the development of sustainable livelihoods for farmers. The study recommends that farmers should be encouraged to participate in irrigation farming and that the existing irrigated areas should be expanded. For all-year round production and development of sustainable livelihoods, farmers' access to credit and farm inputs such as agro chemicals and enhanced seeds should also be improved. '

Keywords: Irrigation, sustainable livelihoods, income, propensity score matching, Ghana

INTRODUCTION

In Ghana over 60% of the population depends on agriculture for their livelihood and income (Al-Hassan & Diao, 2007), particularly the northern Ghana where the majority of the population is in agriculture. It contributes about 65% of household income (GSS, 2005). Most of the agricultural production is by smallholders who rely on seasonal rainfall that is unpredictable and sporadic. The onset of climate change, insufficient rainfall and occasional uncontrollable floods results in frequent crop failures, which are having a serious effect on farmers' income and livelihoods. As a result, the population is extremely poor and food insecurity threatens every year. Northern Ghana has been described as having the most poverty stricken hunger spots in Ghana (GLSS, 2000). Although there are several irrigation schemes in the north, there is still high prevailing poverty incidence. The yield level of major crops has either declined or remained where it was decades ago and is unable to match the population growth rate. As a result of this mismatch there is an increase in the level of poverty in the north (IFAD, 2001; Dittoh, Bhattarai & Akuriba, 2013).

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The region houses the Tono irrigation scheme with a water storage capacity of 93 million m³ and 24 000 hectares of irrigable land, and is one of the largest irrigation schemes in West Africa. Yet the region is only able to produce 44% of its food requirement and the remaining 56% is imported despite the efforts to ensure the production of food all-year-round (MoFA, 2007). It is expected that farmer's involvement in irrigation schemes will ensure the production of food all-year-round, improve on their income, livelihoods, and reduce poverty and migration. However, the region still shows high levels of poverty, unemployment and food insecurity. Living standards, literacy levels, health and nutritional status are all extremely low and well below the national average (Whitehead, 2006).

Irrigation farming is widely acknowledged to play a major role in improving productivity, reducing poverty and sustaining rural livelihoods (Hussain & Hanjra, 2004; Smith, 2004; van Koppen & Safilios-Rothschild, 2005). It enables households to generate more income, increase their resilience and, in some cases, transform their livelihoods (Leahi, 1988). Irrigation contributes to agricultural growth and reduces poverty directly by: (a) permitting intensification and diversification, hence increased outputs and incomes; (b) increasing agricultural wage employment; and, (c) reducing local food prices. It is one of the most important rural development investments that can have both direct and indirect impact on poverty and food security in semi-arid tropical countries (IFPRI, 2002; Bhattarai & Narayanamoorthy, 2004).

Given that agriculture is largely rain-fed, irrigation water has become a very crucial resource in agricultural production, and poverty reduction as well as sustainable livelihood development. In this regard, Leahi (1988) pointed out that, in areas with arid and semi-arid climates, the uncertainty of rainfall would strongly be pointed to irrigation as a prime candidate to support livelihood development which can be sustain in future to improve food security in the medium and long term. Similarly, where rainfall is insufficient and unreliable and rain-fed agriculture cannot fully support food production, investment in irrigation will help stabilize agricultural production and promote food security consequently sustainable livelihood. Hence, the development of irrigation schemes has been undertaken to support sustainable agricultural production for enhanced livelihoods in the region (ICOUR, 2007). The major justification for this is to improve food security, reduce rural poverty, improve rural livelihoods and stimulate the local economy in general. However, some studies have argued that irrigation schemes have not produced intended results (Underhill, 1990; Diemer & Vincent, 1992; Rukuni, 1995; Machethe et al., 2004). Also, the World Commission on Dams (2000) confirms that irrigation schemes have typically fallen short of physical targets, did not recover their costs and have been less profitable in economic terms than expected. By extension, this has left questions in the minds of many as to whether irrigation schemes in the Upper East Region of Ghana has any impacts on farmer's livelihood outcome, such as income. Hence, the study seeks to evaluate the impacts of irrigation on farmers' income as a means of developing sustainable livelihood.

LITERATURE REVIEW

According to FAO (1997), irrigation is the supply of water to agricultural crops by artificial means, designed to permit farming in arid regions and to offset the effect of drought in semi-arid regions. Mutsvangwa & Doranalli (2006) define irrigation as the cultivation of land through the artificial application of water to ensure double cropping as well as a steady supply of water in areas where rainfall is unreliable. Irrigation water is applied to ensure soil moisture is sufficient to meet crop water needs and thus reduce water deficit as a limiting factor in plant growth.

According to Burrow (1987), irrigation schemes have proven to be a viable and attractive option for rural farmers in developing countries. He further asserted that returns from irrigated farming even on tiny plots could greatly exceed returns from rain-fed production. In many developing countries, irrigation schemes were counted on to increase production, reduce unpredictable rainfall and provide food security and employment to poor farmers. It enables farmers to earn an income, which enables them to meet some of their basic needs. A study in Zimbabwe shows irrigators' investment was estimated to be between \$150 and \$200 while rain-fed farmers' investment was estimated to be lower than \$100. This indicates that irrigators were in a better position to invest in capital items than non-irrigators because of higher income. Irrigation developments have made it possible for other rural infrastructure to be developed in areas which would otherwise remain without roads, schools and clinics.

According to Chenje et al. (1998), irrigation schemes have resulted in increased income that was translated into increased expenditure, investment and trade. Furthermore, irrigated agriculture is an essential

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component of any strategy to increase global food supply. It resulted in lower food prices, higher employment and a more rapid agricultural and economic development. Chitsiko (1999) argues that irrigation schemes are important in augmenting government policy of reducing rural to urban migration. He noted that irrigation schemes provide a source of livelihoods, self-reliance and income to the youth who did not intend to move to town. These schemes helped in reducing rural-urban migration by offering rural population an alternative source of income and employment. Food security is likely to increase in households practicing irrigation farming. Chenje et al. (1998) state that the aim of irrigation is to increase crop production and grow crops in areas where such an activity would normally be impossible due to lack of water. Irrigation schemes are viewed as a substitute for costly disaster relief by governments. According to Kadzombe et al. (1973), instead of importing food relief at a higher cost, farmers are assured of a constant source of food and income by establishing irrigation schemes.

According to FAO (1996), yields per area, for most crops, have increased between 100 to 400% as a result of irrigation. This has contributed to a reduction in food prices. For example, the area under irrigation in India increased by 30% between 1970–1985, from 31.1 million hectares to 41.8 million hectares, whilst food grain prices fell by 20% relative to the price index for all commodities. These reductions have a positive impact on the income of the urban and rural poor. Irrigation is a key to developing high value cash crops; and by helping guarantee consistent production, it creates significant rural employment. According to FAO (1998), irrigation has put smiles in the faces of many people in semi-arid and arid regions where crop production without irrigation is unpredictable. In Egypt, 80% of the food requirement comes from irrigated lands (FAO, 1998). It has been possible to increase and protect harvest and grow crops that could not otherwise be cultivated under conditions of extreme drought. Irrigation increases the use of farm labour, income and eliminating the uncertainty that comes from variable yearly and seasonal rainfall (Oriola, 2009). It has made higher and more reliable yield possible, as crops can be planted more than once in a year within the tropics.

Irrigation farming maximizes production with double or multiple cropping: taking full advantages of modern technologies and high yielding crop varieties. Moreover, it provides farmers an opportunity to grow high value crops like vegetables and fruits that require year round, generous supply of water to grow. Studies on the impact of irrigation farming in some African and Asian countries generally show that irrigators are in a better position in terms of income, food security, nutritional status and standard of living than those relying on rain-fed production. For instance, Sing & Misra (1960) compared India's Sarda canal irrigation and non-irrigating villages and concluded that income from irrigated farm is 5.5% more than that from rain-fed farms they surveyed.

There are four interrelated mechanisms by which irrigated agriculture can help farmers: increasing production and income; reduced food price that helps poor households meet the basic needs and improve welfare; protecting against the risks of crop loss due to erratic, unreliable or insufficient rain fall; promoting greater use of yield enhancing farm inputs which creates additional employment, which together enables people to move out of the poverty cycle. Irrigation farming has a strong multiplier effect on other sectors of the economy (Ali & Pernia, 2003). Narayamoorthy (2001) reports that besides increasing the cropping intensity and productivity of crops, access to irrigation increased the demand for agricultural laborers and wage rates. Shah and Singh (2004) found that, in India more irrigation means fewer people below the poverty line. FAO 1996) suggests that in developing countries, irrigation can increase yields of most crops by 100 to 400%, while also allowing farmers to reap the economic benefits of growing higher value cash crops that are less risky, more continuous and create higher levels of rural employment and income for both farm families and landless laborers. Binswanger & Quizon (1986) find that, in India, the effect of expanding the irrigated area by 10% of the rural poor resulted in an aggregate output increase by 2.7% and a decreased in the aggregate price level by 5.8%. With a secure water supply, farmers can choose to invest in higher yielding seeds and grow higher value crops.

A study by Haile et al. (1996), using farm level data collected from 324 households in Nepal, also indicated that drip irrigation has generated a significant positive effect, increasing the onion yields and overall farmer income. An average yield of drip irrigation production is increased by 86% when compared to rain-fed crops. The net income of irrigators exceeds that of the rain-fed farmers by \$69 per hectare, which has an obvious effect on the ability of the farmers to increase the production and sustained livelihood strategies. Kuwornu & Owusu (2012) concluded that irrigation investment in Ghana is justified due to significant irrigation contribution to consumption expenditure per capita in farm households. Dillon (2011) investigated the impact of small-scale irrigation investments on household consumption, assets and informal insurance in Mali using both PSM and the matched difference-in-difference method. Both estimation methods confirmed the positive role played by irrigation schemes on household consumption and asset accumulation.

Hussain et al. (2006) evaluated the impact of small-scale irrigation schemes on poverty alleviation in Pakistan using descriptive statistics. The study found that poverty levels were higher in rain-fed than in irrigated areas. For example, the poverty head count ratio was found to be 37% in rain-fed areas, compared to (29%) in irrigated areas. Interestingly, the study found that poverty head ratio was even much lower (23%) in areas that practiced both irrigated and rain-fed farming. Namara et al. (2008) studied the role played by access to irrigation on income, rural poverty and inequality in Ethiopia using the logistic regression model. As expected, the poverty incidence, depth and severity values were lower for farmers that had access to irrigation compared to the non-irrigators. Bacha et al. (2011) both assessed the impact of irrigation farming on household welfare in Ethiopia using the Heckman's two-step estimation procedure. Both studies observed significant welfare differences between irrigators and non-irrigators, and concluded that access to irrigation had played a part in those observed differences. Bacha et al. (2011) found that about 70% of the irrigation users were food secure while only (20%) of the nonusers were food secure in the Filtino and Godino irrigation schemes in Ethiopia.

A study by Fanadzo (2012) suggests that irrigation schemes in South Africa have failed to bring about the expected social and economic development in rural areas. However, these studies used gross margin or correlation analysis. Van Averbeke (2012) investigated the factors that contribute to differences in the performances of smallholder irrigation schemes in Vhembe District in South Africa. Although arguing that smallholder performance has been below expectations, gross margin analysis by Yokwe (2009) and Hope et al. (2008) indicated that irrigators have somewhat greater gross margins per hectare compared to non-irrigators. For the Zanyokwe and Thabina irrigation schemes, Yokwe (2009) finds greater gross margin per hectare among irrigators for all the crops that were included. Hope et al. (2008), however, find that irrigation schemes provide expected income and food for those plot holders with irrigation access. The study conducted by Tekana & Oladele (2011), using the OLS procedure, conclude that irrigation plays a central role in the improvement of household income, rural livelihood and food security.

RESEARCH METHODOLOGY

A multistage sampling procedure was adopted to select the respondents for the study. At the first stage, two districts namely, Kansena-Nankana and Bongo Districts were purposively selected for the study. The selections of the districts were guided by the level of irrigation farming activities present. The districts have as much as 68.7% of economically active population employed in agricultural activities (GoG, 2010). The selected district also has the largest irrigation scheme in the region. These irrigation schemes (Tono and Vea) cover areas of 2490 and 850 hectares, respectively (ICOUR, 1995). At the second stage of sampling, three (3) communities noted for irrigation farming were randomly selected from each of the two districts. The third stage of sampling involved the use of simple random sampling to select 30 respondents from each community. Respondents were randomly selected from both irrigators and non-irrigators. A total of 90 respondents were sampled in each of the two districts, computing to an overall total of 180 elements for the study.

ANALYTICAL FRAMEWORK

In analysing the impact of irrigation on outcome the method of matching based on propensity scores was applied. Evaluating the impact of project interventions requires the establishment of the requisite counterfactual that represents what would have happened had the project not taken place or what otherwise would have been true (Baker, 2000). The establishment of this counterfactual often poses problems where the "before intervention situation" remains missing. Under such circumstances, an appropriate estimation of the counterfactual needed (Friedlander & Robins, 1995; Zaman, 2001). Thus, the Propensity Score Matching (PSM) framework was adopted for estimating the impact of irrigation access on farmers' income. The impact of the outcome variable in this case farm income is obtained by matching an ideal comparative group of farmers, who did not participate in irrigation farming (non-irrigating farmers) to the treatment group farmers who participate in irrigation farming (irrigating farmers) on the basis of propensity scores (*p*-scores) of a set of observable characteristics (X) that influence farmers decision to participate or not to participate in irrigation.

To develop the PSM framework, let Y_i be the outcome variable (income) of a farmer *i*, such that Y_{1i} and Y_{0i} denote a farmers' income with and without participating in irrigation respectively. A dummy variable I_i denotes irrigation participation or access to irrigation facility by a farmer *i*, where $I_i = 1$ if a farmer has access to

irrigation facility, and $I_0 = 0$, otherwise. The income observed for a farmer *i*, Y_i is defined by the following equation (Quandt, 1972).

The impact of irrigation on a farmer *i*'s income is given by:

where $\Delta i Y_i$ denotes the change in the income of a farmer *i*, resulting as a result participating in irrigation farming Heckman et al. (1997). A farmer can be classified into two groups which are mutually exclusive, that is, Y_{1i} (irrigating farmer) or Y_{0i} (non-irrigating farmer). The framework assumes heterogeneity in the impact of irrigation participation on income of farmers due to differing characteristics. Hence average treatment effect (ATE), and the average treatment effect on the treated (ATT) are used in the impact analysis framework of PSM (Heckman et al., 1997). ATE estimates the effect of farmers participating in irrigation scheme on income without irrigation (counterfactual) while ATT estimates the impact of farmer's participation in irrigation on income of farmers who actually participated in irrigation. Mathematically, it can be represented as:

$$ATT = \left[E\left(\Delta_{i} | I_{i} = 1\right) \right] = E\left[Y_{1i} - Y_{0i} | I_{i} = 1\right] = E\left[Y_{1i} | I_{i} = 1\right] - E\left[Y_{0i} | I_{i} = 1\right]....(3)$$

From equation (3), $E[Y_{0i} | I_i = 1]$ is the missing data representing the outcomes of irrigation participants in the absence of irrigation scheme participation. One way to estimate this missing data is to use the income of a non-irrigating farmer as:

$$\left[E\left(\Delta_{i}\left|I_{i}=1\right)\right]_{=}\right]$$

There is the need to control for unobservable heterogeneity, in equation 4 to avoid bias in the estimates using $E[Y_{0i}|I_i=1]$. This result into the following equation:

$$= E \Big[Y_{1i} | I_i = 1 \Big] - E \Big[Y_{0i} | I_i = 0 \Big] - E \Big[Y_{0i} | I_i = 1 \Big] + E \Big[Y_{0i} | I_i = 1 \Big].....(5)$$

$$= \underbrace{E \Big[Y_{1i} - Y_{0i} | I_i = 1 \Big] + E \Big[Y_{0i} | I_i = 1 \Big] - E \Big[Y_{0i} | I_i = 0 \Big]}_{Bias}$$

Rearranging (5) gives,

The PSM method takes care of the bias (Cobb-Clark & Crossley, 2003; Ravallion, 2005) to ensure consistent estimate. The PSM procedure has two parts, the first part consists of using binary logit model to derive propensity scores (Dehejia & Wahba, 2002). A binary logit model can be represented as:

$$\Pr(I_i = 1 | X) = \frac{1}{1 + e^{-\beta X}} = \Pr(X)....(7)$$

where X is a vector of explanatory variables including household demographic characteristics that are deemed to influence farmers' decision to participate in irrigation farming. Pr (X) is the propensity score. Based on the propensity scores from the logit model, the Nearest Neighbor matching and Kernel matching method were used to match the income of the two groups of farmers. Rosenbaum & Rubin (1985) opine that common support assumption is necessary for a valid conditional independence which are all necessary for a meaningful matching. The common support assumption can be presented mathematically as follows:

$$\left\{ E\left[Y_{0i}\right], I_{i} = 1, X_{i} = x \right\} = \left\{ E\left[Y_{0i}\right], I_{i} = 0, X_{i} \approx x \right\}.$$
(8)

Rosenbaum & Rubin (1985) showed that once appropriate common support is established the conditional independence assumption becomes valid. They proved that, if income of non-participants (Y_{0i}) is independent of participation in irrigation (I_i) given $X_i = x$, then participants are also independent of participation (I_i) given their propensity scores [P(X)]. Once common support is established for the irrigating farmers, the heterogeneous impact (ATT) of irrigation on farmers' income can then be estimated using Equation (9).

Nearest Neighbor and Kernel Based Matching algorithms were used, which involve trade-offs in terms of bias and efficiency to match treated and untreated respondents.

RESULTS AND DISCUSSIONS

The descriptive statistics of the respondents has been grouped into two tables. Table 1 presents the characteristic captured as continues variables while Table two presents the descriptions of the characteristics captured as dummy or categorical variables. Age of the sampled respondents ranged from 28 to 80 years with an average age of 41 and 42 years for irrigator and non-irrigators respectively. There is no significant difference in the distribution of the sampled respondents, suggesting age has no influence on the participation decision. This is attributable to the fact that both respondents belong to the same population. The average household size for the irrigators and non-irrigators was about 7 and 6, respectively. This result is statistically insignificant, suggesting that labor availability is not an important factor influencing households' decision to participate in irrigation farming in the study area.

Level of education often influences adoption of technology positively (Hoag et al., 1999). This is attributed to the fact that farmers with more years of schooling would be expected to better visualize the benefits of technology. Similarly, education plays a key role in a household's decision to undertake irrigation framing. The average schooling years of the respondents of irrigators and non-irrigators is about 6 and 4 years, respectively (Table 1). Years of experience is critical in taking decision to either participate in irrigators farming or not. From Table 1, it can be seen that average years of experience is 18.7 and 20.4 for irrigators and non-irrigators respectively with standard deviation of 9.9 and 10.7, respectively.

Cultivated land size of irrigators and non-irrigators is on average, 1.84 acres and 1.95 hectare, respectively. This is consistent with Kuwornu & Owusu's (2012) finding that land sizes are usually small, often in the range of 1.2 hectare in irrigated areas. The study also examined the level of fertilizer usage between the irrigators and non-irrigators and the result is presented in Table 1. The average quantity of fertilizer and seeds of irrigators are 146.79 kg and 55.38 kg per hectare, respectively. The corresponding values for non-irrigators are 80.00 kg and 21.00 kg, respectively. This might be attributed to the fact that the irrigators are quite sure of good yield hence are prepared to invest in fertilizer compared with non-irrigators. The result further shows that there is a significant difference in the average inputs used by the two groups of farmers at 5% level.

Table 1: Comparison of Continuous Variables between Irrigators and Non-irrigators								
	irrigators		non	-irrigators				
Variable Definition	Mean	St. Dev.	Mean	St. Dev.	T-test			
Age of respondents	41.59	10.93	42.57	11.52	$\rho = 0.60$	_		
Household size	6.93	2.70	5.98	2.50	$\rho = 0.03^{**}$			
Years in schooling	5.68	5.54	4.29	5.80	$\rho = 0.14$			
Years of experience	18.7	9.9	20.4	10.70	$\rho = 0.56$			
Cultivated land size (acre)	1.84	0.77	1.95	0.72	$\rho = 0.16$			
Quantity of fertilizer (kg)	146.79	74.61	80.00	35.53	$ ho = 0.000^{***}$			
Quantity of seed (kg)	55.38	28.97	21.00		10.43	$\rho = 0.000^{**}$		

Note: *** significant at 1%, ** significant at 5% and * significant at 10% of significance levels

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Table 2 presents the descriptions of the characteristics captured as dummy or categorical variables. In Table 2, the majority (75%) of respondents were males with 25% being female. The mean value for irrigators and non-irrigators are male 76% and 73%, respectively, while female are 24% and 27%, respectively. Table 2 indicates that the proportion of female irrigators was 24%, which implies that women's access to irrigation is far below that of men. This confirms the results of Kinfe et al. (2012) which found that women's access to irrigation is limited. Of the sample respondents, 80% are married and the rest are either single or separated/divorced. With regards to level of education, about 46% of the respondents do not have any formal education while only 2 had tertiary education. Large proportion of the respondents is married in both categories of farmers. On the average, about 80% of the total respondents are married. In case of irrigators, 85% are married while only 69% of non-irrigators are married.

In general, about 64% of the total sample believed that the land quality is good for farming. In the case of irrigators about 71% and 47% of the non-irrigators believed that the land quality is good for farming. This is not surprising as the non-irrigators perceived irrigated land as not good for farming hence they decided not to use the irrigation facility for farming. About 96% of non-irrigators source of farm land is inheritance while close to 50% of irrigators used company owned irrigated land for farming (Table 2). It is possible that the payment for the use of land might be one of the reasons why the non-irrigators are not using the irrigation facilities as large proportion used inherited land for farming. The findings show that sampled farmers in the study area have better access to extension services that was illustrated by frequent visits by extension agents, participation in demonstration day, and training of the farmers. According Madhusuda et al. (2002), agricultural extension services play a vital role in the motivation of farmers towards the adoption of improved irrigation practices.

	irrigators non-irrigators]	Fotal				
Variat	ole Definition	Freq.	%	Freq.	%	Freq.	%	χ^2 -test
Candan	Male	91	76	37	73	128	75	a = 0.65
Gender	Female	29	24	14	27	43	25	ρ – 0.63
	No formal education	49	41	30	59	79	46	
	Primary	21	18	6	12	27	16	
Educational	JHS/Middle	21	18	4	8	25	15	$0 = 0.009^{***}$
level	SHS/Technical	27	23	6	12	33	19	p 0.009
	Tertiary	2	2	5	10	7	4	
	Single	8	7	6	12	14	8	
Manital status	Married	102	85	35	69	137	80	
Marital status	Divorced	1	1	1	2	2	1	$\rho = 0.10$
	Widowed	9	8	9	18	18	11	
	Good	85	71	24	47	109	64	
Land quality	Poor	35	29	27	53	62	36	$\rho = 0.003^{***}$
	Family/inheritance	64	53	49	96	113	66	
	Community usage	12	10	2	4	14	8	$a = 0.000^{***}$
Source of farm	Rented	2	2	0	0	2	1	ρ 0.000
Tanu	ICOUR	42	35	0	0	42	25	
	No	6	5	21	41	27	16	
Access	Yes	90	75	21	41	111	65	0 000***
to credit	No	30	25	30	59	60	35	$\rho = 0.000$
Access to	Yes	61	51	17	33	78	46	0. 0. / **
extension service	No	59	49	34	67	93	54	$\rho = 0.04^{**}$

Table 2: Comparisons of Categorical Variables between Irrigators and Non-irrigators

Note: *** significant at 1%, ** significant at 5% and * significant at 10% of significance levels.

The introduction of high valued crops, efficient use of water and proper use of inputs have all been deemed as significant factors for crop production and productivity. Hence, the result of this study is consistent

with that study by Ziba (2014) which revealed that 51% of the irrigators and 33% of non-irrigators get extension service (Table 2). The Chi-square test indicated that there is a significant relationship between irrigation users and non-users with regard to extension service at a 10% level of significance. Credit is an important institutional service for poor farmers to purchase inputs and ultimately to adopt new technology. However, whiles some farmers have access to credit, others may not due to problems related to repayment and down payment requirement to get inputs from formal sources. Hence, some farmers avoid farm credit. The survey result indicated that 75% of the irrigators and 41% of the non-irrigators had taken credit. This was statistically significant at 1% level of significance (Table 2).

FACTORS INFLUENCING PARTICIPATION IN IRRIGATION SCHEMES: THE ECONOMETRIC MODEL RESULTS

The Logit model was used to generate propensity scores for the matching algorithm. The overall model is statistically significant at a *P*-value of 0.000. Hence, the chosen observable characteristics adequately explain the probability of participation. The Logit regression revealed that variables such as the household size, years in schooling, family labour, land acquisition, cultivated land size, access to credit and produce price affect the probability of participation in irrigation farming significantly. Household size is statistically significant at a 1% level of significance and positively associated with the probability of participation in irrigation farming. The possible reason is that households with larger family size can probably have more labor to engage in irrigation schemes. Since farmers with larger household size can perform various agricultural activities without labor shortage. Hence, farmers with larger household size can probably choose to participation would increase by 73% if other variables in the model remain constant. This finding is consistent with previous studies (see, Haile, 2008). Sikhulumile et al. (2014) that found household size positively increases the probability of participation in irrigation in irrigation in irrigation farming. This suggests that the increase in the household size implies a cheap labor source and this may affect the probability to participate in irrigation schemes.

However, family labor has negative but significant relationship with farmer's decision to participation in irrigation farming. This might be due to the fact that with family labor the farmers prefer to cultivate larger area than going in for irrigated farm land which comes with rental cost. Alternatively, with large family size they may have higher expenses hence could not afford to rent irrigated land for their farming activities. Based on the marginal effect a unit increase in family labor would lead to about 31% less likelihood of farmer using irrigation facility. The results also indicate that farmers with large cultivated land size were less likely to participate in the irrigation scheme. This was shown by negative coefficient of cultivated land size (-1.63) and significant at 1% significance level. Gebrehawaria et al. (2009) also report of such a negative relationship between cultivated land size and participation in irrigation schemes in Ethiopia.

Farmer's perception on the land acquisition process also has negative but significant relationship with their decision to use irrigation facility. The result shows that farmers who perceived acquisition of irrigated land as cumbersome are less likely to use irrigation facility. In line with the marginal effect, farmers who perceive irrigated land acquisition process as cumbersome are 27% less likely to use irrigation facilities as compared to their counterparts who perceive the process as not cumbersome. The results show that market access for inputs is statistically significant (at 5% level of significance) and it positively affects the irrigation participation of farmers. This implies farmers with access to the market have a higher likelihood of participating in irrigators than those who reported otherwise. As irrigation is meant to enhance productivity and marketable surplus, it is not surprising that those farmers with better market access are more likely to participate in irrigation schemes. This means that if farmers have access to market they are more probable to participate in irrigation schemes and otherwise. A study by Adeoti et al. (2015) on adoption of treadle pumps and poverty impact in Ghana, found markets to be significant determinants of participation in treadle pump irrigation.

Access to credit had a positive and statistically significant (at 5% significance level) relationship with irrigation participation, suggesting that the farmers with credit availability have higher opportunities to be engaged in irrigation schemes than otherwise. Access to credit played an important role in improving farmers' livelihoods. Farmers with access to credit purchased more inputs (fertilizer, improved seed variety, agro chemicals) than those without. Access to credit also ensures that farmers can secure inputs in time. This leads to

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improved agricultural output, resulting in increased farm income. One of the most critical problems threatening the viability of irrigation is the lack of credit. Producer price received by the farmers is also significant in farmer's decision to participate in irrigation farming. The coefficient of this variable is 1.7, which is significant at 1%. This implies that if the producers received good price for their produce they more likely to go into irrigation farming the following season. This might be due to the fact that they have enough money to pay to rent the land and also acquire other farming inputs for production with expectation of good price. The marginal effect revealed that a using increase in producer price is likely to increase the probability of farmer using irrigation facility following year by 21%.

Standard Marginal							
Variable	Coefficient	Error	Z	P-value	effect		
Constant	2.0694	2.338	0.89	0.376	0.0584		
Age	0.0189	0.0473	0.40	0.689	0.0075		
Gender	1.1555	0.6915	1.67	0.095	0.0296		
Years in schooling	0.0054	0.0617	0.08	0.935	0.1181		
Marital status	0.9276	0.6984	1.33	0.184	0.0486		
HH size	0.7302***	0.2265	3.22	0.001	0.3184		
Family labor	-0.7081***	0.2717	-2.61	0.009	-0.2143		
Years of experience	-0.0574	0.0516	-1.11	0.266	-0.0157		
Cultivated land size	-1.6306***	0.4758	-3.43	0.001	-0.1562		
Land quality perception	0.4344	0.5678	0.77	0.444	0.0584		
Land acquisition process	-2.6957*** 1 7095**	0.9305	-2.9 2 31	0.004	-0.2705		
Access to inputs	1.7075	0.7405	2.51	0.021	0.0270		
Ready market for produce	-0.2068	0.7474	-0.28	0.782	-0.1181		
Credit access	1.8520**	0.7176	2.58	0.01	0.0486		
Access to extension	0.7411	0.6268	1.18	0.237	0.5164		
Price of produce (lastyear)	1.7547***	0.6480	2.71	0.007***	0.2143		
Logistic regression		Number of O	bs=	171			
		L K Chi-square (16)		114 41			
		– Prob> Chi-sq	117,71				
		=		0.000			
Log likelihood = -46.9965	0.549						

Table 3: Logit Model Predicting Probability of Irrigation Participat	tion
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Note: *** significant at 1%, ** significant at 5% and * significant at 10% of significance levels

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The propensity score matching results indicate that irrigation has a significant impact on the farmers' income of irrigators. Irrigator's income is found to be between GHC 1986.11 and GHC 1990.65 more than the non-irrigators based on the matching method adopted. The Nearest Neighbor matching method identified 46 comparable control farmers, while the Kernel matching method identified 44 control farmers from the nonirrigators (Table 4). The average income estimated using the Kernel matching method is higher than that of the Nearest Neighbor matching method, indicating that the Kernel matching method is conservative. To conclude, both matching methods indicate that irrigation schemes play an important role in farmers' income and of livelihoods in the area. The Propensity Score Method (PSM) results support the conclusions of [42] Hope et al. (2008) that access to irrigation schemes plays a key role in determining the poverty reduction impact. Comparing the results across the different matching methods indicates that the estimated irrigation impact is robust.

Matching	Number of	Number of	Но	usehold Incom	Standard			
Algorithms	Treated	Control	l Matched Matched A treated Control A		ATT Error		i-stat	
Nearest Neighbor	108	46	1986.11	651.02	1335.09	133.17	10.03***	
Kernel matching	107	44	1990.65	636.78	1353.87	209.14	6.47***	

Note: *** significant at 1%, ** significant at 5% and * significant at 10% of significance levels

The estimated ATTs using Nearest Neighbor and Kernel matching method on income of the impact of irrigation schemes have shown in Table 4. PSM results confirm that irrigation schemes improve farmers' income, indicating that irrigated farmers get between GHC 1335.09 (US\$ 381.45) and GHC 1353.87 (US\$ 386.82) more than the non-irrigated farmers depending on the matching methods used. This result is consistent with the findings of previous studies (Gebregziabher et al., 2009; Bacha et al., 2011; Kuwornu & Owusu, 2012). This indicates that access to irrigation schemes has led to significant increase in farmers' income in the study area.

CONCLUSIONS AND POLICY RECOMMENDATIONS

From the results presented in this paper, it can be concluded that there are more male in farming sectors compared to the female. This may be attributed to access to land in the area. Thus, it is recommended that the ICOIR should liaise with the district MoFA office and the NGOs interested in women welfare to develop a scheme that would improve women access to irrigated land. Generally, produce price and access to input had significant effect on probability of farmer participating in irrigated farming. Thus, policies that would improve access to input and stabilize price of agricultural produce is likely to improve farmers' participation in irrigation. The result of the propensity score matching revealed that participation in irrigation farming has significant effect on income of the farmers. Therefore, it can be concluded that irrigation scheme in the region can support sustainable livelihood development and improve crop variety, access to input and credit facilities supported by appropriate extension services. The above recommendation, if implemented properly, would improve farmers' participation in irrigation farming; minimize crop failure, increase income and consequently sustainable livelihood. It is therefore imperative for government, NGOs, interest groups and individuals to give irrigated agriculture the needed attention to ensure enhanced livelihoods through income generation in the region.

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CORPORATE ENVIRONMENTAL EFFICIENCY AND TURNOVER

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ABSTRACT

This paper aims to assess the relationship between corporate environmental performance and firm turnover. The environmental performance proxies are limited to carbon reduction, water reduction and waste reduction. Literature on previous empirical findings vacillates. Therefore, data for this study was collected form socially responsible firms in the JSE' Socially Responsible Index. Archived data from sustainable development reports of 2011 to 2015 of the sample were analyzed using simple regression analysis. The findings show the existence of a significant relationship between corporate environmental performance and firm turnover. The relationship is negative for water reduction and positive for other variables. Whilst this paper concentrated on sales turnover effect of environmental performance, further research is needed to understand the impact of each variable on financial performance in order to motivate managers toward engagement on environmental efficiency.

Keywords: Sustainability performance, environmental performance, emission reduction, water reduction, waste reduction

INTRODUCTION

The JSE endorses the King code of corporate governance which promotes sustainability in the form of corporate environmental responsibility (Visser, 2005). Corporate environmental responsibility is a vastly discussed issue globally, however, there is no globally acceptable definition as the subject is still evolving (Kercher, 2007). A study indicates that corporate social responsibility (CSR) can be defined in five dimensions, namely: environmental, social, economic, stakeholders and voluntariness (Dahlsrud, 2008). Corporate social responsibility being an unclear subject, there exists hesitation within corporations to engage in environmental investment activities (Höllerer, 2013). Therefore, the use of CSR in this research will also refer to corporate environmental performance; hence corporate environmental performance and CSR will be used interchangeably in this research. During the industrial revolution environmental impacts were not considered as the impacts were not known nor realised.

The obvious environmental changes led scientists to question the possible cause and if there were any solutions. Studies were done over time to assess the impact of industries and human activity on the atmosphere and the environment. Researchers found that pollution is the main contributor and mostly corporates were the bigger offenders (Bowler & Brimblecombe, 2000). The recommendations lead to developments of some legislatures and eventually laws and regulations on waste disposal. New industries emerged and the human population kept growing hence the need for more services and energy. Thus more corporations and an increased burning of fossil fuels and biomass thus leading to more atmospheric pollution and increasing levels of GHG. The relationship between corporate growth and increased corporate emissions was positive (Beck, 1959). Now with the idea of preserving our planet, corporates are encouraged to adopt environmental friendly practices.

Dr. Tlou J. Ramonyai is a medical doctor and a master of business administration (MBA) student at the Turfloop Graduate School of Leadership, Faculty of Management and Law, University of Limpopo South Africa. During his studentship in the MBA programme, Dr. Ramonyai developed a research interest in corporate environmental sustainability management and financial performance linkage.

Professor Collins C. Ngwakwe is a professor of accountancy in the MBA Programme at the Turfloop Graduate School of Leadership, University of Limpopo South Africa. He specialises in integrated accounting, financial management and corporate governance. His research interest blends environmentally-focussed sustainable development with finance, accounting and business. Some literature indicates that to some extent there is a relationship between customer satisfaction and corporate environmental investment (Korschun, 2014). There is also evidence, which indicates that, a corporation with good corporate environmental investment performance has limited capital constrains to fund their projects (Cheng, 2014). Furthermore, some previous studies have demonstrated a positive relationship between CSR and Corporate financial performance and that CSR has an impact on gross profit (Kang, 2014). Multinational enterprises and national enterprises operating within the RSA engage significantly in CSR (Noyoo, 2016). There is a greater need for research to assess the effects of corporate environmental performance on corporate turnover, gross profit and net profit. Hence, this research intends to evaluate this phenomenon in the context of selected JSE Socially Responsible Investing (SRI) firms.

RESEARCH PROBLEM

Corporate environmental responsibility has been under discussion for many years; however, there is still no clear global understanding of what it means. Even with evidence that environmental investment is beneficial to corporations there is still hesitation and reluctance from some corporations (Höllerer, 2013; Kang, 2014). Internationally and locally, there are studies that show that there is a relationship between CSR and corporate financial performance (Nkomani, 2013; Chang, 2014). However, there are limited studies in South Africa on the relationship between environmental performance and corporate turnover in the SRI index companies. If there is no provable evidence of a positive relationship between corporate environmental performance and corporate turnover, the element of hesitation and doubt will continue. Therefore, this study seeks to examine the effect of corporate environmental performance on corporate turnover, gross profit and net profit within a given time period.

Worsening environmental changes due to industrialisation and human activities threaten life and the entire ecosystem (Halpern, 2008). Hence the need to ask relevant questions so that relevant solutions can be found to help rehabilitate the environment and guide law makers. The laws and legislatures encouraging corporate social investment are trying to address this problem. The following research questions were formulated:

- What is the relationship between carbon emission reduction and corporate turnover?
- What is the relationship between water reduction and corporate turnover?
- What is the relation between waste reduction and corporate turnover?

This paper is guided through these research questions.

LITERATURE REVIEW

Carbon Emission Reductions and Firm Turnover

South Africa aims to reduce the green gases emission by 34% by 2020 by implementing a carbon tax bill (Alton, 2014). Dwyer et al. (2013) found that carbon tax will reduce Australia's GDP and will affect sectors like tourism. This implication is that more carbon emitted will reduce turnover and hence profit but less carbon will increase turnover and profit. However, China, being the largest carbon emitter, has already committed to reducing its carbon emission significantly by 2020 (Li, 2013).

Studies show a relationship between environmental performance such as in carbon reduction and turnover and corporate financial performance (Nkomani, 2013; Chang, 2014). It further elaborated that both large and small corporations can reduce greenhouses gas emissions profitably (Planbeck, 2012). Carbon emission reduction has an impact on the economy as a whole as fossil fuels and energy consumption drive industries (Dang et al., 2013). With no standardised way of measuring greenhouse gas emissions methodological inconsistencies have been noted, which resulted in unclear emission figures (Dragomir, 2012). Some researchers have submitted that the effect of carbon tax on business should be assessed thoroughly to minimise the financial implications and control the environmental impact of greenhouse gases (Li, 2013). Greenhouse gas emission reduction is found to be related to improved financial performance in a short term, however corporate growth is

CORPORATE ENVIRONMENTAL EFFICIENCY AND TURNOVER

related to increased emissions (Russo & Pogutz, 2009). This research will respond to this call by examining a possible relationship between carbon emission reduction and turnover.

Water Reduction and Firm Turnover

Previous research has shown that corporations are trying to conserve natural resources and eliminate waste thus improving their turnover, profit and competitiveness (Rodinelli & Berry, 2000). Also, research has indicated that saving water will reduce the water bill of corporates while at the same time remaining environmentally friendly (Wong et al., 2012). Rainwater is one of the most under used natural resources which studies show that harvesting rainwater can supply about 60% of water needed to irrigate both single and multifamily building needs (Entrop et al., 2010). Hence, researchers have found that water savings may improve corporate turnover (Wong et al., 2012).

Industrial rainwater harvesting systems prove to be cost effective even though the cost of maintaining the system was not taken into consideration (Ward, 2012). Water recycling is one of the best ways to reuse water, e.g. collecting water used once other than toilet water and using it for irrigation or for toilets. Maintenance of the water pipes is crucial in water conservation as leaks can lead to a lot of water being lost and the cost thereof being large (Ward, 2012). Corporations in East Asia encourage their suppliers to adopt lean production; it has been demonstrated that water reduction is related to cost saving and improved productivity (Rao, 2002).

Waste Reduction and Corporate Turnover

A meta-analysis study and other studies show a positive relationship between corporate environmental performance and corporate financial performance (Nkomani, 2013; Eccles, 2014; Chang, 2014). Corporate environmental performance can be improved by, reusing, recycling, recovering and reducing waste (Glew et al., 2013). These result in maximising profitability (Glew et al., 2013). Reducing waste at all levels of the supply chain is proven to be one of the requirements to improving profitability (Kumar et al., 2012). Changing waste into inventory is an increasing interest in social entrepreneurship, thus maximising on the already available resource (waste) and also being environmentally friendly (Parris & McInnis-Bowers, 2014). Recycling waste material for the same product is also highly beneficial, like recycling glass out of broken bottles to make other bottles. Usually recycling requires less energy and leads to lower carbon emission than manufacturing new products from scratch. New technologies and skills development are proven to improve waste reduction in some manufacturing companies, which is associated with improved future financial performance (Waddock & Graves, 1997).

METHODOLOGY

This paper adopts a positivist research paradigm to situate the research design. Research paradigm is a guided step-by- step way of looking at the world and the nature of knowledge (Mertens, 2013). Collis & Hussey (2013) highlight that research paradigm is people's philosophies and assumptions of looking at things to help guide how research is conducted. Positivism is a philosophical guide of quantitative research, which perceives reality as objective (Sarantakos, 2012). In positivism, variables are assessed and an objective review, which is measurable, predictable and controllable, is given (Cohen, Manion & Morris, 2013). In this study the relationship of firm environmental performance (independent variable) against a dependent variable (firm turnover) to produce results on corporate turnover will be assessed. Therefore, a positivist research paradigm is more suitable since this research will measure relationships between variables (Cohen et al, 2013; Creswell, 2013).

Furthermore, this research will adopt a quantitative approach since positivist assumptions are better suited for quantitative research (Creswell, 2013). Quantitative research is applicable when variables are assessed and measurable results using mathematical, statistical or computational methods are given (Creswell, 2013). The research design opted for in this study is a case study. A case study is an intense study of an entity or unit or group that stresses factors that affect its success or failures (Yin, 2013). Studying one unit can help to

understand the concepts or relations better than studying the whole cross section of an entity (Gerring, 2006). A case study design was chosen as the researcher will be looking at a number of JSE listed companies, therefore the research design will be a multi-case study. Kothari (2005) defines a multi-case study in healthcare context, when a group of individuals with the same condition are studied for a common reason. The researcher will thus study top performing JSE listed companies in terms of environmental investment, which is in keeping with a multi-case study.

Study Area

A Study area is a geographic area in which data are collected and analysed (Hancock & Algozzine, 2015). This research will be conducted in South Africa. The physical addresses of the sampled firms are all over the country. The one common area is that the firms are listed on the Johannesburg Stocks Exchange.

Population

A Study population is a sample that will be studied in a particular research (Yin, 2013).

Eligibility criteria are when the sample is chosen based on a set of conditions that must be met to be included in the study (DCCT Research Group, 2013). The eligibility criteria in this study is that participants has to:

- Be a corporation in business within South Africa;
- Be JSE listed; and,
- Be top performing in corporate social investment.

The study population includes all the 61 corporations listed in the JSE responsible investment index.

Sampling and Sample Size

Sample is a subset of a population strategically chosen to represent the entire population in a study (Suresh & Chandrashekara, 2012). Sampling is the process of choosing a sample, strategically picking individuals from a group to represent and give information about the entire group (Lunsford & Lunsford, 1995). There are random and non-random sampling methods. Non-random methods include judgemental sampling, and it is described as purposive or judgmental because the choice of selection is based on the opinion of researcher (Fellows & Liu, 2015). Judgmental or purposive sampling was chosen because this study will be looking at the top performing corporations in SRI in JSE listed companies for year 2015. The sample size will be corporations listed in JSE responsible investment index and judged to be top performers in corporate social and environmental investment. Hence adopting a judgemental sampling, the sample is made up of the top 30 performing companies out of the 61, which is about 49% of the entire population.

Data Collection

Data collection is the way of gathering information from the study sample process and evaluating it in a way that answers the research questions (Lewis, 2015). The researcher will be using the annual financial statements from corporations' publications of the said study sample for the year 2015. This method of collecting data is archival. Archival data collection method is defined as collecting data that is no longer active but relevant to the current life. (Wagner et al., 2014). This way of collecting data is also called retrospective (Montgomery, Peck & Vining, 2015). The data to be collected by the researcher will be: Carbon emission data, Water usage data, waste reduction data and firm turnover from the sample companies.

Data Analysis

Data analysis is a technical way of extracting and evaluating information from the data to give solutions (Treiman, 2014). Little & Rubin (2014) say that it is a statistical process of analysing and evaluating data. There are many methods of data analysis; this researcher will be using multiple regression analysis. Regression analysis is defined as statistical technique of assessing relationships between variables (Hayes, 2013). This paper uses multiple variables, inclusive of the following:

- Carbon emission reduction
- Water use
- Waste reduction
- Turnover.

A computational simple regression formula will be used, in accordance with Pennink's (2010) study as follows: Simple regression model:

 $Y = \beta o + \beta 1 \chi + \varepsilon$

Where Y = dependent variables = Turnover $\beta o = Y$ intercept $\beta 1 =$ regression coefficient (value of change in Y) $\chi =$ independent variables = carbon reduction, water use, and waste reduction $\epsilon =$ error term.

Simple linear regression is best suited for this study because it is both retrospective and quantitative in nature (Montgomery, Peck & Vining, 2015)

DATA ANALYSIS AND RESULTS

Data were collected from five companies listed on the JSE Socially Responsible index over five years (2011 to 2015). The data were extracted from the annual financial reports and sustainable development reports for all the years. The data collected are presented in appendix 1. Names of companies are replaced with descriptors "Company A to E" in order to preserve confidentiality, as environmental issues remain very sensitive. The sample of companies was purposively chosen from the top performers in the 2015 JSE SRI socially responsible index. However, firms that did not have all the data with all the variables needed for the study were left out, hence only five companies reflected all the data required and these were used. Since the data arrangement was through a panel data, the 5 companies by 5 years resulted in 25 observations.





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Figure 1 above shows the financial performance of "Company A" depicted as TO (Turnover per year). It shows that the company has been performing well financially with only year 2012 showing a slight drop in turnover. There is also a consistent rise in water (H2O) use for the first three years and a drop in the last two years. The biggest reduction in water use coincides with the highest turnover in year 2014. Carbon dioxide (CO2) emission is within narrow limits for the five years. Waste is uneven with year 2012 showing the highest amount of waste generated then the reduction in subsequent years. Figure 1 generally shows the lowest TO (turnover) is related to the highest waste, highest carbon dioxide emission and second highest waste generated.

Figure 2 shows the data for firm B, clearly seen there is a progressive increase in turnover for the first four years with a slight decrease in turnover for the last year. The water use of company B is kept steady even though there is rise in turnover. There is a slight decrease of water use for year 2015 with a slight decrease in turnover. Carbon dioxide emission is generally high for "Company B"; and, there is a significant increase in carbon dioxide in 2012 compared to 2011. The increase in carbon dioxide emission is also in line with the increase in turnover for year 2012. Years 2013 and 2014 show a slight decrease in carbon dioxide emission even though there is an obvious increase in turnover for those years. Carbon dioxide emission in year 2015 is the highest for this five-year period.



Figure 2: Five-year Trend Analysis of "Company B" on Turnover and Environmental Performance

This level of emission is also related with the first drop in turnover for the period. For waste, there is a slight increase in waste generation for year 2012. There is an increase in all variables in year 2012. However, there is a decrease in waste generation for the subsequent years. The reduction shows an almost perfect reduction strategy for "Company B". Figure 3 presents results for "Company C". Turnover in "Company C" is increasing consistently for the first three years.



Figure 3: Five-year Trend Analysis of "Company C" on Turnover and Environmental Performance

There is a slight decrease in turnover for the last two years but still above year 2012. The water use is increasing consistently with turnover for the first three years and then decreases for the last two years. Carbon dioxide emission increases consistently for the sampled period of five years. The waste production

is reducing consistently for the sampled five years. "Company C" is reporting a fairly high turnover. The firm uses a lot of water for its production and the carbon dioxide emission is continuously rising. Waste generation is decreasing significantly, going to almost zero generation of waste.



Figure 4: Five-year Trend Analysis of "Company D" on Turnover and Environmental Performance

"Company D" shows a growing turnover consistently over a period of five years (Figure 4). The company uses a lot of water in its processes. From the sampled data it can be seen that there was a decrease in water use for year 2012 and year 2014 respectively. The last year, 5 shows to have the highest use of water in "Company D". 2015 is also the year in which "Company D" reported the highest turnover. Carbon dioxide emission increased consistently for the first three years. A very minimal increase in the emission of carbon dioxide is noted. There is however a slight decrease in the emissions for year 2015, which is the years in which the highest turnover is reported. Waste generation is very low for the first two years, years 2011 and 2012 respectively. In year three 2013 there is a large increase in waste generation for "Company D". The same production of waste is also reported for year 2014. There was a slight increase in waste generation for year 2015. "Company D" shows to have a steady growing turnover. The company uses a lot of water in its productions and year 2015 is significantly high. There is a slight increase in carbon dioxide emissions and a very minimal decrease in emissions in the year 2015. For the last three years there is an alarming increase in waste generation.

The turnover of "Company E" was growing for the first three years (Figure 5). There is a significant drop in turnover for year 2014. There is however a slight increase in turnover for year 2015. 2013 is the year in which "Company E" reported the highest turnover for the sampled period. Water use is significantly high. The first three years show that there was a slight increase in water use.



Figure 5: Five-year Trend Analysis of "Company E" on Turnover and Environmental Performance

Year 2014 shows that there was an alarming increase in water use. Also, 2014 is the year where turnover dropped significantly. The last year shows that the water use was still very high but a drop from the year before. Furthermore, 2015 is second highest year for water used in the sampled time frame. Carbon dioxide increased significantly for the second year, 2012 and from 2012 to 2015 there is a consistent

decrease in carbon emission. Year 2011 shows that company D produced the highest amount of waste. From 2012 to 2015 there was a significant drop in the amount of waste produced. The last three years show that waste production was kept within a limited range.

DATA ANALYSIS AND RESULTS

Test 1, Research Question 1: What is the relationship between water reduction and corporate turnover?

Statistical analysis involves simple regression and the equation used, as already stated, is: $Y = \beta o + \beta 1 \chi + \varepsilon$ Where Y is turnover, βo is the Y intercept, $\beta 1$ is regression co-efficient, χ is water reduction and ε is error term.

Test 2, Research Question 2: What is the relationship between carbon dioxide emissions and corporate turnover?

Statistical analysis involves simple regression analysis: $Y = \beta o + \beta 1 \chi + \epsilon$ Where Y is turnover, βo is the Y intercept, $\beta 1$ is regression co-efficient, χ is carbon dioxide reduction and ϵ is error term.

Test 3, Research Question 3: What is the relationship between waste reduction and corporate turnover?

Statistical analysis involves simple regression: $Y = \beta o + \beta 1 \chi + \varepsilon$ Where Y is turnover, βo is the Y intercept, $\beta 1$ is regression co-efficient, χ is waste reduction and ε is error term.

Significance Level

The relationship is deemed significant if the p value is less or equal to 0.05 (P \leq 0.05). For this study a p value of more than 0.05 (p>0.05) will be deemed as a non-significant relationship.

Test 1 Results are presented in Table 1. The statistical analysis presented in Table 1 shows a p- value of 0.02 (p-0.02), which is far below the non-significant level of (p- 0.05). There the relationship between water reduction and corporate turnover is significant within the 5 sampled firms. The relationship is however negative which is in keeping with some literature (Filbeck & Gorman, 2004; Busch & Hoffmann, 2011; Liu & Lu, 2015).

The findings also contradict other studies such as (Rodinelli & Berry, 2000; Gallego-Álvarez, García-Sánchez & Silva Vieira, 2014; Molina-Azorín et al., 2009; Wong et al., 2012; Cheng, Ioannou & Serafeim, 2014). The reason for this contradiction could be the difference in the analysis method used and areas of study. The other factor could be that the sampled firms are from different industries, while some industries may be using more water than others, which may also have an impact on the findings. The study duration and sample size may be one of the contributing factors as some studies were conducted on a far larger scale than this study.

Table 1: Simple Regression Analysis Results of the Relationship between Water Reduction and Firm Turnover

Model 3: Fixed-effects, using 25 observations Included 5 cross-sectional units Time-series length = 5 Dependent variable: Sales TO

	Coefficient	Std. Error	t-ratio	p-value	
Constant	88611.3	13810.7	6.4162	< 0.00001	***
Water RDN	-626.186	251.815	-2.4867	0.02236	**
Mean dependent varian	ce 74894.38	8	S.D. dependent varianc	e 65746.4	7
Sum squared residual	7.61e+10	C	S.E. of regression	63306.1	3
R-squared	0.266012	2	Adjusted R-squared	0.07285	7
F(5, 19)	1.377197	7	P-value(F)	0.27678	7

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Log-likelihood	-308.4364	Akaike criterion	628.8729
Schwarz criterion	636.1861	Hannan-Quinn	630.9013
rho	-0.292924	Durbin-Watson	2.402580
for differing group intercept	ts -		

Test for differing group intercepts -Null hypothesis: The groups have a common intercept Test statistic: F(4, 19) = 0.356925with p-value = P(F(4, 19) > 0.356925) = 0.83602

Test 2 Results are presented in Table 2.

Table 2: Simple Regression Analysis Results of the Relationship between Carbon Dioxide Reduction and Firm Turnover

Model 2: Fixed-effects, using 25 observations Included 5 cross-sectional units Time-series length = 5 Dependent variable: Sales TO

	Coefficient	Std. Error	t-ratio	p-value	
Constant	49017.6	9864.02	4.9693	0.00009	***
C02RDN	1.87406	0.324758	5.7706	0.00001	***
Mean dependent variar	nce 74894.3	8	S.D. dependent var	65746.	47
Sum squared residual	3.67e+1	0	S.E. of regression	43929.	14
R-squared	0.64657	0	Adjusted R-squared	0.5535	63
F(5, 19)	6.95178	9	P-value(F)	0.0007	61
Log-likelihood	-299.301	3	Akaike criterion	610.60	27
Schwarz criterion	617.915	9	Hannan-Quinn	612.63	11
rho	-0.52684	5	Durbin-Watson	1.5724	42
for differing group interc	cepts -				

Null hypothesis: The groups have a common intercept

Test statistic: F(4, 19) = 0.336974

Test

with p-value = P(F(4, 19) > 0.336974) = 0.849623

For carbon dioxide reduction the statistical analysis shows a p value of 0.00001 (*p*- 0.00001), which is far from the significance level of 0.05. These findings indicate that there is a significant relationship between carbon dioxide reduction and corporate turnover. This relationship is positive within the 5 companies. These findings are similar to previous studies that found a positive relationship between carbon dioxide reduction and firm turnover (Russo & Pogutz, 2009; Planbeck, 2012; Fujii et al., 2013; Nkomani, 2013; Sariannidis et al., 2013; Chang, 2014; Eccles, 2014; Jo, Kim & Park, 2015). These findings, however, negate some studies done elsewhere (Busch & Hoffmann, 2011; Liu & Lu, 2015). This may be due to the broadness of the topics studies previously, not being narrowed to a particular environmental factor. The generalisation of industries also plays a major role in these findings

Test 3 Results are presented in Table 3:

Table 3: Simple Regression Analysis Results of the Relationship between Waste Reduction and Turnover Model 4: Fixed-effects, using 25 observations

Included 5 cross-sectional units

Time-series length = 5

Dependent variable: Sales TO

	Coefficient	Std. Error	t-ratio	p-value	
Constant	53184.5	11341.8	4.6892	0.00016	***
Waste RDN	116.644	26.3474	4.4271	0.00029	***
Mean dependent varian	ce 74894.3	8	S.D. dependent var	65746.4	7
Sum squared residual	4.97e+10	0	S.E. of regression	51134.4	8
R-squared	0.521122	2	Adjusted R-squared	0.39510	1
F(5, 19)	4.135212	2	P-value(F)	0.01038	1

Log-likelihood	-303.0984	Akaike criterion	618.1967
Schwarz criterion	625.5100	Hannan-Quinn	620.2251
rho	-0.503676	Durbin-Watson	1.913819
st for differing group interes	nta		

Test for differing group intercepts -Null hypothesis: The groups have a common intercept Test statistic: F(4, 19) = 0.45959with p-value = P(F(4, 19) > 0.45959) = 0.764403

The relationship between waste reduction and firm turnover is significant within the five firms sampled in this study, with a p value of 0.00029. The p value showed by the statistical analysis is way less than the significance level for this research of 0.05. These findings further indicate a positive relationship between waste reduction and firm turn over. These findings are in keeping with previous researches in this area (Watson et al., 2004; De Burgos-Jiménez et al., 2013; Nkomani, 2013; Singal, 2013; Wang & Sarkis, 2013; Chang, 2014; Eccles, 2014). There are other studies, which found different results (Zhu & Sarkis, 2004; Dwyer et al., 2013). This may be due to the fact that some firms recycle their waste. Recycled waste is therefore not accounted for in this paper, but other studies may have included it. These differing findings may be due to the challenges of dealing with waste in other sectors, where the majority of the waste is toxic or hazardous. Where such hazardous waste cannot be manipulated into other products such as healthcare waste.

CONCLUSION AND RECOMMENDATIONS

This paper shows that the relationships between variables analysed are generally significant with a p-value of less than 0.05. The statistical analysis of the data from the five sample companies reveals a negative relationship between water reduction and corporate turnover as well as a positive one between carbon dioxide and waste reduction on firm turnover. The findings in this paper corroborate some previous findings in the literature in demonstrating that the significance of the relationship between carbon emissions and global climate changes. Equally, the paper identifies a positive significant relationship between carbon reduction and firm turnover at the p-value of 0.00001. Further, the paper finds a positive significant relationship between waste reduction and financial performance at a significance level of 0.00029. Also, the paper highlights the fact that sectorial differences play an important role in shaping these relationships. Some sectors like mining are more water intensive than others, such as financial sectors. But the environmental benefits of water reduction are of paramount importance for the future of South Africa.

The paper recommends that corporations should take responsibility for their actions and consider answering questions such as: was profit made at what cost to the environment? A balance must be struck to maintain the economic growth and preserving the environment to allow continuity with sustainability. Being wholly quantitative, this paper recommends for further studies that are qualitative and/or a combination of both, in order to ensure a balance is struck in the activities of corporations. Given that carbon reduction, waste reduction and water reduction are seen as the major performance monitors for reducing air, land and water pollution, these factors needs to be studied and evaluated in detail against a variety of financial performance variables, beyond firm turnover.

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CORPORATE ENVIRONMENTAL EFFICIENCY AND TURNOVER

Appendix 1: Firm turnover, water reduction, carbon reduction and waste reduction						
Year	Company	Rm	Mm3 Water	KT Carbon	КТ	
		Sales Turnover	reduction	reduction	Waste reduction	
Company A	2011	2 974.9	115	312	5	
	2012	2 865.3	156	337	8	
	2013	3 251.1	201	294	4	
	2014	3 767.5	27	326	6	
	2015	3 044.7	33	304	4	
Company B	2011	142 436	0.14	65 449	1175	
	2012	169 446	0.148	68 903	1318	
	2013	181 269	0.147	67 905	1032	
	2014	202 683	0.149	67 484	571	
	2015	185 266	0.135	69 772	482	
Company C	2011	49 823	0.767	189	1.419	
	2012	58 554	0.799	197	1.357	
	2013	65 102	0.832	260	0.634	
	2014	62 101	0.785	273	0.492	
	2015	62 729	0.745	287	0.312	
Company D	2011	22 584	1.725	193	0.118	
	2012	25 174	1.522	257	0.118	
	2013	27 382	1.679	311	8.843	
	2014	31 783	1.536	319	8.869	
	2015	33 711	1.917	300	9.04	
Company E	2011	58 751	0.295	180	9.113	
	2012	143 832	0.319	397	1.609	
	2013	158 646	0.319	335	2.071	
	2014	84 069	0.98	319	2.108	
	2015	91 115	0.698	294	1.925	

Appendix

Key:

Rm = **Rand** In Millions

Mm3 = Million cubic miters KT = Kilotonne

DETERMINANTS OF INVESTMENT ACTIVITY IN SOUTH AFRICA

Thobeka Ncanywa, Itumeleng P. Mongale, and Miglas P. Mphela

ABSTRACT

Investment activities can promote technical progress through the introduction of new technology and can reduce poverty by creating increased rates of employment. In the long run, through the production process, investment activities can create new capital goods. Investment ensures growing capital stock in the country because investing in fixed capital stock can accelerate the economic growth. Gross Fixed Capital Formation (GFCF) is commonly known as the net investment, refers to the total fixed amount of capital accumulated. This paper seeks to examine the determinants of investment activity in South Africa. It uses the Johansen Cointegration and Vector Error Correction model; and, it finds the long- and short-run relationship on the time series data. It establishes that there is positive relationship between economic growth, interest rate, inflation and investment. However, taxation and investment are negatively related. This indicates that investment activity can be explained by tax, economic growth, interest rates and inflation. The paper recommends low taxation, growing economy, increasing availability of credit to boost investment activity in South Africa.

Keywords: Gross fixed capital formation, economic growth, taxation, interest rates, inflation

INTRODUCTION

As one of the important macroeconomic variables, investment can ensure infrastructure development and growth in the economy by raising the productive capacity (Fedderke, Perkins & Luis, 2001; Cheteni, 2011; Ugwuegbe & Uruakpa, 2013). Investment activities can promote technical progress through the introduction of new technology and can reduce poverty through an increase in the level of employment. In the long run, through the production process, investment activities can create new capital goods. Majeed & Khan (2008) and Gkionis et al. (2015) indicate that to ensure growing capital stock in the country there must be higher rate of investment since investing in fixed capital stock can accelerate the economic growth. Gross Fixed Capital Formation (GFCF) is commonly known as the net investment, refers to the total fixed amount of the capital accumulated. It measures the capital stock; in the measurement it excludes land purchase but includes the disposal of fixed assets. Meaning increasing capital stock, excluding the land purchase and less disposable of fixed assets. As a result it can therefore be used as a measure of investment activity of a country (Mishkin, 2016).

During the 1980s and the early 1990s South Africa experienced a low GFCF due to civil conflicts and the apartheid regime (Fedderke, 2005). GFCF increased from R51 289 million in 1994 to R74 018 million during the fourth quarter of 1997. On the other hand, during the first quarter of 1998 the investment decreased

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by R2 653 from last quarter of 1997 and started increasing during the third and fourth quarters of 1998, but declined during the first quarter of 1999 due to the Asian financial crises. From 2000, the investment in South Africa has been increasing until first quarter of 2009 where the world was faced with financial crises. In 2015, the GFCF was around R161 182 million (South African Reserve Bank (SARB), 2015).

Literature provides contradicting views on the relationship between real interest rate and investment. For instance, other studies such as Majeed & Khan (2008) and Gkionis et al. (2015), are supporting the view that they are positively related while some such as Veemon et al. (1996) are supporting the view that they are negatively related. Therefore, this study has been motivated by Gkionis, et al. (2015) who found out that factors such as output growth, private credit growth, taxation and interest rates act as determinants of investment activity in Greece. Also, Michaelides et al. (2005) included profitability to output growth and interest rates.

Developing countries in Africa deal with a growing inability to encourage investment. Fluctuations in GFCF (net investment) need to be addressed by the policy makers, with particular concern of the declining trends. This is due to the fact that GFCF is associated with the importance of acquisition of the existing fixed assets. In addition, as one of the components of GDP, it measures the amount of the new valued added within the economy which is invested rather than used. Decreasing GFCF can result into slow growth rate in the economy, lack of innovation, and difficulties when it comes to the matters related to prediction of investment return (Majeed & Khan, 2008). For example, in South Africa there was a drastic decline of GCFC in 2008 and fluctuated after 2010. Based on the slow growth of investment activities as indicated by the trends in GCFC, it was interesting to find out what determines the investment activity in South Africa. Therefore, the study examines the determinants of investment activity as measured by GFCF in South Africa from 1994 to 2015.

LITERATURE REVIEW

Several investment theories such as the accelerator theory, the rigid accelerator theory and the flexible accelerator theory are considered as theoretical framework of this study. The accelerator theory of investment suggests that in a firm, an increase in the rate of output will entail a comparable increase in the capital stock. Assuming that capital output ratio is some fixed constant, v the desired capital stock is constant part of output and can be denoted as follows:

$$K_{t} = vY_{t}$$
^[1]

where: $_t$ is the period, Yt is the rate of output, Kt is capital stock and v is the positive constant representing the accelerator (Clark, 1917).

Meanwhile the rigid accelerator theory of focuses on output growth as function of investment. The assumption is that optimal stock of capital is reached in each space of time. However, this theory did not take into consideration some factors such as profits and financial factors among others. That is one of the reason why the flexible accelerator model was formulated (Goodwin, 1948; Gould, 1968; Koyck, 1954; Lucas, 1967; Treadway, 1971). The flexible accelerator theory of investment is also known as the capital stock adjustment model. Its main aim was to remove the point that capital stock is optimally adjusted without any time lag. This theory suggested that between the level of capital stock and the level of output there are lags in the adjustment process. If there is continuity for some time in the increase of demand for output, the firm will eventually increase its demand for capital stock (Koyck, 1954).

As far as emperical literature is concerned, Majeed & Khan (2008) examined the determinants of private investment and the relationship between public and private investment in Pakistan. It is interesting to note that their results indicate that there was a "crowding out" effect, and the public sector used most of the financial and physical resources that had a negative influence on the private investment. Furthermore, Naqvi & Naveed (2002) used an accelerator based model to indicate that if the economy is growing, the investment will eventually grow as well. Taxation, economic growth, cost of capital, profitability, inflation and interest rates have been found to be determinants of investment activity. For example, Gkionis et al. (2015) indicated that tax was negatively related to investment in Greece. Governments play an important role in the taxation (corporate tax) because they can encourage or discourage the level of investment in the country. If the government charges a heavy tax, there will be less investment in the country (McBride, 2012). Hassett & Hubbard (1996) revealed that taxation has a negative effect on GFCF. The corporate income taxes increase the cost of capital and at the
same time discourage the level of investment (Arnold, Brys, Heady, Johansson, Schwellnus & Vartia, 2011; McBride, 2012).

The cost of capital also known as the return rate of investment can affect the level of investment if it is high. This is based on a notion that, if the cost of capital is high, private investors would not go for borrowing which will discourage investment (Majeed & Khan, 2008; Gkionis, et al., 2015). This indicates that investment and real interest rate are negatively related. However, study in Malawi by Veemon et al. (1996) found contradicting results on the relationship between interest rates and investment. Availability of capital is another factor that affects the level of investment. For example, if it is readily, it will be easy for the firm to borrow since most of the firms depend on the external funds. For that reason, several studies such as Majeed & Khan (2008), Ugwuegbe & Uruakpa (2013), Ainabor, Shuaib & Kadiri (2014), Gkionis, et al. (2015), indicate that there the positive relationship between the level of investment and changes in credit to firms which is availability of capital.

Profitability is another determinant of investment. Michaelides et al. (2005) used the multiple linear regression model to examine the determinants of investment in Greece and indicated that an increase in the profitability of a firm means more investment in the future. Furthermore, Romer (1996) results indicates that profitability and investment are positively related. The insinuation that firms with higher profit tend to investment more. Literature further indicates that few studies on the relationship between investment and economic growth was also conducted in several African countries. Fedderke, Perkins & Luis (2001) found that infrastructure played an important role on economic growth though causality of economic growth to infrastructure was found to be weak. Ugwuegbe & Uruakpa (2013) and Ainabor (2014) revealed that in Nigeria capital formation had a positive impact on economic growth. Cheteni (2011) investigated the impact of transport infrastructure investment on economic growth and concluded that domestic fixed transport investment has positively influenced the economic growth of South Africa. Therefore, this paper intends to add to this body of literature by focusing on the determinants of investment activity in South Africa.

METHODOLOGY

Data and Specification of the Model

The study employed times quarterly data (1994-2015) sourced from the South African Reserve Bank (SARB). To achieve its aim, the following linear model is estimated:

$$I_t = \alpha_0 + \alpha_1 GDP_t + \alpha_2 RIR_t + \alpha_3 TAX_t + \alpha_4 DC_t + \alpha_5 INFL_t + \varepsilon$$
^[2]

Where *I* is the ratio of GFCF to GDP. *GDP* is the real Gross Domestic product used as a proxy for economic growth (Mohr, et al., 2004; Mishkin, 2001). *RIR* is the real interest rate, *TAX* is the annual changes in the corporate tax rate, *DC* is the private credit annual growth and *INFL* is the inflation rate. In addition \mathcal{U}_0 is the intercept, 't' is the time trend, ' \mathcal{E} ' is the random error term and $\propto_1 - \propto_5$ are the slope coefficients.

Estimation Techniques

According to Asteriou & Hall (2007), testing stationarity is very importance in order to avoid spurious regression. If stationarity test is not tested, spurious regression might mislead the results, for example by indicating a high R^2 . The stationarity test also known as units root test is estimated with Augmented Dickey Fuller (ADF). Phillips Perron (PP) test were also employed to confirm the results of Augmented Dickey Fuller (ADF).

In determining the long run relationship between the variables, the study employed the Johansen cointegration approach. The lag length is the starting point when running the Johansen approach cointegration. Then, the second point is the trace and eigenvalue tests statistics to determine the number of cointegration equation(s) for the series. The presence of cointegration indicates the existence of a long run relationship

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amongst the variables. Furthermore, the study employed the Vector Error Correctional Model (VECM) since there was evidence of cointegrating equations to determine the short run dynamics of the variables and the speed of adjustment (Aziakpono, 2006). In addition, for the determination of causality in the series, the Pairwise Granger Causality was employed. Granger (1969) regards causality as, X_t is a Granger cause of Y_t if Y_t can be predicted with greater accuracy by using past values of X_t . Testing for causality upholds a standard procedure outlined by Gujarati (2004).

After establishing the short run dynamics and the direction of causality amongst the variables, impulse response is engaged to find out the reaction of the current and future values as well as the results of the one-unit increase in the current value of one of VAR error. In addition, it also reflects the effects of an exogenous shock on the whole process over time. Apart from impulse response function, variable decomposition was applied to determine the shocks to a variable which will have an effect on the variable direction, but will also be passed to other variables through the dynamic structure of the VAR (Brooks, 2002).

Finally, the study diagnostic tests were employed to ensure that the results of the VECM model yields true estimates. In that case the Jacque Bera method was used to decide whether or not the residuals are normally distributed in the model (Gujarati, 2004). The Ljung- Box Q and the Breusch- Pagan tests are employed to determine if there is an existence of autocorrelation in the model (Asteriou & Hall, 2007). For heteroscedasticity, the white test was employed. Lastly, Ramsey Reset test was also carried out to determine the correctly specification of the equation. (Asteriou & Hall, 2007).

RESULTS AND DISCUSSIONS

Unit Root Test

The summary of both the ADF and PP unit root test results are presented in Table 1. Both tests are examined at 1%, 5% and 10% level of importance and are based on none, intercept and trend and intercept. The results indicate that all variables in the model at level form are non-stationary. They all become stationary at first difference.

		Augmented Dickey-Fuller			Phillips-Perron			
Order of integration	Variables							
		Intercept	Trend and intercept	None	Intercept	Trend and intercept	None	
Level	I	-1.712255	-2.331707	0.314028	-1.477192	-1.951196	0.553056	
1st diff	DI	- 5.9381***	- 5.9026***	-5.941***	5.9158***	-5.8802***	-5.9198***	
Level	LGDP	-1.199669	-1.218642	3.583***	-1.2600	-0.9187	7.088***	
1st diff	DLGDP	- 4.752***	-4.868***	-2.892***	-4.705***	-4.831***	-2.602***	
Level	TAX	-1.564798	-0.430102	0.332692	-4.724***	-6.790***	-0.543586	
1st diff	DTAX	- 12.278***	- 12.600***	- 12.299***	-37.305***	-58.864***	-35.170***	
Level	INFL	-3.1695**	-3.24670*	-1.184793	-2.704211*	-2.706822	-1.466369	
1st diff	DINFL	-4.045***	-	-4.057***	-5.823***	-5.836***	-5.859***	

 Table 1: Augmented Dickey Fuller and Phillips-Perron Test Results

			4.0112***				
. .	DID	1 6000 71		0.045440	1.2.0000		0.01.50.15
Level	RIR	-1.608351	-3.905**	-0.945412	-1.369099	-2.917564	-0.815045
1st diff	DRIR	-5.514***	-5.473***	-5.516***	-5.066***	-5.031***	-5.109***
Level	DC	-1.50211	-4.892410	2.930474	-0.815774	-4.452***	1.612770
1st diff	DDC	-	-	-	-19.37***	-26.70***	-11.98***
		8.137***	8.168***	11.74***			

Source: Authors

Johansen Cointegration

The cointegration analysis was based on the lag 2 because the best lag length was chosen mostly in lag length selection criteria (Gujarati & Porter, 2009). Tables 2 and 3 indicate the results of the trace and maximum eigenvalue tests results.

Table 2: Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
NT Y	0.265670	107.0261	05 75266	0.0067
None *	0.365679	107.0361	95./5366	0.0067
At most 1	0.313646	68.34413	69.81889	0.0652
At most 2	0.210174	36.35335	47.85613	0.3788
At most 3	0.090371	16 29826	29 79707	0.6911
At most 4	0.054697	8.247216	15.49471	0.4393
At most 5	0.039956	3.465974	3.841466	0.0626

**MacKinnon-Haug-Michelis (1999) p-values

Table 3: Unrestricted Cointegration Rank Test (Maximum Eigenvalues)

No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**	
хт	0.045470	20 (0100	10 00050	0.0710	
At most 1	0.313646	31.99078	33.87687	0.0825	
At most 2	0.210174	20.05509	27.58434	0.3374	
At most 3	0.090371	8.051045	21.13162	0.9005	
At most 4	0.054697	4.781242	14.26460	0.7692	
At most 5	0.039956	3.465974	3.841466	0.0626	

Max-eigenvalue test indicates no cointegration at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Source: Authors

The trace test indicates that there is one cointegrating equation which implies the presence of a long run relationship amongst the variables. This implies that in the long run, investment will be expressed by an explanatory variable in the model.

Vector Error Correction Model (VECM)

The trace test in the previous section indicated that there is at least one co-integration equation. This means that the study can employ the vector error correction model (VECM). This allows us to distinguish between the short and long term effects of variables.

Variables	Coefficients	Standard error	t-statistics
Cointegrating equation	-0.015365	(0.01091)	[-1.40883]
Constants	-0.292448	(0.10072)	[-2.90363]

Table 4: Summary of the VECNI estim	nate	estimates
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Source: Authors

In Table 4 the speed of adjustment is indicated by the coefficients of the error correction terms which is -0.015365. It indicates that there is deviation from equilibrium of only 1. 5365% and is corrected in one quarter as the variable moves towards restoring the equilibrium level (Gujarati & Porter, 2009). The negative sign shows that even if there can be a shock in the economy, the speed of adjustment is still able to restore to equilibrium level. This indicates that investment has no strong pressure from restoring in the long run whenever there is a shock or disturbance in the economy. That been the case, the low speed of adjustment by investment reflect the existence of some factors affecting investment in South Africa.

Equation 3 shows the existence of long run relationship between investment, availability of credits, interest rate, inflation, taxation and economic growth in South Africa. The normalized co-integrating equation shows that there is a negative relationship between investment and taxation in South Africa as indicated by α_1 (-0.402475) from tax. This means that when the government increase the corporate tax the investment tends to decline. This means that if there is 1% increase in tax, this will lead to 0.402475 decline in investment. Hassett & Hubbard (1996), Arnold et al. (2011) and McBride (2012) also revealed that when government increases the level of corporate tax, the investment tend to suffer. The corporate income tax increases the cost of capital and at the same time discourage the level of investment (Arnold et al., 2011; McBride, 2012).

Table 5: Normalized Cointegration Coefficients

Normalized cointe	grating coefficie	ents (standard erro	r in parentheses)		
Ι	TAX	LGDP	RIR	DC	INFL
1.000000	0.402475	-23.65516	-0.085253	-11.69906	-2.811851
	(0.19557)	(44.4843)	(0.41325)	(9.98354)	(0.48918)
	[2.05801]	[-0.531766]	[-0.20630]	[-1.17183]	[-5.74806]
Sources Authors					

Source: Authors

The estimated equation derived from the normalized co-integration coefficient is as follows:

$$I = -0.29 - 0.4 TAX + 23.7GDP + 0.085RIR + 11.7DC + 2.8INFL$$
[3]

Equation 3 further reveals that interest rate and investment have a positive long run relationship. This relationship is in line with Veemon et al.'s (1996) finding that interest and investment are positively related in Malawi. However, the flexible accelerator theory of investment indicates that when the cost of capital is high, private investors do not go for borrowing which will discourage investment. Equation 3 shows that in South Africa when interest rate increases, the level of investment tend to increase. This implies that 1% increase in interest rate will lead to 0.085253 increase in investment. Equation 3 also shows that there is a positive relationship between investment and availability of credit, inflation rate and economic growth in South Africa. These results are in line with some of the previous studies about determinants of investment (see for example,

Majeed & Khan, 2008; Ugwuegbe & Uruakpa 2013; Ainabor, Shuaib & Kadiri, 2014; Gkionis et al., 2015). The availability of credit makes it easy for firms to borrow more especially for firms that depend on external funds.

Impulse Response Functions

The study reported in this paper employed impulse response to determine the reaction of the current and future values as well as the results of the one-unit increase in the current value of one of VAR error.

Figure 1: Impulse Response Functions

Response of INV_RATIO to Cholesky One S.D. Innovations .6



Source: Authors

Figure 1 shows that investment by itself produce large positive impact and it has a positive impact of nearly 6% from first year to second year and from third year to the tenth year the shock dies. Innovation on tax indicates up and down from the first year until the tenth year. In the second year the shock die and it was negative that year. Innovation on GDP indicates a greater positive impact because of a rise from the first to the sixth year and from the seven year to tenth the shock die. Innovation on availability of credit from first year to second is rising with a positive impact until the second year. From the third year the shock dies and becomes negative up until the tenth year. Innovation on interest rate starts by increasing from first to third a year and then become constant up to fifth year. From sixth to the tenth year the shock dies and eventually becomes negative during the ninth year. Innovation on inflation is negative from fourth year up until tenth year even if from first year to second year there was a positive impact of nearly 1%.

Variance of Decomposition

The variance decomposition analysis results in Table 6 indicate that investment explains about 72% of its variance for the 5th year ahead forecast error variance. The remaining 28% account explanatory variables of the error variance. In the 28% of explanatory 0.10% is taxation, 19% is economic growth, 0.74% is availability of credit, 7.69% is the interest rate and 0.15% is the inflation rate. In the 10th year the table shows a decline by 10% in investment. Furthermore, Table 6 shows that in the 10th year investment explains 61.86% of its own variation. The remaining 38.14% explains the explanatory variables. Innovation to the explanatory variables continuous to clarify or explain the important proportion of the variance in investment.

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Period	S.E.	Ι	TAX	LGDP	DC	RIR	INFL
1	0.425143	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000
2	0.734582	95.55325	0.019079	1.244188	1.732282	1.176980	0.274218
3	1.008691	85.24627	0.120100	8.142790	0.927091	5.372659	0.191094
4	1.243187	77.72393	0.083544	14.36753	0.696969	7.000677	0.127349
5	1.431316	72.07005	0.104206	19.25554	0.743577	7.691671	0.134956
6	1.585263	68.28691	0.097986	22.75918	1.080080	7.423567	0.352282
7	1.716868	65.84524	0.114474	25.04731	1.377251	6.743555	0.872172
8	1.838946	64.11262	0.108598	26.56333	1.656600	5.954441	1.604412
9	1.956540	62.77257	0.106472	27.65835	1.853040	5.261214	2.348350
10	2.070723	61.68343	0.095811	28.56736	2.017744	4.714122	2.921539

Table 6: Variance Decomposition

Source: Authors

Diagnostic and Stability Test

The diagnostic tests were done to so that the chosen model is checked for robustness to ensure that the results yields true estimates of the error correction model (Engle & Granger, 1991). There was no sign of heteroscedasticity in the residuals because the P value of 0.6541 is greater than 0.05 significance. The Jarque Bera normality with a p value of 0.50117 indicated that the residuals are normally distributed in the model. The Breusch-Godfrey LM test indicated that there is no serial correlation in the model because the p-value of 0.9866 is more than 0.05. Finally, the Ramsey RESET stability test indicates that the equation is correctly specified.

CONCLUSION AND RECOMMENDATIONS

The aim of the paper was to examine the determinants of investment activity in South Africa. The study employed the Johansen cointegration and Vector Error Correction model and found the long and short run relationship on the time series. It was found that that there is positive relationship between economic growth, interest rate, inflation, availability of credit and investment activity. However, taxation and investment are negatively related in South Africa both in the long and short run. This indicate that investment activity can be explained by taxation, economic growth, interest rates, availability of credit and inflation.

The paper recommends that the South African government should ensure availability of credit in the economy because of the positive relationship between investment and availability of credit. Government should ensure that the economy is growing in the country for the attraction of the potential investors. The estimates of interest rate are small in so much that it does not encourage the level of investment even if they are positively related. The inverse relationship between investment and the level of taxation imply that the government should put in place a reasonable tax rate, as low as possible.

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THE INFLUENCE OF CORPORATE EXTERNAL AUDITOR ON SUSTAINABILITY DISCLOSURES: A STUDY OF INDUSTRIAL GOODS COMPANIES

Nwobu Obiamaka and Owolabi Akintola

ABSTRACT

The purpose of this paper is to assess the level of sustainability reporting of companies in the industrial goods sector of Nigeria. It also examines whether the sustainability disclosures of companies can be influenced by their audit firms. The results show that, on average, the level of sustainability disclosures increased from 2010 to 2014. Further, the results show that companies having one of the Big Four audit firms as financial auditor, have higher sustainability disclosures than companies that do not. Based on the 95% confidence level, a significant difference between big four and non-big four audited companies is found on the combined dependent variables namely economic, environmental, governance and social disclosures. This implies that the difference in the disclosures of companies audited by one of the Big Four and those audited by others was significant. The present study contributes to the existing literature on sustainability reporting. The findings of this paper might be useful to accounting firms as well as regulators and practitioners involved in providing sustainability information to users. The paper recommends that there is a need for regulation of companies in the industrial goods sector in order to improve reporting in environmental and social issues particularly those on climate change, suppliers' assessment based on environmental risks, gross direct greenhouse gas emissions, organic pollutants and suppliers' assessment for impacts on society.

Keywords: Corporate governance, audit firm, industrial goods, sustainability disclosures, Nigeria

INTRODUCTION

Corporate failures have increased the demand for transparency and disclosure to business stakeholders. The changing business environment has made it imperative for companies to report their sustainability performance while reporting on elements of financial statements such as assets, liabilities, expenses, income and capital. According to Selvanathan (2012), the benefits of improved sustainability performance include financial benefits such as cost savings, revenue and efficient use of materials and resources; corporate transparency and reputation. These benefits are some of the reasons for the practice of improved sustainability performance by companies in economic, social, environmental and governance aspects.

Companies identify and report on sustainability issues in their annual reports and/or stand-alone reports. In line with this, a number of studies that assess the extent of sustainability reporting using internationally recognized guidelines such as Global Reporting Initiative (GRI), United Nations Global Compact (UNGC), and national recognized guidelines such as those emanating from respective governments and stock markets exist (Guthrie & Farneti, 2008, Moneva & Ortas, 2008, Gherardi, Guthrie & Farneti, 2014, Adeniyi, 2016). While majority of these studies focus on developed countries, there is dearth of research on developing ones. Nigeria is a developing country and there is an obvious need for research on sustainability reporting due to transparency and disclosure issues of companies that have been the subject of debate since the financial crisis.

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Studies on sustainability reporting could provide useful information about environmental, economic and social performance of organizations.

Accordingly, this current study attempts to achieve two main objectives. The first objective is to assess the level of sustainability reporting of industrial goods companies in Nigeria over the period of 2010 to 2014. The second objective is to assess whether the financial auditor type influences sustainability reporting of industrial goods companies in Nigeria over the same period.

The remaining part of this paper is divided as follows: the second section discusses with the literature review; section three discusses the research method. Section four presents the results. Section five discusses the results and section six provides conclusion and recommendation for further studies.

LITERATURE REVIEW

Nature of Accounting

Accounting is concerned with the collection, recording, analysis and reporting of financial data about organizations. According to Ambashe & Alrawi (2013), accounting is an information system that records and communicates the monetary events of an organization to internal and external users. Although, money is necessary for any business, it does not constitute the sole resource for it to operate successfully. There are environmental resources as well as social resources which are derived from the planet and people. Therefore, these resources need to be accounted for because they can affect the ability of a business to operate successfully.

Traditional accounting is associated with information pertaining to the financial performance of a business. Other information is provided by management in corporate annual reports, where financial information is presented. Okafor & Ogiedu (2011) state that management disclosures are valuable source of information for investors. These disclosures could be mandatory and voluntary. Investors require financial information, information about directors, management, major shareholders, business objectives, research and development, amongst others. Utami (2015) noted that there is also a shift from profit maximization as the sole objective of a business to accounting for the interest of stakeholders. Accounting in the interest of business stakeholders can influence the value of companies. Sustainability reporting meets this need because it includes reporting on economic, environmental and social aspects of a business as well as governance approaches to manage those aspects. Sustainability reporting is crucial because risks arising from economic, environmental, social and governance issues can affect financial performance and the long-term value of a business if not well managed.

The advocacy for corporate sustainability reporting by leading governments has been on the increase with the coming together of Brazil, Denmark, France and South Africa, in support of the United Nations Conference on Sustainable Development (Rio+20). The aforementioned countries attracted the support of the GRI and UNEP. These two bodies became part of recognized leading institutions in sustainability reporting. The GRI has been developing frameworks and guidelines which organizations are employing to report on sustainability. These frameworks include Reporting Guidelines which include the indicators of sustainability reporting which organizations can use in measuring and reporting their sustainability performance. In addition, the United Nations Environment Programme (2012) emphasized the need for partnership between countries and organizations towards the actualization of the goal of sustainable development through provision of relevant information to enable the former improve the quality of life for their people, without putting future generations at risk.

The Nigerian experience towards corporate sustainability reporting is still evolving. According to Okoye & Ngwakwe (2004), increased awareness of social and environmental issues has resulted in clamors for sustainable economic development. There is also a shift towards stakeholder-oriented corporate governance requirements depicted in the changes made to the Code of Corporate Governance for companies operating on the stock market. This code was issued by the Securities and Exchange Commission (the stock market regulator) in Nigeria. This regulatory board demands that companies incorporate the requirements of the Code in line with reporting on sustainability as part of their corporate governance from the year 2012 (Securities and Exchange Commission, 2011). In furtherance of this course, the Central Bank of Nigeria (CBN) sent a specific circular to financial institutions in September 2012, advising them to incorporate sustainability issues in their corporate

reporting by December 31, 2013 to enable them produce a stand-alone report by December 31, 2014. Therefore, financial institutions are expected to abide by a set of sustainable banking principles to promote SR (Central Bank of Nigeria, 2012).

Also, Christofi, Christofi & Sisaye (2012) argued that standardization of disclosures in sustainability reports of companies is necessary. In their view, this step is necessary because investors in the past have not been able to reward companies for adhering to sustainability issues or punish those that violate them in their decision making (in terms of investment). The demand made by both SEC and CBN for sustainability reports from companies aligns with the need for standardization of its practice. In other countries where sustainability reporting was practiced as at 2012, very few stock markets had listing rules and voluntary initiatives towards sustainability reporting. However, in Africa, the Johannesburg Stock Exchange in South Africa is one of the few which has continued to subscribe to rules that enhance sustainability reporting in companies.

Outside the African continent, the listing requirement of Indian Stock Exchange mandates that the top 100 publicly quoted companies must disclose environmental, social and governance issues in their annual reports (United Nations Conference on Trade and Development, 2013). Other countries whose stock market or stock market regulatory body requires sustainability reporting for listed companies only are Pakistan, Malaysia, Canada, Philippines, Singapore, China, Brazil and the United States of America (Sustainable Stock Exchange Initiative, 2013). According to UNCTAD (2013), the Nigerian Stock Exchange announced that it has joined the United Nation (UN) Sustainable Stock Exchanges (SSE) initiative. Nigeria is the second African country to join the UN SSE. The SSE explores how stock markets and stakeholders such as regulators, investors and corporate entities can collectively enhance corporate transparency through environmental, social and governance disclosures while encouraging responsible approaches to investments which are often described as Socially Responsible Investing (Sustainable Stock Exchange Brochure, 2012).

Critiques of sustainability reporting have stemmed from the assertion that pre-occupation with corporate responsibility issues may lead to loss of short-term earnings and investor's short-run returns (Murray, 2010). Although, empirical studies have not been able to establish the benefits of businesses' contribution to sustainable development, at least, they have been able to establish causal relationships between what is disclosed and financial performance (Weber, Koellner, Habegger, Steffensen & Ohnemus, 2005; Buys, Oberholzer & Andrikopoulos, 2011). Corporate disclosure and transparency which details the amount spent on the business' contribution to sustainable development can enable researchers ascertain the financial implications (gains or losses) of business sustainability. Although, there are opinions that the pursuit of sustainable development by business organizations have demerits, Lozano (2013) states that business organizations are increasingly recognizing their role in making societies more sustainable. Sisaye (2012) stresses that the approach to sustainability in business organizations has led to innovations in accounting and reporting systems, and is characterized by increases in the volume of social and environmental disclosures to stakeholders such as institutional investors. However, there are still issues of non-standardization (Sisaye, 2011) and inability to compare the contents of disclosures made across different companies and industrial sectors (Asaolu et al., 2011).

The Influence of Auditor-type on Sustainability Disclosures

Normative pressures in an organization's external environment results from the level of networking among professionals in that environment. One of such professionals is the independent accountant who is saddled with the responsibility for giving an opinion on the financial reports of business organizations. Jalaludin, Sulaiman & Ahmad (2011) stated that normative pressures emanate from professionalism which gives room for similar education and networking among members of such professional circles. Professional groups such as accounting firms provide their members with networking exposure. Consequently, the more business organizations relate with members of similar professional groups, the more sustainability disclosures they are likely to have. Also, rating of organizations and awards given on the basis of sustainability performance could be a source of normative pressures, because organizations tend to compare their practices with others within their sphere of success. Professional networks include big four accounting firms, foreign presence, industry affiliation, membership of external governance bodies.

Normative pressures emanate from the desire for an organization to conform to the norm of certain professional groups, in order to be accepted by them. The platforms mentioned above offer business organizations that subscribe to them networking exposure; for instance, professional associations have the ability to enhance how organizations ought to report to stakeholders. According to Ioane (2014), because

members of the same professional association pass through same form of education, there is tendency for similarities in their behavior as they spread through organizations. One of such professional associations is accounting firms. There are Big four, medium and small accounting firms. The size of such firms is often measured by the types of services they offer, net worth, number of employees, and international presence.

The big four accounting firms provide services in auditing and assurance of financial reports, sustainability reporting, management consultancy, amongst others. When organizations patronize the services of accounting firms who are similar in this regard, they tend to be influenced to adopt certain corporate reporting practices, which they are privileged to observe through their relationship. Based on studies (Johnson, 2013; Ioane, 2014), normative pressure occurs when organizations draw from similar pool of professionals. For example, accounting firms have members who are trained in similar manner. Also, because these firms render services to organizations, there is tendency for organizations that patronize them to imbibe similar kind of reporting. Another institutional factor that exists in the external business environment is the financial auditor of an organization. Auditing of financial statements has dominated the assurance industry. However, studies such as O'Dwyer & Owen (2005) and O'Dwyer, Owen & Unerman (2011) note that sustainability reports need to be audited in order to convey credible and reliable information provided to stakeholders about economic, social and environmental performance. Auditors also have analytical procedures for assessing risks that can affect a business, which often include those posed by environmental and other sustainability issues.

Barako (2007) and Lan, Wang & Zhang (2013) examine the influence of auditor-type on voluntary disclosures. The findings of these studies were mixed. The financial auditor type had a negative relationship with forward-looking disclosures and general strategic disclosures of sampled companies; positive relationship was found between financial auditor type and social disclosures (Barako, 2007). Similarly, auditor type was found to be significantly associated with voluntary disclosures (Lan et al., 2013). Fernandez-Feijoo, Romero & Blanco (2016) found that companies having a Big Four accounting firm as financial auditor had increased sustainability disclosures; companies with highest levels of sustainability disclosures also subjected such information to assurance. On the other hand, Salteh, Nahandi & Khoshbakht (2011) did not find a significant relationship between auditor type and voluntary disclosure. One reason for the positive relationship between auditor type and voluntary disclosures is that auditors that belong to the Big Four category have similar training and are exposed to networking within their professional circles, increasing the likelihood of similar disclosure practices across their client companies. More so, Big Four accounting firms have greater international presence which could make them more inclined to international corporate reporting practices (such as sustainability reporting). Chiang & Northcott (2012) note that there was better support for auditors in the Big Four firms due to access to information from their international network. However, a negative relationship between auditor type and sustainability disclosures could be attributable to avoidance of risks that could arise from the disclosures.

RESEARCH METHOD

The population of this study is made up of the companies in the industrial goods sector of Nigerian Stock Exchange (NSE). According to the Nigerian Stock Exchange (2015), there are 24 companies in the industrial goods sector of the NSE. Industrial goods companies are concerned with manufacturing and distributing goods used in engineering, building, electricity industry and other industries for large-scale industrial and consumption purposes. In this sector goods are produced for commercial purposes. The sample size of the study reported in this paper consists of 11 companies.

The level of sustainability reporting was determined using disclosure occurrence method where indicators of economic, environmental, governance and social disclosures were identified from corporate annual reports (Appendix A). According to Joseph & Taplin (2011), the disclosure occurrence method is a form of content analysis where the researcher makes a list of items that indicate the presence of a particular information and the presence of the information is given a score of "1" while the absence of the information is recorded as "0", after which the total disclosure is determined. This method was deemed to be more appropriate than the disclosure abundance method where pages, words or sentences are counted on a checklist of disclosure items. This method has been criticized to lead to double counting of information.

RESULTS AND DISCUSSION

The descriptive results and the results of statistical analysis were obtained using IBM Statistical Package for Social Sciences (SPSS). Descriptive statistics such as mean, median and standard deviation were obtained for the dependent and independent variables. These statistics are reported in Tables 1, 2 and 3.

The average economic disclosures are 7 while that of environmental, governance and social disclosures are 1.80, 7.31 and 3.80, respectively. A one-way between-groups Multiple Analysis of Variance (MANOVA) was used to examine whether companies audited by big four accounting firms and non-big four accounting firms differ in terms of the four aspects of sustainability reporting.

Tal	Table 1: Descriptive Statistics on Sustainability Sisclosures, 2010-2014								
Year	Mean	Ν	Std. Deviation	Maximum	Minimum				
2010	16.8182	11	12.50454	35.00	.00				
2011	19.1818	11	11.97346	37.00	6.00				
2012	19.6364	11	12.33915	38.00	5.00				
2013	21.5455	11	12.01968	38.00	5.00				
2014	22.3636	11	10.01272	38.00	6.00				
Total	19.9091	55	11.52658	38.00	.00				

Source: Computations from 2010 to 2014 annual reports

Sustainability reporting was measured using four indicators namely economic, environmental, governance and social disclosures. The independent variable was audit firm. Preliminary assumption testing was conducted to check for normality, linearity, univariate and multivariate outliers, multicollinearity, with no serious violations noted.

Table 2: Descriptive Statistics for Sustainability Reporting Indicators								
	Ν	Minimum	Maximum	Mean	Std. Deviation			
Economic disclosures	55	0	9	7.00	1.453			
Environmental disclosures	55	0	10	1.80	3.088			
Governance disclosures	55	0	12	7.31	5.298			
Social disclosures	55	0	9	3.80	3.123			

Source: Computations from 2010 to 2014 annual reports

There was a statistically significant difference between big four and non-big four audited companies on the combined dependent variables: F (4,50) = 2.79; p = 0.036; Wilks' Lambda = 0.817; and, partial eta squared = 0.183. Bonferroni adjustment was carried out on the alpha level to judge statistical significance of the difference in dependent variables due to big four auditor factor. The alpha level of 0.05 was divided by 4 due to the number of dependent variables used in this study. This resulted in a new alpha level of 0.0125. The results for the dependent variables were considered separately, none of the differences reached statistical significance using a Bonferroni adjusted alpha level of 0.125.

Table 3: Descri	ptive Statistics	for Dependent	Variables*Big	Four Auditor
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	1	1		
	Big four	Mean	Std. Deviation	Ν
Economic disclosures	big four accounting does not audit finan statements	firm 6.60 ncial	.516	10
	big four accounting audits financial statement	firm 7.09 ts	1.579	45
	Total	7.00	1.453	55
Environmental disclosures	big four accounting does not audit finan statements	firm .00 ncial	.000	10

	big four accounting audits financial statemen	firm 2.20 ts	3.286	45
	Total	1.80	3.088	55
Governance disclosures	big four accounting does not audit fina statements	firm 5.70 ncial	4.990	10
	big four accounting audits financial statemen	firm 7.67 ts	5.351	45
	Total	7.31	5.298	55
Social disclosures	big four accounting does not audit fina statements	firm 1.80 ncial	1.549	10
	big four accounting audits financial statemen	firm 4.24 ts	3.220	45
	Total	3.80	3.123	55

Source: Computations from 2010 to 2014 annual reports

An assessment of the mean scores indicated that companies that were audited by big four audit firms reported more economic disclosures with mean of 7.09 than companies that were not audited by big four audit firms with mean of 6.60. Companies that were audited by big four audit firms reported more environmental disclosures (mean = 2.20), governance disclosures (mean = 7.67) and social disclosures (mean = 4.24) than companies that were not audited by big four audit firms.

Big four audit firms include KPMG, PwC, Ernst & Young, and Deloitte. These firms have international presence, that is, they operate in more than one continent of the world. External auditors of financial statements also provide oversight in certain disclosures that overlap in sustainability reporting and financial reporting. For example, disclosures on economic indicators of sustainability, social and governance indicators are usually embodied in financial reports. Big four accounting firms provide services on sustainability performance and reporting to organizations, among other services on assurance, tax, management consultancy and others. Thus, it was expected that when any of the Big four accounting firms audits financial reports, there will be more sustainability disclosures. The findings of this study does not agree with Berthelot & Robert (2011) where no difference in the level of climate change disclosure was found whether companies were audited by the big four accounting firm as financial auditor had more sustainability disclosures having a Big Four accounting firm as financial auditor had more sustainability disclosures and companies having a Big Four accounting firm as financial auditor had more sustainability disclosures and companies with more sustainability disclosures obtained assurance to reinforce their credibility.

Sustainability reporting and assurance provides opportunities for the accounting profession particularly in the area of identifying material sustainability issues, measurement of sustainability performance, reporting and providing assurance services to clients. Also, improvement of sustainability performance could lead to cost savings even though the costs are incurred in putting the adequate technology and infrastructure in place to ensure improved sustainability performance. Duff & Guo (2011) note that sustainability issues provide significant challenge and opportunity for accounting firms. This implies that in the area of identifying and reporting sustainability performance and providing assurance on same, accounting professionals are going to be relevant as long as the corporate responsibility outcry from the public remains. It is important for accounting firms to appreciate dialogic accounting and the role it plays in a complex and dynamic world. This notion supports the argument of Brown & Frame (n.d) that accounting professionals should be responsive to diverse stakeholders' values and interests.

CONCLUSION

This paper has two objectives: first, to examine the extent to which Nigerian industrial goods companies engage in sustainability reporting; and, second, to examined whether the sustainability disclosures were influenced by financial auditor-type (big four and non-big four accounting firm). The findings indicate that Nigerian industrial goods companies disclose an average of 22.36 out of 43 disclosure items. Companies reported very few information about environmental indicators of sustainability. The companies reported more economic and governance disclosures in scope and details unlike social and environmental disclosures. The

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findings also indicate that companies that are audited by one of the Big Four accounting firms have higher sustainability disclosures than those that are not audited by other accounting firms. These findings suggest the need for mandatory sustainability reporting guidelines for industrial goods and manufacturing companies in general. Therefore, the paper recommends that the Securities and Exchange Commission (SEC) needs to monitor companies' reporting to ensure that stakeholders have adequate information on sustainability performance.

The paper has limitations because it is preoccupied with only Nigerian industrial goods companies because they are a crucial part of the manufacturing sector of the Nigerian economy, producing goods that are required for large-scale industrial and consumption purposes. Recently, the Nigerian Stock Exchange (NSE) became a gold member of the Global Reporting Initiative (GRI), making sustainability reporting a crucial issue for organizations listed under the NSE. Although there is no mandatory sustainability reporting requirement from the NSE for companies, it is inevitable that there may be some guidelines for companies in the near future. This creates opportunities for future research to examine other determinants of sustainability reporting particularly such as corporate governance characteristics and consequences of sustainability reporting on investment decisions of investors.

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Economic Indicators
Revenue
Operating costs
Employee wages and benefits
Payments to Providers of Capital
Payments to Government
Community Investments
Financial Implications of the risk and opportunity posed by climate change
Value of Defined Benefit Plan obligations
Financial Assistance received from government
Environmental Indicators
Recycled materials used to manufacture the organization's product and services
Fuel/electricity/heating/cooling/steam consumption
Reduction in energy consumption due to conservation
Water withdrawn for operations
Gross direct Greenhouse gas Emissions
Organic Pollutants
Waste and method of disposal
Environmental protection expenditures
Assessment of suppliers on the basis of environmental risks

Appendix: Sustainability Disclosure Indicators

Social Indicators
Benefits to full-time employees
Injury/injury rate/occupational diseases rate
Health and Safety employee training
Representation of men and women in governance bodies
Local community development programs
Stakeholder engagement plans
Anti-corruption policies and procedures
Political financial and other kinds of contributions made by the organization
Suppliers and clients subject to assessments for impacts on society

Governance Indicators
Governance structure and composition
Competencies of members of the highest governance body
Composition of Board directors
Directors' Tenure
Directors' other significant positions and commitments
Chairman is an Executive Officer
Conflicts of interest – cross-board membership and related party
disclosures
Board's role in identifying and managing economic, social and
environmental impacts
Committee that incorporates material aspects in sustainability report
Highest governance body in risk management
Directors' and Executive Remuneration
Organization's code of conduct and code of ethics
Mechanisms for seeking advice on Integrity Issues
Whistle blowing mechanisms or hotlines
Total=43

IMPACT OF ENVIRONMENTAL AND SOCIAL COSTS ON THE PERFORMANCE OF QUOTED MANUFACTURING COMPANIES IN NIGERIA

Chibunna Onyebuchi Onwubiko

ABSTRACT

Environmental and social cost accounting offers an alternative account of significant economic entities. It has the potential to expose the tension between pursuing economic profit and the pursuit of social and environmental objectives. It is in the light of the above that this paper assesses the impact of environmental and social cost on the performance of quoted manufacturing companies in Nigeria. The data for the study were collected from annual reports and accounts of five randomly selected manufacturing companies. Multiple Regression Analysis (MRA) was used to analyze data obtained from the companies. The paper reveals significant relationship between environmental/social cost and return on capital employed (ROCE) and earnings per share of manufacturing companies. Based on this, the paper recommends, among others, that government should ensure complete adherence to environmental laws by companies in Nigeria

Keywords: Environmental and social cost, company performance, manufacturing companies, multiple regression analysis, Nigeria

INTRODUCTION

The deplorable state of the world environment caused by gas emission and industrial pollution and their impact on mankind has led to increased public concern and scrutiny of the operations and performances of companies. Companies are now expected to demonstrate that they are aware of the hazards they create in the environment and addressing the impact of their operations on the environment and society in general. The rapid growth in business activities has, indeed, brought the need for companies to disclose their environmental and social activities in the annual report and accounts under corporate social responsibility. In this regard, businesses are expected to take into cognizance a wide array of social interests, expenditure on human resources and environmental protection. In the light of the increasing deleterious effects of environmental pollution, great importance is attached not only to the financial aspects (profitability) of management but also to its environmental and social impact. The understanding of Corporate Social Responsibility (CSR) and its wide coverage made it to emphasize on responsibility towards the company's employees, local community, society and the future generation (Malgorzato & Agnieszka, 2013). The increasing concern about environmental degradation, resources depletion (especially in the Niger Delta areas) and the sustainability of economic activity have made the development of environmental accounting and reporting an area of significant interest in Nigeria.

STATEMENT OF THE RESEARCH PROBLEM

In the effort of the companies to provide the needed social responsibilities, costs are incurred. These costs are taken into consideration in determining the total profit (performance of the firms). The success or failure of a company may be determined by the amount of resources it expends on its environment. In the light of the above, this study is embarked on to ascertain the impact of environmental and social costs on the performance of manufacturing companies in Nigeria.

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Objectives of the Study

The main objective of this paper is to assess the impact of environmental and social costs on the performance of manufacturing companies in Nigeria. The paper specifically addresses the following:

- To determine the significance of the relationship between Environmental and Social Costs (ESC) and
- i. Net profit of the manufacturing companies
- ii. Return on capital employed (ROCE)
- iii. Earnings per share (EPS)
- iv. Dividend per share (DPS)

Hypotheses

The following hypothetical proposition have been put forth to test the objectives of the study:

- H0₁: There is no significant relationship between environmental and social cost (ESC) and net profit (NP) of manufacturing companies.
- H0₂: There is no significant relationship between ESC and Return on Capital Employed (ROCE) of the manufacturing firms in Nigeria.
- H0₃: There is no significant relationship between ESC and Earnings per Share (EPS) of the manufacturing firms in Nigeria.
- H0₄: There is no significant relationship between ESC and Dividend per Share (DPS) of manufacturing firms in Nigeria.

Scope of the Study

This study concentrates on the period of 2013 accounting year of the companies studied. Information on the profitability of the selected companies is contained in their published financial reports and accounts of the year 2013.

REVIEW OF RELATED LITERATURE: THEORETICAL, CONCEPTUAL AND EMPIRICAL FRAMEWORKS

Owing to the quantum of the production activities by the manufacturing companies within the environment, resources have depleted and environmental degradation in Nigerian has been on the increase. This has led to increased interest in environmental accounting in Nigeria. This paper will briefly discuss the following subheadings: theoretical framework, conceptual framework and empirical study.

Stakeholder's Theory

This theory, according to Watts & Zimmerman (1978), assumes that disclosure on social and environmental information by an organization is as a result of the pressure from stakeholders such as communities, customers, employees, environment, shareholders and suppliers. The basic proposition of this stakeholder theory is that a firm's success is dependent upon the successful management of all the relationships that a firm has with its stakeholders. The stakeholder theory asserts that a firm's continued existence requires the support of the stakeholders and their approval must be sought and the activities of the corporation adjusted to gain that approval (Chan, 1996). The more powerful the stakeholders, the more the company must adapt. This theory concludes that CSR is a way to show a good image to these stakeholders to boost long-term profits because it would help to retain existing customers and attract new ones.

Legitimacy Theory

Legitimacy theory relates to the extent and types of corporate social disclosure in the annual report to be directly related to management's perceptions about the concerns of the community. Gray, Kouhy & Lavers (1995) suggest that legitimacy theory is useful in analyzing corporate behavior. This is because legitimacy is important to organizations, constraints imposed by social norms and values and reactions to such constraints provide a focus for analyzing organizational behaviors taken with respect to the environment. The legitimacy theory argues that organisations seek to ensure that they operate within the bounds and norms of society (Tilt, 1999). Society's expectations have changed "to expect businesses to make outlays to repair or prevent damage to the physical environment, to ensure the health and safety of consumers, employees, and those who reside in the communities where products are manufactured and wastes are dumped" (Tinker & Niemark, 1987, p.84). Legitimacy can be considered as "a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs and definitions" (Suchman, 1995, p.574). To this end, organizations attempt to establish congruence between "the social values associated with or implied by their activities and the norms of acceptable behavior in the larger social system of which they are part" (Suchman, 1995, p.574).

Conceptual Framework

Environmental and social costs accounting, social accounting otherwise known as (social accounting and auditing, social and environmental accounting, corporate social responsibility reporting, non-financial reporting or accounting) is the process of communicating the social and environmental effects of organizational economic actions to particular interest group within the society and to society at large (Gray, Owen & Mannders, 1987). They further emphasized that the social accounting entails corporate accountability. In the works of Crowther (2000), social accounting is an approach to reporting a firm's activities which stresses the need for the identification of socially relevant behavior, the determination of those whom the company is accountable for its social performance and the development of appropriate measures and reporting techniques. On the other hand, environmental accounting, according to Gray, Owen & Adams (1996), is a subset of social accounting, focuses on the cost structure and environmental performance of a company. It principally describes the preparation, presentation and communication of information related to an organization's interaction with the natural environment. They further stated that environmental accounting is most commonly undertaken as voluntary self-reporting by companies, third-party reports by government agencies, NGOs and other bodies posit to pressure for environmental accountability. Accounting for impacts on the environment may occur within a company's financial statements, relating to liabilities, commitments and contingencies for the remediation of contaminated lands or other financial concerns arising from pollution.

Benefits of Implementing Social Accounting Practices by Companies

Social accounting for the purpose of management control is designed to support and facilitate the achievement of an organization's own objectives. In the words of Gray (2000), organizations are seen to benefit from implementing social accounting practices in a number of ways, example are:

- Increased information for decision making;
- More accurate product or service costing;
- Enhanced image management and public relations;
- Identification of market development opportunities; and,
- Maintaining legitimacy.

Society is also seen to profit from the implementation of social and environmental accounting in many ways, including the following:

Honoring stakeholders' rights of information;

- Balancing corporate power with corporate responsibility;
- Increasing transparency of corporate activity; and,
- Identifying social and environmental costs of economic success (Gray, Owen & Adams, 2000).

Adediran & Alade (2013) point out a few benefits of environmental costs accounting to entities as follows:

- It can be significantly reduced or eliminated as a result of a business decision;
- Environmental cost can be offset by generating revenues through sale of waste, by-products or transferable pollution allowances or licensing or clean technologies;
- Better management of environmental costs can result in improved environmental performance and significant benefits to human health as well as business success; and,
- Understanding the environmental costs and performance of processes and products can promote more accurate costing and pricing of products and can aid companies in the design of more environmentally preferable processes, products and services for the future.

From the foregoing, analyzing it implies that the environmental and social cost accounting ensures accountability and transparency of companies' activities which affect different stakeholders.

Empirical Framework

Related topics have been researched in this area, notable amongst them is the work carried out by Uwaigbe (2012) on corporate environmental disclosures in Nigerian manufacturing industry. The study adopted the use of content analysis to ascertain the extent of disclosure among the manufacturing firms studied. However, the study discovered among other things that the level of environmental disclosure practices in Nigeria is still at low ebb. The study concentrated mainly on cement manufacturing firms and fails to analyze the cost components of the firms. This paper, therefore, focuses on manufacturing industries across products and individual firm's environmental costs incurred.

RESEARCH METHOD

Secondary data were used for this research (content analysis) generated from the Annual Reports and Accounts of five randomly selected quoted manufacturing companies from the Nigerian Stock exchange for the year 2013. Content analysis is adopted because it is one of the most systematic objective and quantitative methods of data analysis technique (Wiseman, 1982).

Research Instrument

In order to assess the impact of the environmental and social costs on the performance of manufacturing companies in Nigeria, the study proxies used are net profit, earnings per share, return on capital employed and dividend per share:

Where:	ESC	=	Environmental and social Cost
	NP	=	Net Profit
	EPS	=	Earnings Per Share
	ROCE	=	Return on Capital Employed
	DPS	=	Dividend Per Share

ESC = Summary of costs incurred by the entities on environmental costs during the year 2013.

Net Profit = Net profit during the year under study i.e $\frac{\text{Profit after tax}}{\text{revenue or turnover}} \times \frac{100}{1} = \%$

EPS = Profit After tax Before Extraordinary Items
Profit after tax before extraordinary item
less preference dividend
No of ordinary shares ranking for dividend
$$\times \frac{100}{1} = k$$

ROCE = $\frac{Profit after tax}{Capital employed} \times \frac{100}{1} = \%$
Where capital employed is = Total Assets – Current Liabilities
DPS = $\frac{Gross Dividend - profit dividend}{No of ordinary share in issue and} \times \frac{100}{1} = k$

DATA ANALYSIS, RESULTS AND FINDINGS

Tuble 1. Variables from Companies Tinancial Statement						
Name of organization	ESC (₩)	ROCE (%)	NPM (%)	DPS (k)	EPS (k)	
Guinness Nigeria Plc	40 154 000	9.69	18.67	793	800	
Nigerian Breweries Plc	201 193 655	16	28.26	570	450	
Cadbury Nigeria Plc	8 401 937	16.84	20.92	192	50	
Honey Well Nigeria Plc	5 227 000	6.22	10.18	358	16	
Larfage Cement Nigeria	189 000 000	28.61	28.26	934	330	

Table 1:	Variables	from	Companies ²	' Financial	Statement
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Source: 2013 Annual Reports of selected manufacturing coy in Nigerian Stock Exchange

The above data (Table 1) was analyzed using regression method with SPSS Version 20. The results of the data analysis are presented below (Table 2).

Model	Unstandardized Coefficients		t	Significance
	В	Standard Error		
	5.559	.429	12.959	.006
(Constant)				
Return on capital	.066	.022	3.048	.003
employed	.001	.001	2.003	.008
Earnings Per Share	-0.239	0.32	427	.711
Net Profit	.326	0.42	1.219	.347
Dividend per share				

From the above output (Table 2), the regression equation using the econometric model is drawn as follows:

ESC = $a_0 + a_1ROCE + a_2EPS + a_3NP + a_4DPS$, which can be represented as: ESC = 5.559 + 0.66ROCE + 0.001EPS - 0.239NP +0.326DPS T-Ratio = (12.956) (3.048) (2.003) (-0.427) (1.219)

Hypotheses Testing

Hypothesis one:

H₀: There is no significant relationship between Environmental and Social Cost and Net Profit

 H_a : There is a significant relationship between Environmental and Social Cost and Net Profit.

At a significance Level of α =0.05, the Net Profit Value was found to have a *p*-value of 0.711>0.05, therefore the null hypothesis is accepted.

Hypothesis two:

*H*₀: *There is no significant relationship between Environmental and Social Cost and Return on Capital Employed.*

Ha: There is a significant relationship between Environmental and Social Cost and Return on Capital Employed.

At a significance level of $\alpha = 0.05$, the Return on Capital Employed was found to have a *p*-value of 0.003<0.005, therefore, the null hypothesis is rejected and the alternative is accepted.

Hypothesis three:

 H_0 : There is no significant relationship between Environmental and Social Cost and Earnings per share.

Ha: There is significant relationship between Environmental and Social and Earnings Per Share. At a significance level of $\alpha = 0.05$, the Earnings Per Share was found to have a *p*-value of 0.008<0.005, therefore, the null hypothesis is rejected and the alternative hypothesis is accepted.

Hypothesis four:

Ho: There is no significant relationship between Environmental and Social Cost and Dividend Per Share.

Ha:There is significant relationship between Environmental and Social Cost and Dividend Per Share. At a significance level of α =0.05, the Dividend per share was found to have a *p*-value of 0.341>0.05 therefore the null hypothesis is accepted.

From the above interpretations it can be deduced that apart from Return on Capital Employed and Earnings per share, all other predictor variables have no significant influence on the Environmental and Social Cost of the organizations under study (Table 3).

Table 3: Model					
Model 1	R	R Square	Adjusted R Square	Std. Error of the Estimate	
	.962 ^b	.926	.583	.28477	

Source: SPSS Output

The coefficient of multiple determination was found to be 0.926, therefore, about 92.6% of the variation in the dependent variables (Environmental and Social Cost) is explained by the change in independent variables (Return on Capital Employed, Earnings Per Share, Net Profit value and Dividends Per Share) therefore, the regression equation appears to be very useful for predictions since the value of R^2 is close to 1 (Table 4).

Table 4: ANOVA					
Model	Sum of Squares	df	Mean Square	F	Significance
1. Regression	1.712	1	1.712	10.535	.008
Residual	.488	3	.163		
Total	2.200	4			

To test for the above hypotheses, we consider the test of significance which is the F-Statistic. The tool of F-statistic helps in determining the overall joint significance of the explanatory (independent) variables on the dependent variable. An analysis was performed to see if the model is useful or fit for predicting the environmental and social cost. At α =0.05 level of significance, the F-value was found to be 10.535 at *p*-value of 0.008<0.05, therefore, there exists enough evidence to conclude that at least one of the predictors is useful for predicting Environmental and Social Cost; therefore, the model is useful.

CONCLUSION

Social accounting is a widespread practice in a number of large organizations in the United Kingdom, Royal Dutch Shell BP, British Telecom and so on. Tradecraft Plc, the fair trade organization, claims to be the first public limited company to publish audited social accounts in the UK since 1993 (Dey, 2007). In Nigerian, most of the companies, especially quoted companies disclose environmental and social cost incurred during the year in their directors' report. Others include them under corporate social responsibility. Government has to ensure complete adherence by companies to disclose their environmental and social elements in their financial reports this will ensure effective Environmental Management System (EMS) necessary for companies engaged in international trade.

In view of the findings presented in this paper, the following recommendations are offered:

- The government of Nigeria should as a matter of importance make companies disclose environmental and social cost in the annual reports and accounts by legislating on the regulations that will guide such disclosures;
- Government should encourage companies by given tax incentive to those companies that comply with the environmental regulations and laws of our country;
- Director/CEOs of companies should ensure that their entities comply with the environmental laws of our country; and,
- Finally, merit awards should be given to directors and companies who comply with the environmental laws. This will go a long way in enhancing their performances and ensure sustainability growth of their entities.

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THE RELATIONSHIP BETWEEN FIRM SIZE, FINANCIAL PERFORMANCE AND CLIMATE CHANGE DISCLOSURES IN NIGERIA: A STUDY OF INDUSTRIAL GOODS COMPANIES

Nwobu Obiamaka, Owolabi Akintola, Iyoha Francis, and Nnadi Matthias

ABSTRACT

The paper assesses the determinants of climate change disclosures of industrial goods companies in Nigeria. The objectives of the paper are to examine the effects of firm size and profit on climate change disclosures. Secondary data was gathered from annual reports of 11 companies from the industrial goods sector of the Nigerian Stock Exchange for the period 2010 to 2014. The results indicate that company size predicts the likelihood that companies would disclose climate change information. Also, the results reveal no evidence of the ability of company profitability to predict the likelihood that companies would disclose climate change information. These results have implications on stock market regulators as 70.9% of the companies have no climate change disclosures. The study recommends that regulation is imperative for companies in the industrial goods sector to give attention to climate change disclosures.

Keywords: Climate change disclosures, company size, industrial goods, manufacturing companies, profitability, Nigeria

INTRODUCTION

There has been considerable attention on corporate environmental disclosure and transparency in Africa. The financial crisis that occurred in 2008 in Nigeria and most countries in Africa was blamed on inadequate disclosure and governance oversight by the board of directors. The outcome of the crisis was more emphasis on governance and corporate sustainability. There have been governance reforms with the aim of ensuring high standards of disclosure and transparency. Disclosure and transparency has been argued as a tool to reassure shareholders that their funds are been managed properly (Cheung, Connelly, Limpaphayom & Zhou, n.d). Another school of thought argues that disclosure and transparency is a tool to protect stakeholders' interests. According to Brandt (2015), stakeholders in relation to companies are individuals or groups that have

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THE RELATIONSHIP BETWEEN FIRM SIZE, FINANCIAL PERFORMANCE AND CLIMATE CHANGE DISCLOSURES IN NIGERIA

a stake in the companies' operations, impacts and performance. Transparency has been argued by Onyali, Okafor & Egolum (2014) as a principle of revealing the external impact of a company's operations. This impact cuts across the environment, people and economic context within which the company operates.

Regulators such as Securities and Exchange Commission (SEC) in Nigeria have issued code of corporate governance including sustainability disclosures. The Nigerian Stock Exchange (NSE) became a gold member of the Global Reporting Initiative (GRI) in 2015. GRI is a not-for-profit organization that has been producing sustainability reporting guidelines since 2000 which pass through different stakeholders. Presently, there are G4 guidelines which are made up of 27 new disclosures and this particular guideline aligns with other reporting standards such as the Organization for Economic Co-operation and Development Guidelines for Multinational Enterprises, United Nations Guiding Principles on Business and Human Rights, and United Nations Global Compact (UNGC) Principles. The action by the Nigerian Stock Exchange (NSE) to become a gold member of the GRI suggests that regulators recognize the need for sustainability reporting and the role such disclosures in promoting corporate transparency.

The code of corporate governance by the Nigerian SEC is not a mandatory set of guidelines. As a code, companies are required to comply or explain why they do not. Beyond the Code, companies also practice voluntary sustainability disclosures. These voluntary practices are not regulated nor is it mandatory for companies to obtain assurance on the disclosures. This implies that companies can determine what to disclose or not. Also, within this context of disclosures, certain factors have been argued to be responsible for sustainability disclosures. While studies such as Eleftheriadis & Anagnostopoulou (2015) have argued that size influences climate change disclosures, as well as that profitability does not influence climate change disclosures. In addition, Najah & Cotter (n.d) found that carbon disclosure quality had no relationship with market performance.

There are a number of issues affecting the environment where businesses operate. They include climate change, industrial pollution and natural resource depletion. These issues have changed the perspective of a number of stakeholders such as government, Non-Governmental Organizations, civil society, stock exchange regulators, host communities on the role of business in society. According to Murthy (2012), businesses are viewed as one of the major stakeholders in the sustainable development agenda. This is probably because they use resources from the environment in carrying out their operations as well as employ people. Climate change is a global issue with both local and global impacts. Su-Yol & Young-Hoon (2015) described climate change as a crucial issue that needs to be addressed by business organizations. Business operations particularly those that have to do with production operations result in emission of carbon dioxide, methane, nitrous oxide and sulphur hexafluoride, hydrofluorocarbons and perfluorocarbons. These are greenhouse gases which can affect the environment where business organizations operate, making it toxic for members of the society. For example, Broughton (2005) note that the 1984 gas leak from Bhopal Indian company called Union Carbide Corporation was responsible for the demise of at least 3800 people while exposing the environment to harm. According to Su-Yol & Young-Hoon (2015), businesses respond to mitigating climate change in the following ways: development of low-carbon products, improvement of production processes, sourcing energy from environmentally-friendly avenues, assessment of supply chain and carbon trading.

Reporting on climate change has been on since climate change issues were recognized as capable of constituting risk to business operations when ignored. Climate change disclosures are largely voluntary since there are no regulations from national governments or stock exchange regulators where such disclosures emanate from. Climate change disclosures are influenced by institutional investors such as investment funds, international indexes such as the Dow Jones Sustainability Index, Global 100 and national governments. Sustainable investment involves making investment decisions based on economic, environmental, social and governance performance. Climate change disclosures include disclosures of its risks and opportunities, response to CDP questionnaire, disclosures of carbon emissions, disclosures of greenhouse gas emissions and their management. According to Organization for Economic Co-operation and Development (2015), climate change disclosures include: corporate strategies, governance practices, policies implemented to control and reduce impacts arising from climate change, consumption of fossil fuels, production of waste and pollutants such as greenhouse gas emissions, risks and opportunities as a result of climate change. This implies that climate change disclosures can be qualitative and quantitative or both depending on their nature. For example, policies implemented to control and reduce impacts arising from climate change are qualitative disclosures with consequences that can be measured in quantitative terms such as actual reduction of carbon footprints and energy usage.

THEORETICAL FRAMEWORK

Stakeholder theory is the theory on which this study is based. Information disclosure is carried out by managers in response to the varying needs of a firm's stakeholders. Stakeholders are those who are burdened with or who benefit from a firm's operation. They can be classified into two based on their relative importance namely primary and secondary stakeholders. Primary stakeholders (owners, customers, government and suppliers) are usually interested in a company because of the financial implications arising from their relationship with a company. There are other stakeholders such as environmentalists, media and trade associations that are affected by the operations of the firm (Demaki, 2011). Unlike the narrow principal-agent relationship in a firm, the stakeholder theory recognizes that while a firm satisfies the information needs of these persons they will be perceived better by the market. Based on stakeholder theory, the support and approval of these stakeholders is crucial to the sustainability of the going concern status of a company s based on the premise that the corporation's continued existence requires the support of the stakeholders and their approval must be sought and the activities of the corporation adjusted to gain that approval (Gray, Kouhy & Lavers, 1995). Studies have noted that stakeholders such as employees, customers, suppliers, community, investors and governments are becoming increasingly concerned about the quality and the involvement of companies in relation to their environment (Wolfe & Putler, 2002; Botosan, 2006).

A major demand of firms by stakeholders is that they should demonstrate a sincere commitment to ethical behaviour. Environmental awareness is one of the ways in which firms demonstrate ethical behaviour. According to Bagaeva (2010), corporate actions of environmental awareness can differentiate a company from its peers and promote competitive advantage while establishing long-term relationship with stakeholders. This can further boost corporate reputation and image which is an intangible asset. With accessible and observable corporate disclosures on social and environmental information, one can identify how certain stakeholders assess sustainability of the firm. Also, stakeholder theory argues that the stronger a firm's relationships with non-shareholders (other stakeholders), the easier it will be to meet its overall objectives (Popa, Blidisel & Bodgan, 2009). This theory has been applied by Naser & Baker (1999), Al-Khater & Naser (2003), Bagaeva (2010) in relation to disclosure of a firm's social and environmental impacts.

The purpose of this paper is to determine whether company size and profitability predicts the likelihood that companies would disclose climate change information of industrial goods companies in Nigeria. The paper is organized as follows: the following section presents the research problem and methodology applied, then results are presented and discussed, after which conclusion and recommendation are made.

RESEARCH PROBLEM AND METHODOLOGY

Research Question and Hypotheses

The research question asked is: What factors predict the likelihood that companies would disclose information pertaining to climate change? The hypotheses on which this paper is premised are:

- 1. H₀: Company size does not predict the likelihood that companies would disclose climate change information.
- 2. H₀: Company profitability does not predict the likelihood that companies would disclose climate change information.

Sample Selection and Data Collection

The sample is taken from the industrial goods sector of the Nigerian Stock Exchange (NSE) as of 2015. There are 24 companies in this sector. The criteria for including companies in the sample include:

- 1. The company was not delisted from the NSE during 2010 to 2014 period;
- 2. The company published a full annual report; and,
- 3. The company was listed on the NSE in year 2010.

THE RELATIONSHIP BETWEEN FIRM SIZE, FINANCIAL PERFORMANCE AND CLIMATE CHANGE DISCLOSURES IN NIGERIA

Five companies did not publish full annual report, three companies were delisted during the years under consideration and five companies were not listed as at 2010. The usable annual reports are eleven. Data pertaining to climate change disclosures were collected from annual reports of the eleven companies (see Appendix A). The reports were accessed from company websites. The annual reports accessed for each company was for 2010, 2011, 2012, 2013 and 2014 periods.

Measurement of Climate Change Disclosure Scores

Content analysis is used to analyse the sample companies' annual reports. Climate change disclosures are measured using the following indicators:

- 1. Risks or opportunity posed by climate change;
- 2. Financial implications of the risk or opportunity posed by climate change;
- 3. Costs of actions taken to manage the risk and opportunity;
- 4. Materials used that are from recycled materials used to manufacture the organization's primary product and services;
- 5. Fuel consumption, fuel consumption from renewable energy, electricity/heating/cooling/steam consumption;
- 6. Gross direct GHG emissions in metric tons of CO2 equivalent;
- 7. NOx, SOx, Persistent organic pollutants, Volatile organic compounds, Hazardous air pollutants, Particulate matter, other standard categories of air emissions identified in relevant regulations; and,
- 8. Waste and disposal method.

The content analysis methodology uses binary values to determine the extent of climate change disclosures. This implies that companies are given a score of one point for disclosing climate change information at all and a score of zero is given when no climate change information is disclosed. In order to empirically test the model and because of presence of companies with no disclosed information on climate change, it was also necessary to determine whether company size and profitability predicts the likelihood of disclosing climate change information. Logistic regression was employed because of the categorical nature of the dependent variable (Pallant, 2011).

Empirical Model

The hypotheses formulated for this study was tested using the following regression model.

$$CLHD_{it} = \lambda_0 + \lambda_1 CSZ_{it} + \lambda_2 PFT + \varepsilon_{it} \dots \dots (1)$$

Where:

CLHD_{it} = Presence or absence of climate change disclosure in annual reports for company *i* and year *t*. CSZ_{it} = Company size for company *i* and year *t*. PFT_{it} = Profitability for company *i* and year *t*. Apriori expectations: $\lambda_1 > 0$; $\lambda_2 > 0$

RESULTS AND DISCUSSION

Descriptive Statistics for Climate Change Disclosure Scores

Table 1: Climate Change Disclosure Index from Years 2010 to 2014				
	Frequency	Percent	Cumulative Percent	
Information is absent	39	70.9	70.9	
Information is present	16	29.1	100	
Total	55	100	100	

Source: Computed from 2010 to 2014 annual reports of companies (N stands for number of companies)

Out of the 55 companies included in the sample of this study, 29.1% reported climate change information while 70.9% did not report information on climate change.

Table 2: Logistic Regression Results								
	В	S.E	Wald	Df	Р	Odds	95% C.I	for Odds
						Ratio	Ratio	
							Lower	Upper
Company	0.414	.203	4.166	1	0.041	1.513	1.017	2.251
Size								
Profitability	0.000	.000	.318	1	0.573	1.000	1.000	1.000
Constant	-10.427	4.657	5.014	1	0.025	0.000		

Likelihood of Disclosing Climate Change Information

Interpretation of Logistic Regression Results

Logistic regression was performed to assess the impact of company size and profitability on the likelihood that companies would disclose information pertaining to climate change. The model contained two independent variables (company size and profitability). The full model containing all predictors is significant χ^2 (2, N=55) = 6.014, p-value is less than 0.05. This implies that the model is able to distinguish between companies that engaged in disclosing climate change information and those that did not. The model explained between 10.4% (Cox and Snell R square) and 14.8% (Nagelkerke R squared) of the variance in climate change disclosures, and correctly classified 76.4% of cases. The contribution of each predictor variables (company size and profitability) was determined using Wald test. Based on significance value of 0.05, company size is the only variable that contributes significantly to the predictive ability of the model with a p-value of 0.041. Profitability does not contribute significantly to the model. The Beta values show that there is a positive and significant relationship between company size and climate change disclosures (Beta value = 0.414). Although insignificant, there is a positive relationship between company profitability and climate change disclosures (Beta value = 0.000). The company size variable records an odd ratio of 1.513. This indicates that companies with larger sizes were more likely to disclose information pertaining to climate change than those with smaller sizes, controlling for all other factors in the model. The results of the current study confirm that company size is an important predictor of the likelihood of disclosing climate change information. This supports the argument that companies with larger size have more stakeholders and tend to release more sustainability information in a bid to satisfy their stakeholders.

CONCLUSION AND RECOMMENDATION

This paper emphasizes that the corporate world needs to understand that climate change poses challenges to the manner in which business operations are carried out. This is particularly because business operations generate emissions and carbon footprints which could adversely affect production in the future. It is important for companies to appreciate the opportunities that climate change poses to businesses and implement policies to drive their implementation. However, companies need to disclose climate change information irrespective of their size because during business operations both small and large companies are involved in contributing to climate change problems. Previous research has provided mixed findings on the relationship between climate change disclosures and company size, as well as profitability. The results of the current study indicate that climate change disclosures are related with company size. Larger companies have the financial resources to embark on innovative ways to disclose corporate information. One of the factors that will level out size influences on climate change disclosures is regulation because the moment regulation is put in place every company is on a level playing field and will want to perform better in terms of corporate disclosures. Therefore, this paper recommends for regulation and enforcement of the disclosure as a requirement.

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Appendix A: List of Companies

- Ashaka Cement
- Berger
- Beta Glass
- Cap
- Cutix
- Dangote
- DN Meyer

- First Aluminium
- Greif
- Lafarge
- Portland

SOUTH AFRICA'S "STRUCTURAL POWER": "COMPETITION" STATES IN THE GLOBALITY OF PRIVATE ECONOMIES OF SELECTED COUNTRIES

Johannes Tsheola, Tlou Ramoroka, and Mokoko Sebola

ABSTRACT

The capitalist system, which started with individual capitalists and proletariats, has evolved into a sophisticated system of large financial institutions seeking for profits through complex management of money, amalgamation and investments in the environment of business globalisation and offshore financial markets. Rather than replace the state sovereignty, the latter two phenomena have paradoxically precipitated the invention of a "competition" state that is required to regulate capitalism itself, which evolves through continual slumps of stagnation, destruction, restructuring and contradictions, as a mode and materialistic structure of production. Under business globalisation, societal institutions such as offshore financial markets have taken prominence in the global arena; and, "competition" states are necessary in order that countries may establish the required "structural power" to influence the operations of global markets in ways that secure purchasing power, investment for the creation of products and generation of employment for "national" private economies. This paper argues that South Africa has not established a "competition" state necessary for possession of "structural power", with the result that its participation in business globalisation has not served the "national" private economy through creation of employment. The paper recommends that South Africa should prioritise the establishment of "structural power" through deliberate state interventions because the emergence of business globalisation and prominence of offshore financial markets is at heart, the outcome of "the exercise" of "competition" states' self-selection.

Keywords: Capitalism, business globalisation, offshore financial markets, private economies, South Africa

INTRODUCTION

It is now accepted wisdom to attribute poor performance of "national" economies to "global downturn" (Turok, 2017). However, Turok (2017: 7) notes that South Africa is "performing worse than other countries in the same category which indicates more intrinsic problems". South Africa is generally in a slump wherein "business operations are struggling to keep and maintain a healthy balance sheet due to the tough economic environment" (Watavire, 2017: n.p.). Slumps refer to periods of lowest investments, reduced employment prospects and declining purchasing power, which collectively stimulate general economic downturn (Johnston,

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1986; Mohan, Brown, Milward & Zack-Williams, 2000; Orrell, 2010). According to Wessels (2016: n.p.), South Africa's slump was "not only caused" by the 2007-2009 international financial crisis, there was also "an ideological exuberance of government-led growth strategies" which resulted in "a deterioration of business confidence". This eventuality occurs at the same time as the world economy appears to be "recovering" (Marshall, 2017).

It means that South Africa entered a slump wherein the void of state "structural power" was confirmed as government could not create an investment climate nor create products or employment for the "national" economy under the prominence of business globalisation and offshore financial markets. Hence, Statistics South Africa's recent report on poverty trends headlines the caption that "*Policies Fail the People of South Africa*" (StatsSA, 2017). The fact that in 2015 the total number of South Africans living in poverty grew to 55.27%, which is 30.4 million of the 55 million citizens (StatsSA, 2017), cannot be divorced from the twin processes involving the international financial crisis and the absence of a "competition" state. Statistics South Africa concludes in its poverty trends report that "The last five years, notably between 2011 and 2015, have been a rough economic roller coaster for South Africa, driven by a combination of international and domestic factors such as low and anaemic economic growth, continuing unemployment, low commodity prices, higher consumer prices ... lower investment levels, greater household dependency on credit and policy uncertainty" (StatsSA, 2017: n.p.).

The current world is dominated by the capitalist mode of production; and, to understand aspects thereof, it is imperative to examine the organisation and operations of societies (Johnston, 1986; Wallerstein, 1991; Zack-Williams, Brown & Mohan, 2000; Smith, 2017). Capitalism, as a mode and materialistic structure of production is now globally ubiquitous and imperative (Marshall, 2017; Smith, 2017). The "institutions of society" such as offshore financial markets, Euromarkets, Export Processing Zones, tax havens and so on, that are central to the contemporary conceptions of "business globalisation" are, at heart, outcomes of "the exercise of choice" (Johnston, 1986; Wallerstein, 1991; Mohan et al., 2000; Cameron & Palan, 2004; Monbiot, 2017; Marshall, 2017). In their "national" private economy interests, "nation-states" have sought to establish themselves into "competition" states in order to secure "structural power" that they could use to influence business globalisation and financial markets (Wallerstein, 1991; Mohan, 2000). According to Von Hayek (cited in Wessels, 2017: n.p.), "where competition makes way for planning with good intentions, freedom disappears, innovation is squashed, mediocrity trumps talent, progress makes way for decline … (and) the only legitimate combination of planning and competition … (is) planning for competition, not planning against competition". The fundamental character of the capitalist mode of production is "the necessity for continual change", which encapsulates "stagnation" and "destruction" (Johnston, 1986; Wallerstein, 1991).

This paper examines South Africa in the context of globality of fourteen countries of various levels of Human Development Indices (HDI) in order to establish that its slump is attendant to the void of "structural power" and absence of "competition" state. The paper applies Principal Component Analysis (PCA) to a series of variables that define capitalist societies in order to demonstrate that relative to the other fourteen countries, South Africa possesses no "structural power", which is necessary for influencing markets under business globalisation. The paper argues that the latter, together with the emergent offshore financial markets, are paradoxically driven through choices made by states themselves. To this extent, the paper recommends that South Africa establishes itself as a "competition" state because the environment of business globalisation and offshore financial markets is ubiquitous and imperative. Also, that South Africa uses state intervention to invent its "structural power", largely through educational training and creation of a competitive "national" knowledge economy, in order to lead in the creation of improved business confidence and support of a conducive investment climate.

CAPITALISM, BUSINESS GLOBALISATION, OFFSHORE FINANCIAL MARKETS, "COMPETITION" STATES AND "STRUCTURAL POWER"

According to Johnston (1986: 25), the capitalist mode of production "is a materialistic structure ... evolved by human decision-makers as a way of enabling people to fulfil their material needs". The same observation is made variously by Wallerstein (1991), Mohan et al. (2000), and Mohan (2000). Thus, employment has become "a major factor for income inequality" in the capitalist society (Newman, 2017: 11), largely because of the class structure wherein a large cohort of proletariats and fewer owners of capital coexists

SOUTH AFRICA'S "STRUCTURAL POWER": "COMPETITION" STATES

(Wallerstein, 1991; Smith, 2017). Global capitalism, therefore, should mean that imports would create a downward pressure on consumer prices, and that the wage growth of the lower-income group would remain supressed at very low levels (Wallerstein, 1991; Marshall, 2017; Monbiot, 2017). Generally, there are lines of argument that blame the drop in employment on automation and "financialisation" as the prime drivers of capitalist globalisation (Milward, 2000a; Marshall, 2017; Newman, 2017). As Marshall (2017: 35) codifies, automation and technology are self-reinforcing drivers that exacerbate the challenges in the capitalist world economy due to competition pressure. Under business globalisation, the emergence and partial take-over of the capitalist system by "institutions in all areas of capital - industrial, merchant and financial", has involved changes in relations of production and capitalist class system, with the implication that the conventional "dichotomy between capitalists and proletariat becomes an oversimplification" (Johnston, 1986: 30), thereby entailing mediation through "competition" states (Wallerstein, 1991; Mohan, 2000). Similarly, automation- and technology-driven capitalist globalisation too recreate the class society of states that are crudely described as winners and losers, respectively (Wallerstein, 1991; Orrell, 2010; Marshall, 2017; Monbiot, 2017; Smith, 2017; Turok, 2017). In terms of the capitalist logic, therefore, "Investment, both public and private, is insufficient for employment generation and is often directed to non-productive and non-developmental activities" (Turok, 2017: 7).

Johnston (1986: 36) describes capitalism as "a continuous process of restructuring, of creating new situations out of the contradictions of the old". One fundamental character of the foundation of capitalism is in the perpetual contradiction involving the owners of capital and the proletariats, which under the current dominance of the business globalisation and offshore financial markets has entailed the establishment of "competition" states that would seek to shape markets for the "national" economy self-interests (Wallerstein, 1991; Mohan, 2000; Newman, 2017; Smith, 2017). The evolution of capitalism as a mode and materialistic structure of production, coupled with the advent of business globalisation and prominence of offshore financial markets, has meant that the conventional classes of individual capitalists and proletariats would increasingly be overshadowed by the growth of large corporations, searching for investments in a wider range of sources through financiers and financial institutions (Johnston, 1986; Newman, 2017; Turok, 2017). The latter "amalgamate, invest and manage money" in order to make profits on behalf of capitalists (Johnston, 1986; Newman, 2017; Smith, 2017; Turok, 2017). With the dominance of business globalisation and offshore financial markets (Johnston, 1986; Milward, 2000a; Newman, 2017), conventional "nation-states" had to give way to "competition" states that would amass "structural power" in order to serve the "national" private economy interests for investments, creation of employment and generation of purchasing power (Johnston, 1986; Wallerstein, 1991; Milward, 2000b; Orrell, 2010).

That is, the processes of capitalist production and exchange is now firmly organised through money, which is itself "a social creation"; and, it has become a fundamental necessity for the operationalisation of capitalism (Johnston, 1986; Wallerstein, 1991; Milward, 2000a; Zack-Williams et al., 2000; Marshall, 2017; Newman, 2017; Smith, 2017). Hence, Chang (cited in Marshall, 2017: 39) concludes that "A regime of low investment, low growth and low quality of employment has been built into the system, resulting in the growth of income inequality, which in turn results in less demand and further discourages investment". A state needs to possess "structural power" in order to create an enabling investment environment, because such a regime could only be remedied through increased economic growth, which paradoxically entails state intervention. Indeed, the problem with this capitalist regime is, as Chang (cited in Marshall, 2017: 41) put it, that "income inequality and low investment are both causes and results of low growth". Tacitly, the state presents a fictional degree of "relative autonomy" from capital whilst it, in practice, preserves "the conditions for capital to survive in a system of social democracy"; hence, the primary structures of capitalist production have continued unaltered (Turok, 2017: 8) and reproduced themselves at the scale of states and globality (Wallerstein, 1991; Mohan et al., 2000; Smith, 2017).

Wealth and Power within Capitalism

Newman (2017: 13) notes that economic growth has since at least the 1990s "been driven by financial and business service sectors"; simultaneously, income from financial investments increased tremendously (Marshall, 2017; Turok, 2017). As a locus of purchasing power, "possession of money" is the primate "source of power" that influence the operations of markets through the creation of products (Johnston, 1986; Wallerstein, 1991; Zack-Williams, 2000; Orrell, 2010; Turok, 2017). Those who possess purchasing power are also "able to create products" and employment; and, the use of money in the latter case implies that the users possess "structural power" (Johnston, 1986; Wallerstein, 1991; Mohan et al., 2000; Orrell, 2010; Turok, 2017). Given

that capitalism is founded, primarily, on the "two uses of money" that established a discriminatory society of owners of capital and the proletariat (Johnston, 1986; Orrell, 2010), pertinent questions need to be asked about the ability of developing economies to command "structural power". But purchasing power *per se* is a weakness within capitalism; instead, it is the possession of "structural power" that allows for generation of more money (Johnston, 1986; Wallerstein, 1919; Mohan et al., 2000; Orrell, 2010; Marshall, 2017; Smith, 2017). For this reasons, investment in production enhances purchasing power and accumulation of wealth through a recurrent process of investments and returns (Johnston, 1986; Wallerstein, 1991; Zack-Williams et al., 2000; Orrell, 2010). In essence, the hope and expectation that returns would always be greater than investments motivate for repeated circulation and advancement of money and capital into the production system (Johnston, 1986; Wallerstein, 1991; Zack-Williams et al., 2000; Orrell, 2010; Marshall, 2017; Smith, 2017). Hence, within capitalism, utility of products is secondary to their profitability (Johnston, 1986; Harvey, 1990; Wallerstein, 1991; Orrell, 2010; Marshall, 2017).

Global Interdependence, "Competition" State and Economic Power

At a broader scale, the capitalist society is classified into the bourgeoisie or capitalist and the proletariat (Johnston, 1986; Orrell, 2010; Marshall, 2017; Smith, 2017). Just as there is interdependence between the bourgeoisie and proletariat, the same is true for "nation-states". According to Cameron & Palan (2004: 8), "the imagined community of the territorial nation-state" has rapidly given way to "a series of imagined economies which maintain the fiction of the state – and indeed perpetuate it as a legal entity – but situate it within a radically different set of boundaries and notions of social space". To thrive in the capitalist world system, industrialised states use their power to influence business globalisation and offshore financial markets, in particular, to their selfish "national" advantage (Wallerstein, 1991; Milward, 2000a; Potter, 2002; Simon, 2002; Marshal, 2017; Smith, 2017). However, this assertion could erroneously suggest that states have absolute autonomy. Countries that are intricately married, as it were, to "the vortex of global capital flows" do not command the necessary power to pursue policies of their own choice (Patnaik, 2017: 40). In the world economic system, as Johnston (1986: 26) put it, economic power is unequal and "strongly" positively correlated to wealth. Often, the state is influenced by those groups that command wealth and incomes as well as social, economic and political power (Mohan et al., 2000; Mohan, 2000; Zack-William et al., 2000; Simon, 2002; Orrell, 2010; Patnaik, 2017; Marshall, 2017; Smith, 2017).

According to Garten (2001 cited in Cameron & Palan, 2004: 1), globalisation has conventionally been understood as "an objective process of market integration on a global scale, driven by developments in transportation and communication technologies". However, Cameron & Palan (2004: 2, 7) advise that globalisation is "a *mediated* concept", because "... over and above the various concrete processes of technological, economic and institutional change which are commonly presented as the essence of globalisation, the more fundamental significance of the concept is the role it is playing in rewriting the collective imagery of society". Business globalisation has, indeed, reshaped the notion of a single unified spatiality of a nation-state because of the multiplicity of spaces of diverse identities, being and jurisdiction and non-jurisdictions, wherein states, just like capitalists and proletariats, are in competition (Mohan et al., 2000; Potter, 2002; Simon, 2002; Cameron & Palan, 2004; Orrell, 2010; Marshall, 2017; Smith, 2017). As Johnston (1986: 27) puts it, "The need to compete and the desire to accumulate as much as possible are linked in the search for high levels of profitability". Hence, the search for a "competition" state hybrid that would situate the conventional "nation-state" in the context of business globalisation and offshore financial markets has been incessant (Wallerstein, 1991; Mohan, 2000; Mohan et al., 2000; Marshall, 2017; Patnaik, 2017).

The evolution of the "competition" state is crucial to understanding business globalisation as well as how individual states perform in terms of a variety of indicators in the world economy. The concept of "competition" state has been "used descriptively to encapsulate the actual behaviour of contemporary state actors" (Cameron & Palan, 2004: 111). The generally accepted principle is that only as capitalists reinvest their surplus, or a large proportion thereof, in production for profit, would the economy sustain and create employment as well as reproduction (Johnston, 1986; Potter, 2002; Orrell, 2010; Marshall, 2017). However, this principle is intricately embedded with the perpetuation of a discriminatory capitalist system and society. The world economy is, under the contemporary business globalisation and offshore financial markets, in this same state of continual discriminatory participation that requires strong "competition" states. Unsurprisingly, the evolution of capitalism has been characterised by twin processes of "concentration and centralisation" (Johnston, 1986; Simon, 2002; Orrell, 2010; Smith, 2017). According to Johnston (1986: 32), "Concentration and centralisation of economic power, combined with diffusion of ownership, are major strategies that have

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developed in the face of the inevitable slumps that follow market saturation for a certain product". The international financial crisis of 2007-2009 was an outcome of such a regime.

The state has been viewed as the "independent institution" that regulates competition and ensures that the capitalist mode of production operates successfully (Johnston, 1986; Wallerstein, 1991; Mohan, 2000; Potter, 2002; Patnaik, 2017). Far from victim, the state is the "promoter of accumulation", "legitimator of capitalism" and the "creator of social consensus and order" (Johnston, 1986: 34). Given that the state's primary goal is to promote the continuation of society, it is therefore equally responsible for maintaining an unequal society in its ordinary actions in a capitalist society whose sustenance rests on wealth and power inequalities (Johnston, 1986; Simon, 2002; Cameron & Palan, 2004; Newman, 2017). On its part, the state takes the responsibility to create enabling conditions for the stimulation of investment, especially in training labour force through the education system funded out of tax revenues (Johnston, 1986; Wallerstein, 1991; Milward, 2000b; Mohan, 2000; Marshall, 2017). That is, with global interdependence, states compete on a global stage to serve "national" economic imperatives such as the creation of products and employment.

Business Globalisation and Offshore Financial Markets

Cameron & Palan (2004: 89, 107) assert that "globalisation occupies a domain beyond the purview of any conventional politics" and that business globalisation is, therefore, "an act of narrative framing that seeks to legitimise certain desirable aspects of the contemporary world economy as the products of external, offshore activities". On its part, the offshore economy is thought to exemplify "the status of placeless" and "globality", which is characterised by competitiveness, inclusions and exclusions (Milward, 2000a; Potter, 2002; Simon, 2002; Cameron & Palan, 2004). However, the two extremes of "onshore" and "offshore" economies are mutually constitutive (Wallerstein, 1991; Milward, 200a; Cameron & Palan, 2004; Orrell, 2010).

The offshore economy consists of "offshore financial markets" and "tax havens", among other things, defined by their relative lack of regulation and, mostly, tax-free operations (Palan, 2002, 2003; Cameron & Palan, 2004; Orrell, 2010; Marshall, 2017). The primary distinction of the offshore economy is that it operates outside the jurisdiction of any national authority or state. Whereas denoted "offshore" they actually operate "onshore", within territories of particular states, without any codified legal status and/or multilateral agreements. Hence, their existence as "offshore" is often described as "fictional" (Milward, 2000a; Mohan et al., 2000; Palan, 2002, 2003; Cameron & Palan, 2004; Orrell, 2010; Newman, 2017). Indeed, offshore financial centres, within which the "offshore" economy resides, are themselves both "physically and juridically" located "in major 'onshore' cities" (Cameron & Palan, 2004: 93). Offshore economy's "fictional" existence of not occupying territorial legal spaces accords them an appearance of absolute independence from the state (Wallerstein, 1991; Palan, 2002, 2003; Orrell, 2010). In response to this business globalisation, states have established means through which they would participate in the "fictional" offshore economy and to control its effects on their domestic markets (Johns, 1983; Ginsburg, 1991; Wallerstein, 1991; Milward, 2000a; Carmichael & Pomerleano, 2002; Palan, 2002, 2003; Cameron & Palan, 2004; Orrell, 2010). The reality is that some states are more equal than others in terms of the influence they are capable of exerting on business globalisation and offshore financial markets.

In essence, business globalisation derives from deliberate state policies that are designed to open-up national markets through privatism. To this extent, the establishment of offshore financial markets, business globalisation and the reconfiguration of states are mutually constitutive. Following Harvey (1990), Cameron & Palan (2004: 100) state that business globalisation has been achieved primarily because "the offshore financial markets are operating within unique juridical spaces which are not territorial in nature". That is, they are neither "national nor global" (Harvey, 1990; Wallerstein, 1991; Palan, 2003; Cameron & Palan, 2004). However, the progress of business globalisation and offshore economy are exclusively dependent upon the creation of "open national economies", which is itself a recognition that "offshore" cannot exist outside "onshore" or state sovereignty, albeit in a modified format (Wallerstein, 1991; Mohan, 2000; Cameron & Palan, 2004). For this reason, the progress of capitalism has been contingent upon privatism of the national economies (Held, McGrew, Goldblatt & Perraton, 1999). States had to adjust and cede aspects of their traditional sovereignty to the "fictional" non-territorial spaces of the offshore economies. Hence, the notion that the offshore economy and business globalisation are both constructed and sustained through the same principles of state sovereignty (Wallerstein, 1991; Potter, 2002; Simon, 2002; Palan, 2003; Cameron & Palan, 2004).
That is, the "offshore is fundamentally and paradoxically an expression of the continued salience of the 'sovereign' state" (Cameron & Palan, 2004: 108). The fact that the offshore economy and business globalisation have precipitated the reconfiguration of the state should logically suggest that the latter may not necessarily command any control over the former. Also, it should be evident that the social engineering of the offshore economy and business globalisation by some states would have accorded them a degree of influence over the global markets. The primate requirement of the offshore economy and business globalisation for privitism of national economies of states that would not have the capabilities to exercise control over global markets should suggest that such states would not be able to secure "structural power". From the developing countries' perspective, there would be credence to the suggestion that privatism of the "national" economies for the sake of business globalisation and the offshore economy is equivalent to outsourcing the states' imperatives to create an attractive investment climate for creation of products and employment generation. According to Chang (cited in Marshall, 2017: 41), offshore financial markets can impose "short-term bias on the economy" and that they should be abolished in order that the income generated therefrom may be used to boost the "national" economy. Turok (2017: 7) argues that whereas apartheid economy was protectionist, a democratic South Africa rushed for "insertion" into "a competitive world economy" without first establishing a "competition" state. South Africa's economy is evidently privatised, yet the perceived gains from the offshore economy and business globalisation have continued to circumvent the poor majority.

"Privatism" and Private National Economies

The opening and development of new spaces of offshore have meant that some "quintessential aspects of sovereignty" of the state would be undermined (Wallerstein, 1991; Mohan, 2000; Simon, 2002; Cameron & Palan, 2004; Orrell, 2010). As already indicated, business globalisation is founded on the continued functionality of reconfigured state sovereignty. Hence, theorisation of business globalisation advances ideas of globality whilst simultaneously pronouncing on the different types of states and roles they would play in the world economy. Among others, the following types of states were framed: "enabling" state; "trading" state; "market" state; "welfare" state; and, "competition" state (Wallerstein, 1991; Mohan, 2000; Simon, 2002; Cameron & Palan, 2004). A "competition" state, within the context of privitism, has become critical to the "national" engagement of business globalisation and offshore financial markets (Offe, 1984; Wallerstein, 1991; Mohan, 2000; Cameron & Palan, 2004; Smith, 2017). States are expected to reconcile the interests of the free financial markets with those of the electorate (Wallerstein, 1991; Simon, 2002; Cameron & Palan, 2004; Monbiot, 2017). The notion of the "crisis of state" due to the dilemma that most developing economies could not rebalance (Offe, 1984; Mohan, 2000; Cameron & Palan, 2004; Marshall, 2017; Smith, 2017; Turok, 2017).

Indeed, a capitalist society is founded on the notion that competition is a defining character of human relations and that the market is capable of "creating a more efficient system" by finding "a natural hierarchy of winners and losers" (Monbiot, 2017: 34). At the global stage, the plight of states is predetermined whilst their "national" economies are exposed to the tremors of the offshore financial markets and business globalisation. Hence, King (cited in Marshall, 2017: 41) argues that the solution for "national" economic slumps is in "rebalancing" the global economy, rather than the national monetary and fiscal policies. This observation is corroborated by Milward (2000b), Mohan (2000), Zack-Williams et al. (2000) and Simon (2002), among others. Therefore, the evolution of the "competition" state is crucial to understanding business globalisation as well as how individual states perform in terms of a variety of indicators in the world economy. To this extent, "a new narrative of the state has emerged whereby conventional principles of territorial unity and exception, social and (multi-)cultural holism and common purpose have been replaced by 'privatism'" (Cameron & Palan, 2004: 110). That is, in addition to aspects of the "national" economy being "privatised", "privatism" fundamentally means that "the 'idea of state' itself has moved from a 'public' principle of universal inclusion ... to a 'private' principle of competitiveness", a phenomenon denoted "private economy" (Cameron & Palan, 2004: 110). For this reason, privatism and participation in the offshore economy and business globalisation does not necessarily translate into shared gains for the "national" economies. The capacity and ability of states to raise rent from the world economy is predicated upon a variety of other factors, both tangible and intangible.

Within the offshore economy and business globalisation, performance of the "national" economy is intricately intertwined with the "structural power" for influencing global markets (Wallerstein, 1991; palan, 2003; Cameron & Palan, 2004; Milward, 2000b; Marshall, 2017; Newman, 2017; Smith, 2017; Turok, 2017). In addition to the imperative for privatism, states have been urged to accept that the best possible way to successfully raise rent from the capitalist world economy is to subscribe to the "open economy" by marketization of some aspects of the traditional state sovereignty. Tacitly, states colluded to allow capitalist, as a

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mode of structural materialistic production, to reconfigure the international relations into a state-class structure of winners and losers, in the same vein as there are capitalists and proletariats. In this environment, powerful states created various fiscal spaces to enhance profitability of their "national" private economies (Wallerstein, 1991; Zack-Williams et al., 2000; Palan, 2002, 2003; Potter, 2002; Simon, 2002; Cameron & Palan, 2004; Orrell, 2010; Smith, 2017; Turok, 2017). Cameron & Palan (2004: 111) note that when "investment and capital" are "successfully 'lured", the states in question solicit "considerable income and power". Developing states are generally incapable of successfully luring investments and capital for a variety of reasons beyond the scope of this present paper. For a "nation-state" to draw rent from business globalisation and offshore financial markets, it has to establish itself as a "competition" state and to create "structural power", which the majority of developing countries are unable to achieve.

The "logic of openness" has become globally "ubiquitous and imperative"; and, it has to be asked if developing countries have made strides in constructing "structural power" for productive participation in the offshore economy and business globalisation. There is traction in the claim that the imperative to establish open economies through privatism, as a social creation, as well as the intricate linkages of money to power within capitalism, as well as the mediation for conformity of developing countries through international institutions, is in the self-interest of the industrialised nations. It is necessary to frame questions as follows: Do countries such as South Africa draw rent from business globalisation and offshore financial markets? Does South Africa command "structural power" adequate to influence global financial markets for "national" self-interests? This paper holds that "structural power" for shaping and influencing offshore financial markets and business globalisation has been predetermined with the social engineering of the mergence and predominance of these phenomena.

Structural Power

As South Africa relied on welfarism for poverty alleviation among the increasing majority of the poor, the rich continued to cream-off massive wealth (Turok, 2017), which the state was never going to be able to redress (Milward, 2000; Mohan, 2000; Simon, 2002; Monbiot, 2017; Patnaik, 2017). By their nature, states "construct institutional structures that advance their unique notion of the 'good life'" because they should strive to "advance the economic, cultural and political goals of the nation as a whole" (Cameron & Palan, 2004: 12). The "national" economy has been conveniently portrayed as "a servant to the nation" (Simon, 2002; Cameron & Palan, 2004; Turok, 2017). To be true, "experiences of the rest of Africa and ... the whole world" show that "a country's performance depends as much on intangible factors as on concrete measures" (Turok, 2017: 9). For instance, Newman (2017: 13) establishes that "Capital account liberalisation in South Africa has resulted in capital flight"; and, it is thought that the "sustained outflow of capital seeking for a safe haven" was agitated by prevalent "political and economic instability and uncertainty". Business globalisation and offshore financial markets do not create a win-win outcome (Simon, 2002; Milward, 2000a, 2000b; Orrell, 2010; Manbiot, 2017; Patnaik, 2017; Marshall, 2017; Smith, 2017; Turok, 2017). Cameron & Palan (2004: 17) note that the "trifurcation of socio-economic space does not mean that the emergent spatialities are equivalent". The futurology insinuates that the ability to predict the future creates power for control. The world is presently captivated by the concept of business globalisation because "it is about the future, ... preparation for the future, hence ... the capitalisation of future earnings" (Cameron & Palan, 2004: 10). Within capitalism, therefore, weak democratic states that do not possess "structural power" maintain the "existing capitalist system by managing dissent among the masses" and controlling protests, rather than by creating products and conducive investment climate (Turok, 2017: 8). Equally, offshore financial markets and business globalisation are seen to offer opportunities for the creation of products, investments, profit-making and creation of wealth, which are all predicated upon the ability to secure "structural power". In simple terms, this paper demonstrates that the logic of the cause of a problem being simultaneously the expected result as well as the solution to resolving the problem is a twisted paradox of the capitalist society which progresses through contradictions, destructions, stagnations, slumps and economic growth. That is, the state is advised to secure "structural power" which is only seen to be possible through the establishment of the very character of its own definition, which include creation of investments and products as well as generation of employment and profits.

According to Turok (2017: 8), "The state is a necessary enabler of development"; however, a state without "structural power" would preside over a "national" economy wherefrom "massive amounts of profits ... are transferred to offshore locations by companies with multinational ownership structures". Indeed, Newman (2017: 14) notes that the South African state has tacitly regularised "illegal outflow of capital" by embarking on "rapid and extensive liberalisation of exchange controls". To this extent, the South African state virtually

outsourced its "structural power"; and, the next section sets out to demonstrate this observation from a PCA perspective.

SOUTH AFRICA'S "STRUCTURAL POWER" IN GLOBALITY OF PRIVATE ECONOMIES OF SELECTED COUNTRIES

South Africa is perceived as one of the economic powerhouses in Africa, a continent which is understood to be endowed with natural capital. The latter is being exploited, yet Africa continues to be associated with deep-seated poverty, high unemployment rates, low levels of investment and management of money that does not create products. Whereas capitalism progresses through continual contradictions, Africa has appeared to be in slumps with perpetuity. South Africa, post-apartheid, has been in such a slump amidst an apparent world economy recovery.

Research Design

The paper has conveniently selected 15 countries, inclusive of South Africa, across the four Human Development Index (HDI) categories, as determined in the 2015 United Nations Development Programme, of "very high", "high", "medium" and "low". Together with the 15 observations, 28 variables covering a wide spectrum of the "national" economy were selected for Principal Component Analysis (PCA). The latter technique has been successfully used in a variety of contexts (see for example Tsheola, 2010, 2012). Indeed, complexities of the process of assigning geographic units to places along the HDI levels requires analysis of interrelationships among variables and it entails application of multivariate techniques. The linkages of business globalisation and offshore financial markets with the geographic enclaves of "competition" states for the satisfaction of the establishment of "structural power" as well as investments, creation of products and generation of employment "national" private economies, involve such complexities.

PCA produced a 28 by 28 symmetric correlation matrix, which is a "parametric statistic that provides a more accurate measure of coefficient of determination most widely used in spatially-oriented research" (Tsheola, 2012: 1059). Also, it provides a descriptive measure of the degree (strength and direction) of correlation and linear relationships between variables (Edbon, 1985: 97 cited in Tsheola, 2012). Given the limitation of space in this paper, detailed interpretation of the correlation matrix cannot be presented. It suffices to note that the correlation matrix serves two important purposes, which are: determination of the existence of relationships and description of the direction thereof; and, provision of an accurate numerical statement of the strength of the association and the probability that such a relationship would not have occurred by chance. Of the 378 relationships recorded in the correlation matrix, 183 (48.41%) are direct and 195 (51.59%) are indirect. Eighty-eight (88) of these correlations, both direct and indirect are negligible and inconsequential because they lie in the range of -0.12 and 0.12. Also, 69 of them have magnitudes ranging from -0.13 to -0.24 and 0.13 and 0.24; and, the relationships are therefore determined to be weak. Sixty-six (66) of the correlations have magnitudes ranging from -0.25 to -0.37 and 0.25 to 0.37. Also, correlations with magnitudes ranging from -0.38 to -0.49 and 0.38 to 0.49 are relatively weak. Overall, 223 of the 378 relationships are negligible, which is 59.00% of the total correlation frequencies. Only 102 of the 378 correlations are strong and significant enough, deserving of examination. Of the 102 significant correlations, 40 are indirect and 62 are direct. Forty correlations in the 102 range from -0.50 to -0.62 and 0.50 to 0.62, which are significant relationships. Additionally, 27 and 26 of the 102 correlations, respectively, range between -0.63 to -0.74 and 0.63 to 0.74 as well as -0.75 to -0.87 and 0.75 to 0.87. Finally, 9 of the 102 correlations are in the range -0.88 to -1.00 and 0.88 to 1.00. In the 40 correlations ranging between -0.50 to -0.62 and 0.50 and 0.62, 23 (57.5%) are direct and 17 (42.5%) are indirect relationships. Of the 27 that range between -0.63 to -0.74 and 0.63 to 0.74, 13 (48.15%) are direct and 14 (51.85%) are indirect correlations. Also, 20 (76.92%) of the 26 correlations ranging from -0.75 to -0.87 and 0.75 to 0.87 are direct whilst 6 (23.08%) are indirect. Finally, 9 of the correlations with magnitudes ranging from -0.88 to -1.00 and 0.88 to 1.00 consist of 6 (66.67%) direct and 3 (33.33%) indirect relationships.

In the final analysis, PCA extracted a total of 15 Principal Components, the first seven of which accounted for a cumulative percentage of 92% variance in the original data. Principal Component (PC) 1, which accounts for 39% variance in the original data, signified the presence of enabling environments for

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modernisation and capitalist development. Principal Component 2, which accounts for 17% variance in the original data, was a virtual antithesis of Principal Component 1; and, this paper is focused only on the interpretation of the latter PC.

South Africa in Globality of Private Economies of Selected Countries

Twelve (12) of the 28 variables have strong positive loadings on PC 1; and, stated in a descending order, they are: Inequality-adjusted HDI (0.98), Inequality-adjusted Education Index (0.94), HDI (0.94), Standard of Living (0.85), per capita GDP (0.84), Rural Electrification Rate (0.84), Internet Users Communication (0.83), Total Electrification Rate (0.81), Mobile Phone Subscription Communication (0.46), Research & Development Expenditure (0.50), Fossil Fuels Primary Energy Supply (0.55), Labour Force with Tertiary Education (0.56). But the strongest positive loadings relate to only three variables, which are Inequality-adjusted HDI (0.98), Inequality-adjusted Education Index (0.94) and HDI (0.94) (figure 1). The second category of the strongest positive loadings are in the range 0.80-0.85; and, they include five variables as follows: Standard of Living (0.85), per capita GDP (0.84), Rural Electrification Rate (0.84), Internet Users Communication (0.83) and Total Electrification Rate (0.81). The next strongest positive loadings involve four variables in the range 0.46-0.56, which are: Mobile Phone Subscription Communication (0.46), Research & Development Expenditure (0.50), Fossil Fuels Primary Energy Supply (0.55) and Labour Force with Tertiary Education (0.56). However, Mobile Phone Subscription Communication also load positively and relatively strongly on PC 2 (0.54) and PC 5 (0.50) (figure 1). Collectively, these positive loadings on PC 1, especially the strongest ones, describe multifaceted development, which transcends mere modernisation to encapsulate societal equality and equitable access to national resources. Furthermore, there is evidence of social development as denoted in the strong positive loadings of variables related to education, standard of living and human development.

This observation is supported by the pattern of four negative loadings that are strong on PC 1, which include: Human Inequality Coefficient (-0.95), Inequality in Education (-0.84), Income Inequality Ginicoefficient (-0.68) and Inequality in Income (-0.63). That is, PC 1 is strongly and directly associated with progressive qualities of equitable multifaceted societal development as well as inversely and strongly correlated with variables that denote antithesis of the three values of development, which are high standard of living, high self-esteem and total freedom of choice, especially due to the significance of labour force with tertiary education, as well as relatively low levels of societal inequality in education, income and access to basic resources. The strong positive loading of Internet use for communication (0.83), together with the virtually universal access to electricity, inclusive of rurality, should suggest that connectivity through modern infrastructure and technologies are at relatively advanced stages.

Therefore, it would be befitting to denote PC 1 as a representation of modernisation and capitalist development with first world infrastructure, education, culture, skills and expertise, economic performance and governance that serve to regulate societal ills and inequality downward by providing equitable access and opportunity for societal progress. To this extent, and given the significance and strength of the loadings of variables relating to communication, countries that score positively and highly on PC 1 should signify the presence of enabling environments for investments, creation of products, generation of employment and establishment of "structural power". A relatively low and negative score would imply that the country in question is scarcely established the necessary "competition" state for participation in business globalisation and offshore financial market to serve the "national" private economy interests.

On its part, PC 2 is characterised by two relatively strongest positive loadings of Youth Unemployment (0.79) and Unemployment among Youth who are not in School (0.70). Additionally, the PC is associated with two strong positive loadings of Income Inequality (0.63) and Income Inequality Gini-coefficient (0.62) (figure 2). Together, these strong and relatively strongest positive loadings on PC 2 signal antithesis to shared societal modernisation and capitalist development. A society in conditions as described in this PC would most probably have a non-competition state. Hence, the use of mobile phones for communication loads relatively strongly and positively (0.54) on PC 2, simultaneously with relatively strong negative loadings of Employment as Ratio of Population (-0.71), HDI Annual Growth (-0.60), Labour Force Participation Rate (-0.56) and Labour Force with Tertiary Education (-0.54). This combination of loadings indicates that PC 2 involves an antithesis of capitalist development, which include societal inequality, slow annual growth in HDI (if not stagnation), negligible access to resources as attested to by total and rural electrification (0.31 and 0.18, respectively) as well as supplies of fossil fuels and renewable energy (0.36 and -0.38, respectively).

This PC can be justifiably described as Frustrated Development, where the struggle for capitalist modernisation has exacerbated societal inequities. Amidst these indications of frustrated development, Annual Average Growth in Government Consumption Expenditure is negatively loaded (-0.45) on PC 2, implying that the state is struggling for resources mobilisation and wealth generation because the reasonable positive loading of Total Government Consumption Expenditure (0.42) suggests that there is political and administrative will to promote shared societal progress. The fact that loadings of crucial modernisation-bearing and capitalist development-related variables such as Public Expenditure on Education (0.13), Internet Communication (0.12), Quality of Education (0.02), per capita GDP (0.04), Gross Fixed Capital Formation (-0.06), Research and Development Expenditure (-0.09) and Standard of Living (-0.14) are virtually neutral, would imply that the national societal state of affairs is severely limiting. That is, the gross societal deficiencies invoked in this analysis relate to the void in "structural power", which is an indicator of the absence of a "competition" state. Therefore, a country that scores positively and highly on PC 2 would imply the absence of an enabling environment for investments, creation of products, generation of employment and management of money for "structural power". Together, these characteristics describes the absence of a "competition" state.

Countries scores are crucial for linking the correlation matrix, Principal Components and Component Loadings with Observations. In this way, countries' scores allow for interpretation of the meaning of the PCA results. Countries' scores on PC 1 are instructive in terms of the key questions of whether there is a "competition" state capable of influencing markets to serve the "national" private economy, under business globalisation. As already indicated, PC 1 accounts for over three quarter of variance in the twenty-eight variables. The results reveal that South Africa does not necessarily have "structural power", which can be established though a "competition" state under business globalisation and the prominence of offshore financial markets. Hence, South Africa's participation in business globalisation appears to accentuate regional disparities instead of stimulating the "national" private economy for investments, creation of products, generation of employment and management of money for "structural power".

PC 1 involves multifaceted development beyond mere modernisation. As it can be expected, countries that score positively on PC 1 should necessarily have the qualities that make for possession of "structural power". Conversely, countries that score negatively on PC 1 are less modernised with high levels of societal inequalities that confirm the inability to influence markets under business globalisation. To this extent, such countries would have deficit of modernising culture and environment necessary for investment, creation of products and generation of employment, possibly displaying an investment environment of exuberance, unconnected to the materialistic resources base of capitalism as a mode of production.

South Africa's component score on PC 1 is -0.58 (figure 3), which would in terms of the analysis mean that this country lacks the character of modernised capitalism wherein a "competition" state is established to use its structural power to influence offshore financial markets under business globalisation. In this way, South Africa cannot be expected to successfully create a viable investment environment because it does not have the wealth and power. It is for this reason that countries such as Norway, Australia, Poland, Korea, Thailand, Vietnam and Sri Lanka that have variably trotted the business globalisation route are on the opposite side of South Africa in terms of their component scores on PC 1. Besides, some of these countries have not been fully successful in creating the so-called "open economy" that are presented as prerequisite for the successful influence over global markets. Countries that have relatively successfully engaged with business globalisation and, to some degree, created enabling investment climate as well as influence the global markets can be classified into three categories. The relatively highly successful category would include Norway and Australia, followed by the group of Poland and Korea, and the class of Thailand, Vietnam and Sri Lanka. However, even countries such as Norway and Australia that have successfully established credible enabling investment environments have continued to experience serious problems of the continual slumps associated with capitalism. Also, Poland and Korea, which are relatively advanced in terms of capitalist modernisation, in comparison with South Africa, have continued to struggle to command total "structural power". South Africa is, in terms of command of "structural power", some distance below Thailand, Vietnam and Sri Lanka. Yet, South Africa is in the same Medium HDI category as Vietnam, explaining the significance of variable maturity of the "competition" state. Indeed, Sri Lanka and Thailand are a bar above South Africa in terms of the HDI (see table 2); and, they are yet to master the art of business globalisation. In terms of sheer resourcefulness and societal development, Norway, Australia, Poland and Korea are in the Very High HDI, two levels above South Africa.

HDI Category	Range	Country	2014 HDI Value
		Norway	0.944
Very high	0.800 to 1.000	Australia	0.935
		Korea (Republic of)	0.898
		Poland	0.843
High	0.700 to 0.799	Sri Lanka	0.757
		Brazil	0.755
		Thailand	0.726
		Botswana	0.698
		South Africa	0.666
Medium	0.550 to 0.699	Vietnam	0.666
		Congo	0.591
		Kenya	0.548
Low	0.000 to 0.549	Swaziland	0.531
		Nigeria	0.514
		Malawi	0.445

Source: UNDP, 2015

Given that South Africa is in the Medium HDI, the negative component score on PC 1 means that its education, standard of living and human development are not supportive of the necessary situational prerequisites for continual command of "structural power". Indeed, South Africa's character involves deep human, education and income inequalities. The relatively low proportion of Labour Force with Tertiary Education in South Africa explains the challenges associated with the paucity of economic participation and performance. Indeed, South Africa's negative score on PC 1 presents adequate evidence that the "competition" state is not as yet established and that the country does not command "structural power". Basically, South Africa's real character is the antithesis of PC 1; and, its extraordinarily high scoring on PC 2 confirms this observation (figure 4).

Conclusively, it can be stated that South Africa has not established a "competition" state and that it does not command "structural power", necessary for influencing global markets under business globalisation. Importantly, South Africa does not have the modernised western-style planning, governance, infrastructure, education system, skills, expertise, culture, economic performance, capacity to regulate societal pressures downward, nor an enabling national environment to successfully trot business globalisation and the offshore financial markets.

South Africa's component score on PC 2 is extraordinarily higher than all of the 14 countries (see figure 4). This country's score is 2.89, which is 2.15 higher than the nearest score. Countries that have relatively successfully trotted with business globalisation and offshore financial markets such as Vietnam, which is in the same Medium HDI Category as South Africa, have far lesser positive and mostly significantly larger negative scores on PC 2. Indeed, South Africa is characterised by high levels of Youth Unemployment and Unemployment of Youth not in School, that is succinctly captured by PC 2. Given that Youth Unemployment is high, especially with youth that are not in school, it means that South Africa lacks the quality that is required for the engagement of business globalisation with its futurology.

Other than unemployment of youth, South Africa's significantly large positive score on PC 2 shows that this country is also deeply unequal. Societal inequality in income and inequities in human development described in PC 2 are deep. Clearly, the use of mobile phones in South Africa is itself ubiquitous whilst the population is generally experiencing high levels of unemployment with lack of growth in HDI, declining rates of Labour Participation in the economy, large proportions of Labour Force without Tertiary Education, as well as continuing limitations in access to electrification and heavy reliance on fossil fuels, points to poverty of planning and governance. It is important to recognise that South Africa's score on PC 2 is an extreme case and a virtual outlier that has no connection to the rest of the fourteen countries, especially those in the Medium and Low HDI. Even Kenya, Nigeria and Malawi, which are in the Low HDI Category score negatively on PC 2, implying that their societal development is in relative terms largely shared compared to that for South Africa. Of

the countries in the Medium HDI Category with South Africa, only Botswana scores positively on PC 2 but by 2.15 points below that of the former.

Overall, South Africa's negative score on PC 1 and positive on PC 2 show that there has been serious failure in planning and governance because a country cannot hope to adopt and implement a "competition" state for "structural power" on the bases of material conditions of the nation. Indeed, South Africa is symptomatic of frustrated development wherein societal inequalities are exacerbated by failed capitalist experimentation and modernisation projects as the state struggled for resources mobilisation with high levels of Government Consumption Expenditure. This scenario points to a bloated bureaucracy, devoid of modernised capitalist mode of production as well as absence of a "competition" state. In the final analysis, South Africa lacks the necessary "structural power" for influencing global markets under business globalisation and offshore financial markets.

CONCLUSION AND RECOMMENDATIONS

The paper has used the discourse on business globalisation and offshore financial markets to argue that states have not necessarily disappeared with the emergence and evolution of these phenomena. Instead, the predominance of business globalisation and offshore financial markets has led to the redefinition of state sovereignty in ways that allowed for the existence of spaces that are not regulated by governments. Simultaneously, the growth of business globalisation has meant that state became even crucial as regulators in a situation where the conventional divide between owners of capital and proletariats became more sophisticated as large corporations amalgamated, invested and control the social creation, money, which is the primary driver of the capitalist system. At the global stage, the original tension between capitalist and proletariats has now shifted to that between states that seek to draw increased rent from the world economy for their "national" gains. The paper demonstrated that business globalisation and offshore financial markets which are prone of capital flight entail the establishment of "competition" states.

Furthermore, the paper demonstrated that South Africa, which is in terms of the Human Development Index outperformed by states that are lower than its rank on this measure, in terms of possession of "structural power". Based on the discussion in this paper, recommendations are offered as follows:

- That South Africa establishes itself as a "competition" state because the environment of business globalisation and offshore financial markets is ubiquitous and imperative.
- That South Africa uses state intervention to invent its "structural power" in order to lead in the creation of improved business confidence and support of a conducive investment climate.

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Figure 1: Modernisation and Capitalist Development

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Figure 2: Frustrated Capitalist Development







Figure 4: Countries Principal Component 2 Scores

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IDEALISM OF NEOLIBERALISM, ECONOMICS, EMPLOYMENT AND EARNINGS IN SOUTH AFRICA: DEMYSTIFYING "FINANCIALISATION" AND THE PRODUCTIONIST INDUSTRY

Johannes Tsheola and Olga Makhudu

ABSTRACT

The world economy is in a "chicken-and-egg" scenario wherein low economic growth is assumed to cause employment problems that can, in return, be resolved by higher wages and consumption, all in short supply, thereby discouraging investments due to lowered business confidence. There is a notion that national and local measures such as imposition of austerity would not resolve the problems, as they require reordering the global economy, itself difficult as no single state would be willing to be the first to act amidst content and despondent international institutions. Adherence to neoliberalism and strong institutional frameworks have seen a democratic South Africa run a full circle as its experiences illustrate these world economy conundrums. Its economy has increasingly divested from all other sectors to focus on the financial industry in a phenomenon denoted "financialisation". This paper contests the suggestion that the emergence of "financialisation" has implied that earnings would remain an uncontrollable instrument for the perpetration of poverty and inequality in emerging economies. Instead, it asserts that the dominance of the financial sector in emerging economies is an inherent paradoxical self-serving character of capitalist development. The paper concludes that downgrading of South Africa's profile, banks and corporations into junk status undermines "financialisation", which provides for one of this country's largest employment and earnings as of 2016 and 2017. It corroborates the idea that educational training of employees in the productionist sector, rather than financialisation itself, is the core problem of the South African economic system. The paper uses the statistical data on industrial disputes, employment and earnings, organised according to the Standard Industrial Classification, to demystify the blame on "financialisation" as the cause of destruction of the "productionist" industry.

Keywords: Economy, neoliberalism, productionism, financialisation, South Africa

INTRODUCTION

As the excitement with globalisation subsided, it became apparent that the problems with the world economy are instead "fundamental" and "profound" (Marshall, 2017). The hope that globalisation would exert downward pressure on prices of consumer goods, improving the utility of budgets, dissipated as evidence demonstrated that employment and wages for the majority of the proletariats remained suppressed (Crowley cited in Marshall, 2017). Drawing from observations by Chang, Turner and Crowley, Marshall (2017) codifies the notion that concerns about employment are raised everywhere else across the world because that is the primate route to enhanced levels of living and wellbeing. The apparent predicament in the global economy has been blamed on a variety of factors including "automation", technological advancements and "financialisation"

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the economy (Marshall, 2017; Newman, 2017). In the process of evolution from "productionist" to "financialisation", the global economy has simultaneously appeared to corroborate the Marxist prediction that capitalism would transition into socialism as a function of the reset of the exploitative relations of production between the owners of capital and proletariats (Smith, 2017). However, the capitalist economic system has trotted crisis after the other through unending reflexivity that sustained its core; and, the phenomenon denoted "financialisation", wherein investments flood the financial sector, appears to be the latest diversion. Whereas there is universal agreement that the problems of the global economic system are resolvable, dominant ideas have remained convoluted (Marshall, 2017; Smith, 2017).

Rather than provide for instruments of change, philosophers have overwhelmingly offered interpretations of the nature of society and its progress (Smith, 2017). As a philosophy, neoliberalism provides that "competition" is a "defining characteristic of human relations" wherein free markets, rather than planning and/or design, are thought to create the most efficient economic system that discovers "a natural hierarchy of winners and losers" (Monbiot, 2017: 34). To this extent, neoliberalism philosophy accepts inequality as a starting point (Patnaik, 2017) after which "unrestricted entrepreneurs would create the wealth that would trickle down to everyone" (Monbiot, 2017: 34). This thinking tacitly assumes that the economic system would have remained "productionist"; however, in recent years it has been conclusively demonstrated that investors have divested from the production base and invested heavily in the financial sector (Marshall, 2017; Newman, 2017). Hence, societal progress is threatened with every global financial sector crisis as it was demonstrated in 2008 and 2009. Borrowing from Chang (cited in Marshal, 2017: 39), this paper provides evidence from a South Africa perspective to corroborate the notion that adherence to neoliberalism philosophy has in practice created "A regime of low investment, low growth and low quality of employment (which) has been built into the system, resulting in the growth of income inequality, which in turn results in less demand and further discourages investment". Realistically, the world economy is in the state of "chicken-and-egg" scenario wherein low growth is the cause of employment problems that can be resolved by increased wages and consumption power, which are all in short supply, thereby discouraging investments due to lowered business confidence. Hence, King's call for "rebalancing of global economies" is met with skepticism relating to the "difficulty" that "no one wants to be the first mover" and that the absence of confidence that the International Monetary Fund (IMF) could serve as the driver of such a change (cited in Marshal, 2017: 41). Having portrayed itself as the leader of continental renewal that is accepted by the world due to its adherence to neoliberalism and strong institutional frameworks, a democratic South Africa has run a full circle as its experiences provide illustrations related to these world economy conundrums.

The emergence of "financialisation" is blamed on the decisions of investors for "sucking capital investment from other sectors" in such a way that capitalist development mutated from "production" to virtual "speculation" in financial markets (Marshall, 2017; Newman, 2017). For emerging economies such as that of South Africa, the net effect of "financialisation" has been to direct investment into the financial sector that have continued to exclude the majority of the population, who do not have the requisite means for participation (Newman, 2017; Turok, 2017). Hence, the current investment climate in South Africa is riddled with cries about the rating agencies' declaration of downgrades with negative outlook and/or junk status against the state-owned enterprises (SOEs), banks and the country itself. The paper suggests that the preoccupation with rating downgrades, which is itself not unimportant, has blinded policymakers from discerning the opportunity to rebalance the economy through state investment in the "productionist" base. Unemployment, poverty and inequality in South Africa predate the phenomenon of "financialisation"; and, the latter is merely one of the capitalist economy hybrids arising out of incessant reflexivity. This paper uses South Africa's statistical data, manipulated according to the Standard Industrial Classification (SIC), on disputes about wages, working days and hours lost, employment and earnings to demonstrate that the financial sector is one of the largest employer with relatively greater gross earnings and the least wage strikes of the nine categories of the rest of the economy. To this extent, the paper contests the notion that "financialisation" is the cause of South Africa's unemployment, poverty and inequality. Instead, the paper asserts that the locus of the primary cause of these problems is in the social arrangement of the capitalist economy through the neoliberalism philosophy.

THE ECONOMICS OF FINANCIALISATION IN EMERGING ECONOMIES

Orrell (2010) argues that the economic theory assumptions are fundamentally flawed because they are basically models in physical sciences adapted social reality. There is evidence that the capitalist economic system of investors and proletariats has continued to be "unfair, unstable, and unsustainable" (Orrell, 2010: 5).

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As attested to by the 2008 global financial crisis, "the invisible hand has failed to keep assets prices stable; instead, oil, gold and hard currencies are subject to enormous gyrations" because the underlying economic assumptions "are completely out of touch with reality that the result is a highly misleading caricature" (Orrell, 2010: 4, 5). Free markets have not as yet found a balance, because gyrations of the global economic system have intensified with the increased emphasis on neoliberalism and market efficiency (Orrell, 2010; Marshall, 2017; Turok, 2017). Within neoliberalism, governance decisional and regulatory powers have traditionally resided with the state, whereas discursive power has significantly devolved to non-state actors such as the bourgeoisie (Buscher & Dietz, 2005; Orrell, 2010; Newman, 2017; Smith, 2017). Some investors and private companies are now more powerful than some emerging states, a phenomenon described as "hollow state" by Strange (1996 cited in Buscher & Dietz, 2005; 6).

On their part, African societies have not as yet developed their version of materialism for societal change, beyond the idealism of African Renaissance, for the progress of continental politics and economics. Instead, most of Africa continues to pursue "inherited and unreformed planning system of the colonial era" that are based on inappropriate and "vague idealism of master planning" (Ogbazi, 2013: 109). Emerging economies such as South Africa have, for example, appeared to stumble from one ideological contestation to another, as attested to by the preoccupation of the public discourses about South Africanism, better life for all, people first, decolonisation, state capture, radical economic transformation and, now, monopoly capital. Regarding South Africa, Rossouw & Rossouw (2017: 15) raised concerns of a "looming fiscal cliff" as civil service remuneration and social grants grew substantially at the same time as the economic system drifted from "production" to "financial speculation". According to Turok (2017), capital has had a crucial role in recreating a dysfunctional South African economy through, among others, the polluting effects of state institutions such as the South African Broadcasting Corporation (SABC), the South African Revenue Service (SARS), the South African Airways (SAA), Eskom and such other state-owned enterprises (SOEs). For this reason, the suboptimal performance and malpractices of the South African economy (Turok, 2017) cannot be studied nor understood in isolation from issues of governance. Indeed, societal inequality in South Africa defines continuities of colonial and apartheid economic distortions (Turok, 2017) wherein capital reflexively recreates itself by shifting from the production to the financial sector (Newman, 2017). However, the point to be made is that it is governance of the capitalist development, rather than "financialisation", that is central to South Africa's societal problems of unemployment, poverty and inequality.

In his interpretation of materialism, Smith (2017: 36) notes that Marxism defines societies "principally by their mode of production" which involves how people "produce the means of their own subsistence in community with one another". Imposition of the materialistic perspective in the attempt to understand the "nature" and progress of societies (Smith, 2017) is not meant to dismiss the values of idealism. Historically, human societies have worked in close contact with nature, increasingly mediated through technological advancements, in order to produce, survive, reproduce and prosper (Marshall, 2017; Smith, 2017). The relationships of societies and nature have, however, evolved into complex systems of production, based on mediated inclusions and exclusions that recreate poverty and inequality (Orrell, 2010; Manbiot, 2017; Marshall, 2017; Smith, 2017). One of the numerous phenomena that grew with the ascendency of neoliberal globalisation to become hegemonic in emerging economies, is denoted "financialisation" (Newman, 2017). But "financialisation" cannot be responsible for the longstanding character of capitalist development, which separates owners of capital from the proletariats for targeted discrimination.

The organisation and system of "production for profit and exchange", denoted capitalism, is now globally hegemonic (Smith, 2017: 37). Neoliberalism as a philosophy has triumphed, globally, with the unequivocal support of investors fearing distributive effects of democracies (Monbiot, 2017; Smith, 2017). In essence, neoliberalism prioritises growth over redistribution without offering a credible argument for the transition from the former to the latter (Patnaik, 2017). Besides, states do not enjoy absolute autonomy, especially in the context of "the vortex of global capital flows" (Patnaik, 2017: 41) as well as the "financialisation" of the global economic system (Marshall, 2017; Newman, 2017). There is universal acceptance that a "productionist" economic system prescribes "firms as the core site of capital accumulation" whereas financialised business processes reposition firms in ways that serve to increase "financial operations and motives" (Newman, 2017: 13). Thus, firm performance has become a function of that of "stocks and shares on capital markets associated with the shareholder value movement" (Newman, 2017: 13). In the process, "automation" and technological advancement have colluded to redefine the owners of capital as winners and the proletariats as losers, with the result that the economic growth is affected negatively as the majority of consumers tend to command lesser disposable expenditure (Marshall, 2017). Theoretically, the expansion of wages of the majority should increase consumption in ways that benefit the owners of capital, but neoliberalism has appeared to be self-destructive in that it supports social economic organisation that allows for "increasingly

uncontrolled power of corporations and the increased financialisation of the economy" (Chang cited in Marshall, 2017: 39). This observation cannot be easily dismissed in the context of the world economy that paradoxically boasts exchanges of monumental capital in the midst of scarce "high-quality employment" for the majority of citizens (Marshall, 2017). Equally, the observation cannot be construed to suggest that "financialisation" is the cause of the problems of the global economy.

From a Marxist perspective, Smith (2017: 36) notes that capitalism "is inherently unstable and volatile" because it "consists of two antagonistic classes" of the bourgeoisie who own means of production and the proletariat who sell their social value for survival. Given its inherent ability of reflexivity and the absence of evidence of its evolution into socialism, capitalist development is presumed to progress through crises that continuously reset the enrichment of the bourgeoisie and the pauperisation of the proletariat (Orrell, 2010; Smith, 2017). That is, the notion that socialism is an "unrealised potential of capitalist development itself" remains unresolved largely because society is itself required to "translate the potential of socialism within capitalism into reality" (Smith, 2017: 37). Indeed, there are "vested interests in how change and development are to proceed" (Desai & Potter 2002: 59); hence, societal economics is value-laden and, far from the logic of rationality, controversial and contested (Legum, 2002; Smith, 2017). With the triumph of the Washington Consensus, Keynisianism was rejected as a non-alternative (Legum, 2002). Instead of the state creating "stable macroeconomic framework for production" in accordance with Keynesianism (Adedeji, 2009), imperfect free markets that are incapable of self-correction hold reign to determine the investment for the nature of societal progress (Legum 2002). Owners of capital cannot be reasonably expected to provide for educational training of the old labour force in the "productionist" base under free market neoliberalism.

With the ascendency of globalisation, liberal capitalism, often mediated through statism, came into dominance. This hegemonic economic system is largely founded on "free" market forces, private investments for profit-making, technological advancement and capital accumulation (Peet, 2002; Hall & Midgley, 2004; Orrell, 2010; Smith, 2017; Turok, 2017). Emerging economies, especially those in Africa, have appeared to have perpetually lacked any potent political-economy theory that would serve as a weapon for decolonisation and societal progress. To this extent, there is no African emerging economy that serves a leading example such as that of the so-called Asian Tigers. The ongoing discourses about decolonisation and "radical economic transformation" are indicative of the incessant "antagonism", if not perceived, in the capitalist societies over the means of production and ownership thereof, manifesting through the paradoxical and contradictory relationships of the institutions of the state and the market (Peet, 2002; Hall & Midgley, 2004; Orrell, 2010; Manbiot, 2017; Smith, 2017). However, the hegemonic capitalist development has mastered the art of reflexivity (Peet, 2002; Hall & Midgley, 2004); hence, the current global economic system is preoccupied with the divestment from "production" in favour of "financialisation" (Newman, 2017). Whereas the state-market paralysis is longstanding, it has become increasingly complex under reflexive capitalist development (Peet, 2002; Hall & Midgley, 2004; Orrell, 2010) wherein the economics of investment involve multiple actors (Orrell, 2010; Newman, 2017; Smith, 2017; Turok, 2017).

For emerging economies such as South Africa, whose societies lived through experiences of colonialism and apartheid capitalism, economics has never been "a moral science" nor a "part of an ethical system in the service of humanity" largely because of the imposition of the "immutable laws" that determined the politics of "deciding how people should live" (Legum 2002: 1, 2). In this regard, governance, rather than "financialisation", should become paramount in studying and understanding the nature of societal progress. Reflexively, capitalist development has continued to incorporate its critiques into refined, but unchanged, versions (Peet, 2002; Orrell, 2010; Marshall, 2017). Historically, the underlying hegemonic neoliberal governance of economic and politics has continued unaltered. The significance of governance in the current economic system is succinctly presented by Patnaik (2017: 40) who dismisses the thinking that redistribution could wait whilst growth is prioritised, thus: "To believe that the State can pursue growth-promoting policies till a certain date and then suddenly switch redistributive policies after that date, is to believe in the absolute autonomy of the State in a capitalist society, which is naïve in the extreme". To be precise, the global predominance of the financial sector is an indicator of the strength of the investors against the proletariat and the state (Newman, 2017; Patnaik, 2017; Smith, 2017). Indeed, governance consists of multiple actors whose power relations are mediated through their influence on the state itself (Croucamp & Malan, 2016).

Newman (2017: 10) argues that the current economic system is dominated by the phenomenon denoted "financialisation" wherein the financial sector serves as the "vortex" or "centre of gravity" which sucks capital investment and "re-calibrate" performance of all other sectors, some to the point of their collapse. That is, the progress of the economic system has occurred by defying the trickle-down logic of the owners reinvesting their profits to create employment for the poor. To this extent, the owners' decision to invest in the financial sector is

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construed as an instrument of thwarting the potential for redistribution. Financialisation takes root in an "industrial structure which is heavily skewed towards capital intensive industries connected to extractive industries" (Newman, 2017: 11). Driven by the "financial and business service sectors", economic growth is thought to allow for continued enrichment of the owners and impoverishment of the proletariat (Marshall, 2017; Newman, 2017; Smith, 2017; Turok, 2017). Overall, this phenomenon "manifests the choices that owners/investors make about their preference for what to do with the profits they earn" (Newman, 2017: 10). In essence, the investment climate drifted from "a production economy" to speculation or the so-called "casino economy" (Newman, 2017). According to Newman (2017) "financialisation" as an economic system grew with intensification of neoliberalism and globalisation, which collectively continued to frustrate development and perpetuate societal inequality in emerging economies such as South Africa (Newman, 2017). The implications of this phenomenon on employment, earnings and inequality in South Africa have been described as deep (Newman, 2017), perhaps erroneously. This paper examines South Africa's statistical evidence of performance of the SIC industries in order to demystify the notion of "financialisation" being the cause of unemployment, low wages, inequality and poverty. Examining the triumph of President Donald Trump, Monbiot (2017: 35) notes that as the "self-interested neoliberalism" fail societies, the sectors of society that are disempowered and disenfranchised "turn instead to a virulent anti-politics in which facts and arguments are replaced by slogans, symbols and sensation". That is, the problem of the global economy precedes the emergence of "financialisation", as a nuance capitalist reflexivity, within neoliberalism philosophy and globalisation that now captivates societies.

GOVERNANCE AND ECONOMICS IN SOUTH AFRICA

Kaufmann, Kraay & Mastruzzi (2009, 2010) confirm the universality of the notion that "good" corporate governance is an essential ingredient for sustained economic growth and development, because it provides for quality institutions and an enabling investment climate, which are critical for attracting the necessary investment in infrastructure. The Worldwide Governance Indicators (WGIs) reveal that many countries have made progress in anti-corruption over the past decades, but that they have not made the necessary improvements to sustain enabling investment climate (Kaufmann, Kraay & Mastruzzi 2009, 2010).

Recently, the South African economy and most of its state-owned enterprises (SOEs) experienced downgrading with negative outlook and/or to junk status by the most powerful institutions in the global financial arena. The downgrades were predictable because they were associated with overt governance lapses and collapse of institutional quality in some key sectors of the state. To be sure, the South African constitution remains internationally-acclaimed, with benign Bill of Rights and Chapter 9 institutions. Notwithstanding the institutional provisions, a democratic South Africa has leaped from one governance abyss to another, to the extent that one Minister of Finance served for a period of less than one month in 2016. The revelations on state capture, corruption and factionalism in the ruling elite, political patronage, the eight motions of no confidence in the president and the recent Gupta-linked emails are just a few symptoms of the underlying governance-vice. The downgrading of South African banks to junk status corroborates the observation that the traditions and institutions by which authority in exercised (Kaufmann, Kraay & Mastruzzi 2009, 2010) have virtually collapsed. To this extent, it should be unreasonable to blame "financialisation", as though it were not part of the continuities of neoliberal capitalism, for unemployment, low wages, inequality and poverty in South Africa.

Investors wield both economic and political power, rendering their governance a double-pronged challenge for developing states, whose voting majority are almost exclusively poor (Glemarec & Puppim de Oliveira, 2012). Therefore, governance of politics and economics in developing countries has meant that shareholders have become prominent actors wherein state powers have melded with that of capital in state-funds gobbling SOEs that list on international stock exchanges and behave like private multinational companies on the global arena (Wooldridge, 2012). One denominator that characterise these "coddled state giants" has been in their irresponsible and unproductive investments of public funds (Wooldridge, 2012). South Africa's SOEs have commonly gobbled the fiscus trotting the unknown markets as if they were private multinational companies; and, as Croucamp & Malan (2016) put it, owners of capital have used the state and its institutions to gain excessive power, through both formal and informal networks, over all other actors, including the proletariats. However, South African evidence does not corroborate the notion that "financialisation" is the cause of unemployment, low wages, inequality and unemployment.

SOUTH AFRICA'S ECONOMICS, EMPLOYMENT, EARNINGS AND INEQUALITY

Newman (2017: 11) identifies "wage inequality" as the "main driver of inequality in South Africa". According to Newman (2017), investments in the financial sector have produced increased earnings, which jumped from R750 000 million in 2006 to R1.1 trillion in 2007. Simultaneously with "financialisation", South Africa's civil service remuneration and social grants grew substantially to account for 58% of government annual revenue in 2017 (Rossouw & Rossouw, 2017). This aspect of societal context is however ignored in the argument that blames "financialisation" for unemployment and inequality. Also, the distortion of the South African economy is further attested to by the predominance of labour unions in civil service sector rather than those in "productionist" sectors of the economy. But the problem with analyses that identify the growing wage bill in civil service sector and social grants is the jump to the conclusion that austerity would serve as panacea for regeneration of economic activity. This thinking ignores the reality that the economy is financialised and that market speculation exclusively benefit the investors and undermine the trickle-down logic and/or state redistribution. Social grants that are granted to over 17 million beneficiaries do not amount to large sums of money to individuals; instead, they are survivalist. The dependency syndrome created in this way, without suggesting that social security is non-essential, may as well dampen the need to work and the entrepreneurial instincts in society. In fact, trapping 17 million people in "social security poverty" cannot be blamed on "financialisation"; instead, adequate insight could be gained by examining governance matters.

Chang's observation about the "regime of low investment, low growth and low quality of employment ... resulting in the growth of income inequality, which in turn results in less demand and further discourages investment", as "a recipe for increasing social conflict" (cited in Marshall, 2017: 39) is pertinent for South Africa. According to the 2015 Report of the United Nations Industrial Development Organization to the China G-20 Development Working Group,

"Rarely has a country progressed and become developed without sustained structural transformation from an agrarian or resource-based economy towards a higher productive agriculture and a sophisticated industrial or service-based economy. Industry, by providing decent jobs and by expanding the fiscal revenues needed for social investments can boost capacity for inclusive development" (cited in Bonnett, 2016: 52).

Promises of a better future under the philosophy of neoliberalism amidst the reality of the actual economy of stark inequality, joblessness, incomelessness and hopelessness among the majority of the population, are unrealistic. According to Monbiot (2017: 35), "The disenfranchised turn instead to a virulent anti-politics in which facts and arguments are replaced by slogans, symbols and sensation". Unsurprisingly, South Africa's labour market has in recent years been captivated by the sensation of industrial strikes, both protected and unprotected, largely in the "productionist" sector, which has experienced increased divestment. Industrial strikes, employment and earnings provide useful insights to demystify the notion that "financialisation" is the cause of South Africa's unemployment, low wages, poverty and inequality.

Industrial Strikes Across Economic Sectors

Over the period 2005 to 2015, the incidents of industrial strikes across all sectors of the South African economy increased by 8%, whereas the same measure was 25% between 2014 and 2015 (RSA, 2015). However, the incidents of strike declined from a total of 102 in 2005 to a low of 51 in 2009, only to rebound to a ten-year high of 114 in 2013 and then 110 in 2015 (RSA, 2015). With such trends in industrial strikes, employers and employees lost profits and wages, with the latter being hit more severely. Theoretically, lost profits would imply decreased business confidence and lesser reinvestments by the owners of capital, whereas lost wages would directly reduce the disposable expenditure on a variety of goods, thereby negatively affecting the investment climate across the economy. The Department of Labour concedes that most of the industrial strikes recorded between 2005 and 2015 "were primarily" about "wages, bonuses and other compensations", thereby defining the impact of labour disputes as one of the most critical considerations in understanding the status of the South African economy (RSA, 2017: 8).

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The number of working days lost to industrial strikes hovered from 2 627 953 in 2005 to a low of 497 436 in 2008, a decade-long high of 20 674 737 in 2010 and 903 921 in 2015 (RSA, 2015). However, there is no direct, one-on-one, relationship between the number of working days lost to industrial strikes and GDP growth rate. When in 2005, 2006 and 2007, annual GDP growth rates consistently remained above 5.5%, working days lost to industrial strikes grew from a low of 2 627 953 through 4 152 563 to 9 528 945, respectively (RSA, 2015). In 2008 as working days lost to industrial strikes dropped to the decade-low of 497 436, annual GDP growth rate declined to just below 4%, in contrast to the rate of almost -2% in 2009 during which days lost to strikes increased to 1 526 796 (RSA, 2017). In 2010 when annual GDP growth rate improved to just below 4%, working days lost to strikes increased abruptly to 20 674 737; and, the same occurred in 2014 with growth rate around 2% and working days lost to strike totalling 10 264 775 (RSA, 2015).

Evidence presented above demonstrates that there is no verifiable direct or indirect relationship between working days lost to industrial strikes and real annual GDP growth rates. But the "social economic arrangements" are such that labour disputes impact significantly on the investment climate and business confidence. However, conscious avoidance of labour disputes by supressing wage demands, which may mean abrogation of labour rights and conferment of undue and excessive power to the owners of capital, would ultimately negatively affect the buying power of the proletariats, thereby creating conditions for the slowing down of economic growth. This observation should not be construed to be suggesting that allowing wage disputes and inflationary increases would resolve the global economy problems. Again, the purpose is to demonstrate the convoluted nature of the relationships of the pertinent variables. As already indicated, incidents of industrial strikes across all sectors increased by 8% and 25%, respectively, between 2005 and 2015, and 2014 and 2015; yet, wages lost due to such work stoppages decreased by 62% and 98% over the same periods (RSA, 2015). In generalised form, these trends could suggest that an increase in the incidents of industrial strikes is associated with a decrease in the wages that workers lose. But the Department of Labour attempted to explain this apparent convoluted relationship by pointing to the effectiveness of mediation that stimulate workers' savings, rate of bargaining council wage settlement, duration of strikes and the number of workers participating in strikes (RSA, 2015). Closer analysis of the contribution to disputes by type of industry appears to provide further insights that point to the reasons that could also be underlying the dominance of "financialisation" of the economy as owners of capital seek for, as it were, safe investment havens.

The Republic of South Africa uses the Standard Industrial Classification (SIC) system to order its economic sectors into nine categories, thus: Agriculture; Mining; Manufacturing; Utilities; Construction; Wholesale and Retail Trade; Transport; Finance; and, Community Services. Data on working hours and days lost to industrial strikes appear to explain why finance could be perceived as safe investment arena for the South African economy (figure 1).



Sources: RSA, 2015

In terms of contributions to the total number of working days lost to strikes, the finance sector recorded a low of 20 415 in 2013, only second to 3 232 of Utilities (RSA, 2015). Whilst the number of working days lost to strikes in utilities increased to 14 466 in 2014 and declined to 742 in 2015, those in finance declined consistently to 3 062 and 0 over the same period (RSA, 2015). By 2015, the lowers contributors to the working days lost to industrial strikes were finance (0%), utilities (0.1%), manufacturing (5%) and agriculture (5.5%), whilst the median contributors were wholesale and retail trade (8.2%) and construction (11%), and the largest contributors being community services (19%), mining (25%) and transport (27%). There is a positive correlation between the contributions of industry types to the working days lost and the number of employees participating (figure 2).



Source: RSA, 2015

Agriculture

Mining

Manufacturing

Utilities

20

15

10

0

The transport sector leads in terms of the 2015 industrial contributions to the total working days and hours lost, but it pales into insignificance when the total number of employees participating is taken into account, wherein it comes out third after mining and community services (figure 2). However, community services contribute far lesser working days and hours lost to strikes compared to transport and mining. Discounting community services, which is dominated by the public sector employees, the mining sector remains one prominent consideration of note in terms of the "productionist" economy and the involvement of employees in industrial strikes over wages, bonus and such other compensation. The agricultural sector in South Africa continues to be a site of labour repression, wherein some workers are not as yet unionised; and, it is not surprising that the number of workers participating in strikes is lower. This contrast is accentuated in the construction industry where even fewer employees participate in industrial strikes with relatively many working days and hours lost. Manufacturing offers an important contrast wherein there are more employees participating in fewer working days and hours lost to strikes. The point of this discussion is to identify the exceptionalism of the finance industry wherein in 2015 there was nil working days and hours lost as no strike was recorded. A series of questions have to be raised in this regard because the requisite educational training, skills and expertise required in this sector exclude the majority of poor South Africans. Does it mean that owners of capital have consciously selected to invest in the financial sector in order to discriminate against the majority of the poor? Does the absence of industrial strikes in the financial sector suggest that wages are highly competitive and that there is labour satisfaction? What are the employment and earnings statistics of the finance sector? The following subsection focuses on non-agricultural sectors to explore the 2016 and 2017 employment and earnings in the finance sector of the South African economy, relative to other industries.

Construction

Scontribution of Working Days Lost % Contribution of Working Hours Lost % Contribution of Employees Participating

Wholesale &

Retail Trade

Transport

Finance

Community

Services

Non-Agricultural Sector Employment, 2016-2017

The non-agricultural formal sectors of the South African economy include mining, manufacturing, utilities, construction, wholesale and retail trade, transport, finance, and community services (RSA, 2015; Statistics South Africa, 2017). In 2016 and 2017, community services remained the largest employer, followed by finance, wholesale and retail trade, and then manufacturing (figure 3). This pattern is in sharp contrast of the mining industry, which is the second smallest employer, in almost a tie with the transport. A reminder that the number of employees participating in strikes in mining has been far greater than that in transport, which has however created a relatively greater loss in working hours and days (figure 2). As already pointed out, mining has seen greater number of employees, only second to community services, being involved in relatively lower number of lost working days and hours where the latter loss was greater than that for community services

(figure 2). In fact, the number of days lost to strikes in the mining industry during 2014 was incomparable to any other industry, with manufacturing following at a greater distance as second (figure 1). With the exception of community services, it could be argued that mining industry with its fewer employees as per 2016 and 2017 employment statistics has experienced the second most industrial disputes to transport in the rest of the South African economy during 2014 and 2015. That cannot be compared to the manufacturing industry which was the fourth largest employer in 2016 and 2017, yet having been the third smallest contributor to working days and hours lost to strikes in 2015 (Figure 2).



Source: Statistics South Africa, 2017

Given that the Department of Labour reports that industrial strikes were largely caused by wage, bonus and other compensation disputes, the analysis provided above should allow for the deduction that the four largest employers (community services, finance industry, wholesale and retail trade and manufacturing) offer relatively reasonable wages. This deduction could be more valid for the finance industry where in 2015 there were no strikes nor loss of working days and hours, owing to wage, bonus and compensation disputes. Being the second largest employer in the rest of the South African economy, the finance industry has evidently absorbed employees with "financialisation". To this extent, "financialisation" of the economy is not necessarily the primary reason for the South African society's unemployment and inequality. As already stated elsewhere, agriculture and mining remain the most exploitative industries of the South African economy wherein the majority of the poor are subjected to poverty-wages, which cannot be blamed on "financialisation". The profile of the employees in agriculture and mining industry should not necessarily be better than those in the rest of the economy, inclusive of that of community services. To this extent, the industrial labour instability in the mining sector should suggest that this industry is suffering from state neglect, rather than being a victim of "financialisation". That is, the employees in the financial industry are most probably earning reasonable wages because of their educational training, which is at its core the state's responsibility.

Supporting the notion that societies across the world desire "high-quality employment" to enhance wellbeing and lives, Marshal (2017: 39) cites Buchholz who argues that "the most important long-term economic challenge ... (is) education" and that "whoever harnesses intelligence will prosper most" because the global economic system is about a "race for IQ points". Indeed, educational training will equip societies with entrepreneurial skills and expertise (Buchholz cited in Marshal 2017). Drawing from Crowley's commentaries, Marshal (2017: 39) continues to note that "... educating the under-fives has a major, and lifelong, economic impact But as people age, it becomes harder and harder to get value out of training and education". The majority of miners, notwithstanding their years of experience in low wage jobs, cannot be left to the owners of capital for training and education, especially given that the state has married the South African economy to the neoliberalism philosophy over the past 20 years or so. With free market forces at play, and decreed by the state itself, owners of capital have the right to decide where to invest their profits. It should, therefore, be argued that divestment from mining and "financialisation" is motivated by the South African social reality wherein owners

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of capital invest in industry where there is abundance of educationally-trained labour force. Indeed, owners of capital, as private citizens and entities, cannot be reasonably expected to shoulder the responsibility to educate the old labour force, notwithstanding the fact that business suffers when "money to spend" become increasingly scarce. The earnings by industry should conclusively settle this argument.

Non-agricultural Industry Gross Earnings, 2016-2017

Evidence suggest that the finance industry is the second largest to community services in terms of gross earnings during 2016 and 2017 in the South African economy (figure 4). Wholesale and retail trade as well as manufacturing are a distant third and fourth place, respectively, behind the finance sector. This evidence suggest consistency in the finance industry because it is the second largest to community services in terms of total employment (figures 3 & 4). In fact, the four largest contributors to employment in 2016 and 2017 are the same for providing the largest gross earnings, in the same descending order from community services, finance, wholesale and retail trade and manufacturing. Mining is broadly second from bottom of the pile, in a tie with construction industry, in terms of gross earnings (figure 4). If anything, questions could be asked about gross earnings in wholesale and retail trade (figure 4), which are not necessarily in keeping with the total number of employees (figure 3).



Source: Statistics South Africa, 2017 (values in R' million)

It should, therefore, be possible to establish that "financialisation" in itself is not a problem because investment in the financial sector are associated with relatively significant employment numbers in the South African economy as a whole. Whereas year on year change in employment has been, on average, negative (-0.6%) between 2016 and 2017 (Statistics South Africa, 2017), transport (-3.8%), community services (-2.1%), utilities (-1.6%) and construction (-1.0%) have all performed worse than the finance industry (-0.6) (Statistics South Africa, 2017). Only three industries, manufacturing (-0.3%), wholesale and retail trade (1.7%) and mining (1.3%) performed above the economy-wide average (Statistics South Africa, 2017). Understandably, mining leads percentage year on year change in gross earnings for 2016-2017 because it is the industry that has been associated with low wages and relatively many working days lost to wage disputes (figure 2). The same may not be true for the utilities wherein change in earnings are second to that of mining (figure 5) because strikes and loss of working days and hours have not been prominent; and, that could be associated with the fact that the industry host the smallest employment in the rest of the South African economy (figure 3).





Transport presents a mixed bag in that change in gross earnings is the least of all the industries across the South African economy, notwithstanding the fact that it lost the greatest number of working days and hours to industrial disputes. Whereas finance industry has experienced negative change in gross earnings during 2016-2017, it is at the same level as the national average of the rest of the non-agricultural industries in the South African economy. In the final analysis, there is no evidence to suggest that "financialisation" could have singlehandedly perpetuated South Africa's societal problems of unemployment, low wages, poverty and inequalities. Apparently, the current inequalities are structural and are inherent to the social fabric of the capitalist society, which manifest from cradle with the denial of appropriate educational training to the proletariats. The private owners of capital have no obligation to provide education for the old employees who would in all probability not serve to refresh society as automation and technology become increasingly imperative and ubiquitous. South Africa has an exceptional opportunity to rebalance its economy into the "productionist" base through deliberate state investment during this period of ratings downgrades, instead of jumping onto the austerity bandwagon.

CONCLUSION AND RECOMMENDATIONS

This paper has demonstrated that the notion of unemployment, poverty and inequality being caused by "financialisation" of the South African economy insinuates that these social ills are new to the capitalist development. By its nature, the organisation of capitalism is based on the separation of the owners of capital from the proletariats in ways that allow for selective discrimination of the latter in order to source their social value for profit. Also, the suggestion that unemployment and inequality could be functions of the recent phenomenon of "financialisation" exposes the misunderstanding of the longstanding character of reflexivity of the capitalist economy; and, "financialisation" is in reality a hybrid of such capitalist reflexivity. The significance of good governance for "investment, innovation and growth" cannot overemphasised (Givens 2013: 1026); and, South Africa is in a serious limbo in respect of the governance of the state and the SOEs. South Africa's democratization has appeared to ironically stir a process of widening socioeconomic disparities and polarisation of the society.

The paper concedes that the dominant economic "thought", which sustains its self-fulfilling prophecy, will blind policymakers from discerning the opportunity of refreshing the "productionist" base to rebalance the economy by refreshing old labour force productive capabilities through educational training. There appears to be three fundamental recommendations arising from this paper:

• That the state has to take full responsibility of providing appropriate educational training for old labour force in order to create abundance of a cohort for the "productionist" base of the economy.

- That the state invests directly in the "productionist" economy and desist from continued wasteful bailouts of "luxury" SOEs such as SAA.
- That the state moderates the public discourse rhetoric that have the potential for naturalisation and constitutive effects of creating artificial realities such as "radical" in economic transformation.

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