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Economic Growth in Sierra

Driving Competitive Advantage

Highlights

Manufacturing Firms in Lagos

Effect of Inflation on Economic

Discovering Thoughts, Inventing Future

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Driving Competitive Advantage: The Role of Strategic Entrepreneurship in Textile Manufacturing Firms in Lagos State, Nigeria

By Egwakhe, A. J., Tijani, O. O., Akinlabi, H. B. & Egwuonwu, T. K.

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Abstract- The paper argued that the challenges experienced in Nigerian textile manufacturing firms resulted from weak strategic entrepreneurship leading to alarming decline in the industry's performance. Thus, investigated competitive advantage nexus with strategic entrepreneurship (strategic flexibility, adaptability, innovation, strategic leadership, risk taking and dynamic capabilities) as proxies in Lagos State, Nigeria. A cross-sectional survey research design was used and primary data collected. The adapted questionnaire validity was established through confirmatory factor analysis while the reliability was ascertained through internal consistency test. The population consists of 253 senior management staff and total enumeration was used. A total of 253 copies of the questionnaire were administered but 237 copies reverted. Descriptive statistics, exploratory analysis and structural equation model were utilized to analyse the data.

Keywords: competitive advantage, dynamic capabilities, strategic entrepreneurship.

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Driving Competitive Advantage: The Role of Strategic Entrepreneurship in Textile Manufacturing Firms in Lagos State, Nigeria

Egwakhe, A. J. ^α, Tijani, O. O. ^σ, Akinlabi, H. B. ^ρ & Egwuonwu, T. K. ^ω

Abstract- The paper argued that the challenges experienced in Nigerian textile manufacturing firms resulted from weak strategic entrepreneurship leading to alarming decline in the industry's performance. Thus, investigated competitive advantage nexus with strategic entrepreneurship (strategic flexibility, adaptability, innovation, strategic leadership, risk taking and dynamic capabilities) as proxies in Lagos State, Nigeria. A cross-sectional survey research design was used and primary data collected. The adapted questionnaire validity was established through confirmatory factor analysis while the reliability was ascertained through internal consistency test. The population consists of 253 senior management staff and total enumeration was used. A total of 253 copies of the questionnaire were administered but 237 copies reverted. Descriptive statistics, exploratory analysis and structural equation model were utilized to analyse the data. The findings indicated that strategic entrepreneurship has a significant effect on competitive advantage ($R^2 = 0.175$, $F^2 (0.007)$). However, based on the individual coefficient results only dynamic capabilities, innovation and strategic leadership had positive and significant effect among other predictors. The study recommended that firms in Nigerian textile industry should focus more on strategic reconfiguration of their capabilities as to continuously drive competitive advantage.

Keywords: competitive advantage, dynamic capabilities, strategic entrepreneurship.

1. INTRODUCTION

The effectuality of business tends to be a phenomenon that managers, decision makers and practitioners are seriously fretful with in all companies globally but predominantly in the textile sector. This concern has been fuelled by the need for firms to dominate their market based on attaining and sustaining competitive advantage. As such, Besanko (2010) established that competitive advantage is imperative as it enhances the performances of the firm and ensures greater economic benefits for the nation. Similarly, Ardianus and Petrus (2016) asserted that competitive advantage is prominent as it ensures organization's sustainability in the industry which is feasible through continuous improved performance. In line with this, past scholars have posited that for a firm to achieve and sustain its competitive advantage, strategic entrepreneurship is a fundamental practice

(Idowu, Irefin, & Akarakiri, 2018; Ogbari, Obigbemi, Atolagbe, & Ojo, 2016). Correspondingly, Durotoye, Adeyemi, Omole, and Onakunle (2018); Makinde and Agu (2018); Ukenna, Makinde, Akinlabi, and Asikhia (2019) also emphasized that strategic entrepreneurship results in superior firm performance in a highly turbulent environment for the sole goal of ensuring their competitive advantage.

In the same vein, researchers (Dogan, 2015; Renato & Naguib, 2016) speculated that strategic entrepreneurship is imperative for a firm as it encompasses the incorporation of entrepreneurial innovativeness, flexibility, adaptive and risk taking skills that create wealth and indicate sound performance. Takhtshahi and Maroofi (2017) also affirmed that strategic entrepreneurship enhances firm's performance, increase profit or/and market share when aligned with entrepreneurial activities which results into competitive advantage.

However, the increasing competition in the business world has stimulated the debate on how strategic entrepreneurship can rouse competitive advantage of textile firms. Based on this, scholars such as Mazzei, David, and Christopher (2017); Paek and Lee (2017); Sandeep and Jaiswal (2016) and Sarutaya (2015) had studied strategic entrepreneurship and competitive advantage in diverse sectors across Africa, Europe, USA, Asia and Middle East countries. Nevertheless, some of these studies found a significant positive relationship between strategic entrepreneurship and competitive advantage (Ali & Mohammad, 2012; Daryani & Tabrizinia, 2015; Mazzei et al., 2017; Paek & Lee, 2017; Rezaian & Naeiji, 2012), while the result of Kagathi (2013) showed a negative relationship. However, these studies did not examine strategic entrepreneurship dimensions and competitive advantage of textile manufacturing firms in Lagos State Nigeria.

Manufacturing Association of Nigeria [MAN] Report (2018), has showed that the Nigerian textile sector is no longer competitive anywhere in neighbouring African countries, Europe, the Far East and the United States of America. Moreover, Nigeria is no longer among the six African countries that contributed 91% of exports by value to the U.S. under the African Growth and Opportunity Act [AGOA] in

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African Cotton and Textile Industries Federation [ACTIF] (Aminu, 2016; MAN, 2018). Similarly, the stiff competition between the local and foreign textile manufacturers has generated much problems in the Nigerian textile sector, and this has led to the local firms being subjected to low product demand due to high price and low quality of their products when compared with foreign made fabrics (National Bureau of Statistics [NBS], 2015). This situation has hindered local manufacturers from being competitive not only in the country but also across the globe.

In the same vein, Murtala, Ramatu, Yusuf, and Gold (2018) attributed the problem to low inputs supply, demand, and price competitiveness of the Nigerian textile sector, high cost of production, trade liberalization and low packaging quality are among the challenges that have crippled its ability to achieve competitive advantage of textile firms in Nigeria. Paek and Lee (2017) posited that strategic entrepreneurship plays a critical role in competitive advantage of firms. Daryani and Tabrizinia (2015) previously asserted that strategic entrepreneurship leads to competitive advantage. In addition, Ali and Mohammad (2012), Rezaian and Naeiji (2012) earlier discovered that strategic entrepreneurship has a significant and positive effect on competitive advantages and organisational performance. However, the study of Kagathi (2013) on some dimensions of strategic entrepreneurship like strategic leadership and innovation found negative effect on competitive advantage. Based on the mixed results of strategic entrepreneurship on competitive advantage, this study seeks to ascertain how strategic entrepreneurship would affect the competitive advantage of textile manufacturing firms in Lagos State. The work is organized in sections of the introduction, literature review, methodology, the results presentation, conclusion, and recommendation.

II. LITERATURE REVIEW

The aspect of literature review comprised of synthesis of concepts, empirical discourse and theoretical exploration in relation to the thesis of the work so as to scientifically deepen understanding on the constructs and interplay between constructs. Competitive advantage within context is firm's capability to produce products or offer services dissimilar to what rivals do, by exploiting unique assets that organisations warehouse in order to add value in a way that rivals find problematic to replicate and outstrip (Sarpong & Tandoh, 2015). Wirda, Herri, Elfindri, and Rivai (2019) agreed with Sarpong and Tandoh (2015) and added that the benefit achieved by firms with competitive advantage was feasible as a result of executing a strategy that utilizes various resources owned by the company. According to Malkawi, Omari, and Halasa (2018), competitive advantage describes the features that enable an organisation to out-perform its

competitors. Similarly, Hosseini, Soltani, and Mehdizadeh (2018) see competitive advantage from the financial perspective especially when a firm's profit rate is more advanced than the average rate of the related industry due to its inimitable capabilities. Competitive advantage has been measured by studies along market share, efficiency, product or services cost (Kortelainen & Karkkainen, 2011), gross margin, returns on assets, net income, unit cost ratio (Farole, Reis, & Wagle, 2010), and total factor productivity by Toit, Ortmann, and Ramroop (2010). This paper sees competitive advantage as organization's superiority over its competitors in producing goods and services that are distinctive due to its peerless resources.

III. STRATEGIC ENTREPRENEURSHIP

Strategic entrepreneurship denotes the association between entrepreneurship and strategic management (Kuratko & Audretsch, 2009). Kyrgidou and Hughes (2010) and Ukenna et al. (2019) defines strategic entrepreneurship as a practice that entails organisational efforts to recognize opportunities with the maximum potential to lead, create value via the entrepreneurial element, utilize them through tactical activities based on the organisational resources. In the view of Djordjevic (2013), strategic entrepreneurship is captivating entrepreneurial act using strategic perspective and it engages in concurrent opportunity seeking and competitive advantage actions designed and executed in order to generate wealth. Dogan (2015), Hanne, Daniel, and Jon-Arild (2016), Lackéus (2016), and Makinde and Agu (2018) defined strategic entrepreneurship as the fusion of entrepreneurial (opportunity-seeking actions) with strategic (advantage-seeking actions) to create wealth. According to Paek and Lee (2017) strategic entrepreneurship is an organization's strategic intent to unceasingly and carefully leverage entrepreneurial opportunities for organisational development and benefit. Hence, this paper measured strategic entrepreneurship as strategic flexibility, adaptability, innovation, leadership, risk taking and dynamic capabilities.

Innovation can be defined as all activities involved in the refinement/invention of a product/service. According to Bor (2018), innovation is the firm's predisposition to engross in and sustain a new idea, novelty investigation and creative processes. The route of deciphering an idea or invention into a good or service that generates value or for which consumers will pay is also referred to as innovation (Bor, 2018). In business, innovation habitually results when ideas are transformed by the company in order to further satisfy the needs and expectations of the customers (Duan, Cao, & Edwards, 2020). In line with this, Schumpeter opines that an entrepreneur is a leader, who strategically controls the means of production into new straits

(Schumpeter, 1911). Entrepreneurs set profit estimates as a prerequisite for innovation choices.

Alberto (2016) described strategic leadership as the leadership ability that incorporates a core of significant managerial practice such as long term goal fortitude, exploring and exploiting a firm's core competences. In the same vein, Yilmaz and Flouris (2017) identified the main aim of strategic leadership as strategic productivity while inventiveness, perception, and planning to assist an individual in realizing his/her objectives and goals. Moreover, Golensky and Hager (2020) added that strategic leadership enables both leaders and managers to be smart, responsible and effective in fulfilling their obligation to the organisation which enable a firm to have an edge in the industry.

Kitigin (2017) defines risk-taking as a firm's propensity to be involved in risky projects and managerial preferences for bold versus cautious actions in order to achieve firm's aims. Llanos-Contreras, Arias, and Maquieira (2020) maintained Kitigin (2017) definition but added that risk-taking is an opportunity that enhances business long-term position in financial and socioemotional wealth creation. The inability of firms to take valiant risk has not only affected the progress of the firm but also hindered them from taking advantage of opportunities in the environment. Wahl and Kirchler (2020) positioned that firms should adopt optimistic attitudes towards risk-taking as it yields positive returns for the firm.

Dynamic capability is a firm's outline of combined activity through which a firm systematically spawns and revises its functional routines in quest of upgraded effectiveness (Piening, 2013). Similarly, Singh and Rao (2016) postulated dynamic capability as firm's competency to manage alliances, acquire, incorporate and reconfigure resources base to address the varying business situations. Moreover, firm's ability to refurbish competences so as to achieve corresponding business environment is referred to as dynamic capability (Kumar & Kumar, 2020). As such, Supeno, Sudharma, Aisjah, and Laksmana (2015) defined strategic flexibility as a way of amassed control in an extremely stormy environment. A firm's capacity to retort meritoriously to alterations can offer a strong base for strategic flexibility. In addition, Brinckmann, Villanueva, Grichnik, and Singh (2019) postulated that firms need strategic flexibility in order to proactively or reactively adjust to the market and internal demands as they aim to establish themselves. Adaptability is defined by Buch (2009) as an organization's aptitude to clasp change or be changed to fit a reformed environment. In addition, Choi (2020) argued that adaptability illustrates the capability to learn from experience, and improve the aptness of the learner as a competitor. From the numerous views on strategic entrepreneurship proxies the paper define strategic entrepreneurship as the process through which employees with entrepreneurial personalities having

risky, innovative ideas are able to find opportunities, seek advantage in a dynamic manner and get it implemented for the benefit of the organization.

a) *Strategic entrepreneurship and competitive advantage*

Several scholars established that strategic entrepreneurship positively influences firm's competitive advantage (Gelard & Ghazi, 2014; Hitt, Ireland, & Hoskisson, 2012; Mazzei et al., 2017). Amongst such scholars is the study of Paek and Lee (2017) which revealed that strategic entrepreneurship plays a crucial role in the competitive advantage of firms. In the same vein, Ali and Mohammad (2012); Rezaian and Naeiji (2012) earlier discovered that strategic entrepreneurship has a considerable positive effect on competitive advantage and organisational performance. The work of Ireland, Hitt, and Sirmon (2003) also established that strategic entrepreneurship helps in achieving competitive advantage and value creation in an organisation. Daryani and Tabrizinia (2015) results also concurred with Ireland et al. (2003) that strategic entrepreneurship has a positive effect on competitive advantage and wealth-creation while a prior study by Ireland and Webb (2007) demonstrated that strategic entrepreneurship facilitate firms to have advantage in the market.

Moreover, Sarutaya (2015) indicated that dynamic capability as a dimension of strategic entrepreneurship has a significant positive impact on competitive advantage. Similary, Breznik and Lahovni (2016) position supported Sarutaya (2015) that firms which has and deploy relevant competences as dynamic capabilities hold the prospective for a sustained competitive advantage. In the same vein, Kaur and Mehta (2017) affirm past findings through a comparative analysis and indicated that dynamic capability have significant effect on competitive advantage in both foreign and local firms. In line with the empirical conclusions by preceding scholars, the survival-based theory otherwise called "survival of the fittest theory" initially created by Herbert Spencer (Miesing & Preble, 1985) was considered best-fit for theoretical underpinning. The theory's philosophy assert that the best and the fittest of contenders will win at last which would prompt the improvement of the social community overall. The survival-based theory examines the tactics a company uses to avert being eradicated by contenders (Miesing & Preble, 1985) and achieve a major edge in the industry. Brain (1996) supported the theory that a firm needs to ceaselessly adjust to aggressive competition in the environment in order to endure.

The survival-based view accentuated with respect to the suppositions that in order to endure, firms needs to convey techniques that ought to be centred around running exceptionally proficient tasks and can

react quickly to the changing of aggressive competitive environment (Khairuddin, 2005). However, Lynch (2000) critiqued the theory and posited that choosing a specific arrangement of technique would not be ideal. Lynch (2000) and Abdullah (2010) further explained that it is smarter to explore different avenues regarding a few procedures without a moment's delay and let the procedure of the most suitable method be picked based on the best system that adjusts better to the environment. This theory is essential in understanding entrepreneurial techniques that can possibly help a company to reinforce its position. This is with the expectation that it would improve business performance and accomplish a definitive objective of ensuring their competitive advantage is achieved.

b) Methodology

This study is basically quantitative in nature. A cross-sectional survey research design was adopted in this study. The adoption of cross-sectional survey research design is in line with the study of Daryani and Tabrizinia (2015) and Paek and Lee (2017). The respondent organisations were three surviving textile manufacturing firms in Lagos State out of the 15 textile firms in existence. The three textile manufacturing companies consist of Wollen and Synthetic Textile Ltd, Nichemtex Textile Ltd and Sunflag Textile Ltd with a target population of two hundred and fifty-three (253) senior management staff of the selected textile-manufacturing firms. The sample technique adopted was census. Primary data were collected through an adapted questionnaire on strategic entrepreneurship and competitive advantage over a period of three months.

The questionnaire was a Likert-scale type. It was pretested for validity and reliability. The content and construct validity were conducted by administering twenty-five (25) copies of the questionnaire to senior management of Gbemi Aladire Clothes and Fabric manufacturer in Ita-bada, Itoku, Abeokuta South, and Baba Show Kampala at Ake, Abeokuta South, Abeokuta Ogun State. The content validity informed the decision to refine some question items and others were removed. The construct validity was done with Kaiser-Meyer-Olkin indicating good-fit. The reliability results revealed that the instrument was above the minimum threshold of 70% according to (Hair, Black, Babin, & Anderson, 2010).

Two hundred and fifty-three (253) copies of the questionnaire were administered with the help of trained research assistants to the senior management staff of the three textile-manufacturing firms. The senior management staff were considered capable of answering the questions intelligently and accurately due to their accumulated experiences and insight about their firms and the industry. 237 of the administered copies were retrieved and considered usable giving a response

rate of 93.7%. Sixteen copies of questionnaire were dropped due to missing information needed for the analysis. The data were treated (Construct and Convergent validity, Discriminate validity, and Normality test) before the analysis. Data were analysed in two phases: descriptive was used and for covariance Smart PLS a technique of structural equation modelling (SEM) application was used for confirmatory analysis.

c) Analysis and findings

Majority (73.8%) of the respondents were male while 24.9% were female and 38.0% were of the age bracket 31-35 years, 24.5% were in the age bracket 36-40 years, 18.1% of the respondents were of the age bracket 25-30 years, 10.5% were of the age bracket 41-45 years, 3.8% were of the age bracket 46-50 and 51-55 years and 1.3% were of the age bracket 56-60 years. 68.4% of the respondents are married, 25.3% single, 4.6% divorced/separated and 0.8% are widowed. In terms of work experience, 39.2% had worked for a period between 5 to 10 years, 36.3% between 0 to 4 years, 13.9% for the period 11-15 years, 5.5% for a period 16 to 20 years, and 4.2% between 21 to 25 years. The respondents are educated with 30.0% holders of a bachelor's degree, 17.3% had SSCE certificate, 19.8% held higher national diploma, 25.3% had Masters (MBA/MSc) degree, 5.5% holders of DBA and 0.4% had doctorate degree.

d) Measurement Model

The outer or measurement model assessed the relationship between the observable variables and the theoretical constructs they represent. A reliability test was conducted to determine the internal consistency of the measures used. The Cronbach alpha (α) for adaptability, dynamic capability, innovation, risk taking, strategic flexibility, and strategic leadership were 0.70, 0.735, 0.750, 0.773, 0.741, and 0.838 respectively while competitive advantage had a value 0.714 which are higher than the recommended threshold of 0.70 demonstrating adequate reliability (Hair et al., 2010). The constructs were initially purified using Exploratory Factor Analysis (EFA). EFA was performed on the items composing the constructs to identify the variables that cluster together into the most effective number of factors (Bordens & Abbot, 2014) and identify the structure of the measurement model (Hair et al., 2010). Prior to performing EFA, the suitability of the data was assessed through two tests, that is, Kaiser-Meyer-Olkin measure of sampling adequacy (KMO) and Bartlett's Test of Sphericity. Kaiser-Meyer-Olkin measure of sampling adequacy (KMO) is a measure to quantify the degree of correlations among the variables which indicates the proportion of variance in the studied variables that might be caused by the underlying factors. The KMO index ranges from 0 to 1, the closer the value to 1, the more significant the correlation among the variables (Kaiser, 1974). On the other hand, Bartlett's test of Sphericity

provides the statistical probability that the correlation matrix has significant correlations among at least some of the variables with small values ($p < 0.5$) indicating that

the data is useful in factor analysis. The results of KMO and Bartlett's test of Sphericity are presented in Table 1.

Table 1: KMO Measure of Sampling Adequacy and Bartlett's Test of Sphericity

Variables	KMO	Bartlett (Chi Square)
Innovation	0.709	0.000; (158.624)
Strategic Leadership	0.679	0.000; (156.234)
Risk Taking	0.633	0.000; (174.872)
Dynamic Capabilities	0.615	0.000; (151.811)
Strategic Flexibility	0.801	0.000; (94.512)
Adaptability	0.663	0.000; (132.586)
Competitive Advantage	0.683	0.000; (97.086)

Source: SPSS Output Result 2020

Table 1 indicated that all variables had achieved KMO index values of 0.600 above the threshold of 0.500 and p-values of Bartlett's Test of Sphericity below 0.05 which indicated that the data were useful for factor analysis (Kaiser, 1974). The variability of each observed variable that could be explained by the extracted factors. Confirmatory factor analysis (CFA) was estimated using Smart PLS version 3.2.8 software in order to establish the extent to which the observed data validate and fit the pre-specified theoretically based model (Chao & Spillan, 2010). CFA was estimated on multiple criteria such as construct reliability, convergent validity and discriminant validity. Construct validity for the variables was assessed by computing composite reliability and internal consistency of the items. Composite reliability was evaluated using Smart PLS which generated values above 0.6 which was found to be accepted. Internal consistency was estimated using Cronbach's alpha (α)

and the values were 0.600 above which is higher than the recommended threshold of 0.700 demonstrating adequate reliability (Hair et al., 2010). In this paper, convergent validity was assessed using Average Variance Extracted (AVE). The Average Variance extracted (AVE) for adaptability was 0.568, dynamic capability was 0.585, innovation was 0.599, risk taking was 0.526, strategic flexibility was 0.695, and strategic leadership was 0.605 and competitive advantage was 0.648 which exceeded the cut-off value of 0.5, thus confirming convergent validity (Bryman, 2012). To satisfy the requirement of discriminant validity of the measurement model, the criterion suggested by Fornell and Larcker (1981) was followed. The discriminant validity was confirmed as the square root of a construct's AVE was greater than the correlation between the construct and other constructs in the model (Madhoushi, Sadati, & Delavari, 2011).

Table 2: Results of Construct and Convergent Validity

Variables	rho_A	Composite Reliability	(AVE)
Adaptability	0.774	0.804	0.568
Competitive Advantage	0.809	0.811	0.684
Dynamic Capability	0.754	0.823	0.585
Innovation	0.778	0.831	0.599
Risk Taking	0.807	0.844	0.526
Strategic Flexibility	0.769	0.827	0.695
Strategic Leadership	0.864	0.884	0.605

Source: SPSS Output Result 2020

Table 3: Results of Discriminant Validity

	Adapta bility	Competitive Advantage	Dynamic Capability	Innovat ion	Risk Taking	Strategic Flexibility	Strategic Leadership
Adaptability	0.781						
Competitive Advantage	0.444	0.796					
Dynamic Capability	0.475	0.522	0.794				
Innovation	0.434	0.465	0.535	0.796			
Risk Taking	0.466	0.390	0.602	0.573	0.725		

Strategic Flexibility	0.416	0.366	0.587	0.472	0.390	0.702	
Strategic Leadership	0.427	0.479	0.593	0.639	0.729	0.449	0.778

Source: SPSS Output Result 2020

The normality of data was assessed by examining its skewness and kurtosis. The result showed that skewness was within the range of -0.748 and +2.433 and kurtosis was within the range of -0.406 and + 0.868 which complied with the normality threshold of -3 to +3 (Cooper &Schindler, 2011). Multicollinearity was tested using Tolerance and Variance Inflation Factor. The variance inflation factor (VIF) obtained is between 1 to 10 while the tolerance value is greater than 0.10 showing that there was no multicollinearity associated with strategic entrepreneurship and competitive advantage variables.

e) Structural Model and Assumption Testing

Partial Least Squares Structural Equation Modelling (PLS-SEM) was used to analyse the model and testing the assumption. PLS-SEM was used sinceit provides more flexibility in modelling second order constructs and formative constructs (Chin, 1998). The

structural model evaluated by examining the R^2 value and the size of the structural path coefficient. The R^2 values range between 1 and 0 where 1 means a perfect prediction of the structural model (Hair et al. 2010). According to Hair et al. (2010), in development and testing of structural model, bootstrap method was used in order to find t -statistics and standard deviation estimations in path-coefficient. The path-coefficient estimates were used to determine the significance of the relationship. The resultant T -tests statistics from the bootstrapping procedure provided the basis for determining the statistical significance of the path-coefficient estimates (Hensler, Ringle, & Sinkovics, 2009). Hair et al. (2010) and Azar and Shafigi (2013) noted that coefficient results are significant to accept hypothesis if t -statistics is larger than 1.96.

Table 4 sets out the path coefficient and the t -values observed with the level of significance achieved from bootstrapping.

Table 4: Path Coefficient and T-values of Strategic Entrepreneurship

Path	β	SER	TStatistics	PValues	Results
Adaptability -> Competitive Advantage	0.213	0.131	1.624	0.105	Not Supported
Dynamic Capability -> Competitive Advantage	0.304	0.103	2.957	0.003	Supported
Innovation -> Competitive Advantage	0.161	0.079	2.05	0.041	Supported
Risk Taking -> Competitive Advantage	-0.099	0.106	0.941	0.347	Not Supported
Strategic Flexibility -> Competitive Advantage	-0.002	0.102	0.021	0.983	Not Supported
Strategic Leadership -> Competitive Advantage	0.184	0.09	2.031	0.043	Supported

Source: PLS-SEM Output 2020

As indicated in Table 4 and Figure 1, the path coefficient between adaptability and competitive advantage was positive but insignificant with a path coefficient of 0.213 and a significance level of 0.105 ($\beta=0.213$, $p>0.05$). Results show positive and insignificant relationship between adaptability and competitive advantage. The path coefficient implied that for every 1 unit increase in adaptability, competitive advantage was increased by 0.213 units. Thus, results show positive and insignificant relationship of adaptability with competitive advantage. The path coefficient between dynamic capability and competitive advantage was positive and significant with a path coefficient of 0.304 and a significance level of 0.003 ($\beta=0.003$, $p<0.05$). The path coefficient implied that for every1 unit increase in dynamic capability, competitive advantage was increased by 0.304 units. Thus, results

confirm positive and significant relationship of dynamic capability with competitive advantage.

The path coefficient between innovation and competitive advantage was positive and significant with a path coefficient of 0.161 and a significance level of 0.041 ($\beta=0.161$, $p<0.05$). The path coefficient implied that for every 1 unit increase in innovation, competitive advantage was increased by 0.161 units. The result confirms positive and significant association between the two variables. With regards to risk taking, the path coefficient between risk taking and competitive advantage was negative and insignificant with a path coefficient of -0.099 and a significance level of 0.347 ($\beta=-0.099$, $p>0.05$). The path coefficient implied that for every 1 unit increase in risk taking, competitive advantage was reduce by 0.099 units. The result reveals

negative and insignificant association between risk taking and competitive advantage.

The path coefficient between strategic flexibility and competitive advantage was also negative and insignificant with a path coefficient of -0.002 and a significance level of 0.983 ($\beta = -0.002, p > 0.05$). The path coefficient implied that for every 1 unit increase in strategic flexibility, competitive advantage was reduced by 0.002 units. The result reveals a negative and insignificant relationship between strategic flexibility and competitive advantage. Finally, the path coefficient between strategic leadership and competitive advantage was positive and significant with a path coefficient of 0.184 and a significance level of 0.043 ($\beta = 0.184, p < 0.05$). The path coefficient implied that for every 1 unit increase in strategic leadership, competitive advantage was increased by 0.184 units. The result

reveals positive and significant relationship between strategic leadership and competitive advantage.

The quality of the structural model was assessed using the determination of coefficients R^2 . From the analysis, the value of R^2 coefficient was 0.382 which indicated that 38.2% of the variation in competitive advantage can be accounted for by strategic entrepreneurship dimensions (adaptability, dynamic capability, innovation, risk taking, strategic flexibility, and strategic leadership) with $F^2(0.007)$. Based on the assessment criterion suggested by Cohen (1988) and Chin (1998), the outer model that contains strategic entrepreneurship dimensions was found to reflect a moderate predictive relevance. It implied that strategic entrepreneurship dimensions have moderate effect on competitive advantage.

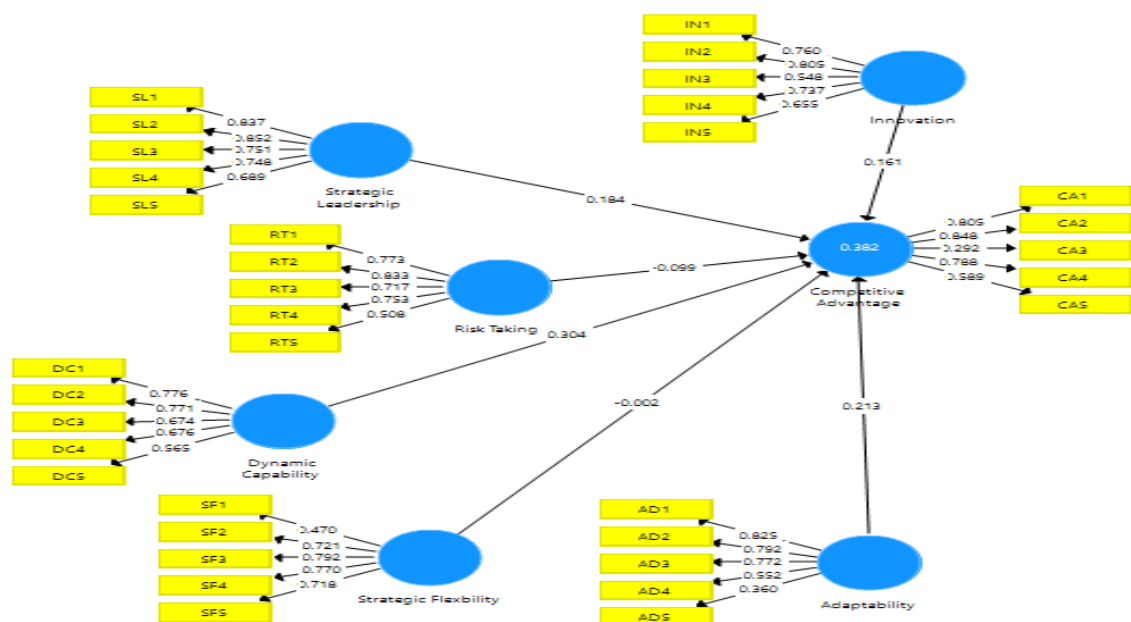
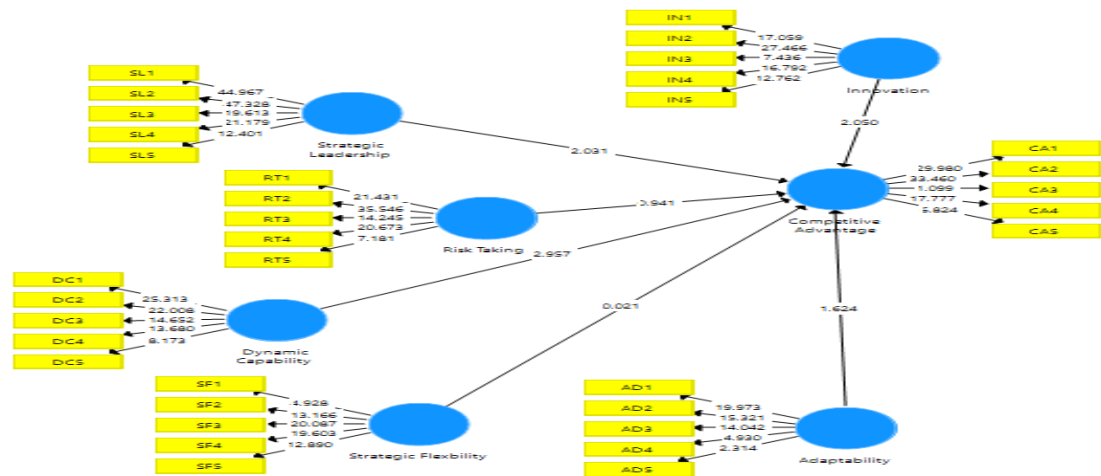


Figure 1: Item Loadings and Path Coefficients for Strategic Entrepreneurship Dimensions and Competitive Advantage

T -statistics was used to test the significance to the relationship between strategic entrepreneurship dimensions and competitive advantage where critical values for t -statistics should be greater than 1.96 at 0.001 level of significance. The resultant T -tests statistics are illustrated in Figure 2 and showed that dynamic capability ($t = 2.957, p < 0.05$), innovation ($t = 2.05, p < 0.05$) and strategic leadership ($t = 2.031, p < 0.05$) had significant t -statistic values which are above the 1.96 standard, while adaptability ($t = 1.624, p > 0.05$), risk taking ($t = 0.941, p > 0.05$), and strategic flexibility ($t = 0.021, p > 0.05$) t -statistics are not statistically significant at 0.05 significance level. The results showed that dynamic capability, innovation, and strategic leadership have positive and statistically significant

effect on competitive advantage. Hence, dynamic capability, innovation, and strategic leadership are significant predictors of competitive advantage of textile manufacturing firms in Lagos State, Nigeria. And, in order to increase competitive advantage in the industry, textile manufacturing firms in Lagos State must focus on their dynamic capability, innovation, and strategic leadership.



Source: PLS-SEM Output

Figure 2: T-statistics for strategic entrepreneurship dimensions and competitive advantage

f) Discussion of Findings

The findings indicated that strategic entrepreneurship had affects competitive advantage of textile manufacturing firms in Lagos State. The result affirms the result of Bosire and Nzaramba (2015) that the adoption of strategic entrepreneurship components do lead to better business practices, increased revenues and profits of firms. Similarly, Daryani and Tabrizinia (2015) also confirmed that strategic entrepreneurship positively impact on competitive advantage and wealth-creation. This finding is consistent with the submission of other scholars that strategic entrepreneurship enhances firm's competitive advantage (Barchue & Aikaeli, 2013; Ireland & Webb, 2007; Ukenna et al., 2019). In the same vein, past studies have substantiated strategic entrepreneurship as the bedrock for achieving and improving on the competitive advantage of firms (Hoogendoorn, Zwan, & Thurik, 2017; Liyanage & Weerasinghe, 2018; Tur-Porcar, Roig-Tierno, & Mestre, 2018; Youssef, Boubaker, & Omri, 2017; Yusuf, 2017). Thus, it is affirmed that strategic entrepreneurship impulses firm to immediately act to sudden changes in the external business environment that might pose as threat to the attainment of the firms' objectives.

On the other hand, the individual coefficient results revealed that risk taking and strategic flexibility have negative and insignificant effect on competitive advantage could infer adverse consequences on competitive advantage. Consistent with these findings, Kitigin (2017) argued that the low inclination of firms to undertake risky ventures has not only led to negative outcome but has also hindered their performance. Moreover, this could lead to poor creativity and low competency of employees in the organization. Additionally, Brinckmann, Villanueva, Grichnik, and Singh (2019) opined that the static strategies and tactics utilized by firms could result in their inability to adjust to

the market and internal demands which they aim to establish themselves.

In addition, the individual coefficient results also indicated that dynamic capabilities have a positive and significant effect on competitive advantage. Szymanski, Fitzsimmons, and Danis (2019) supported this finding that successful organizations have dynamic capabilities that are aligned with their competitive environments and they continuously improve on it. As the competition intensifies globally across sectors, managers are charged with the responsibility to improve their dynamic capabilities as this enables them to record an unrelenting competitive advantage. Further corroborating the individual regression results of dynamic capabilities, Fainshmidt, Wenger, Pezeshkan, and Mallon (2019) posited that dynamic capabilities positively affects the competitive advantage of an organization.

Moreover, the adoption of flexible and effective strategies facilitate firms to identify and exploit opportunities in the changing trend of the external business environment so as to achieve competitive advantage (Dogan, 2015; Haddawee, 2018; Ibrahim, Rizal, & Mahadi, 2016; Makinde & Agu, 2018; Paek & Lee, 2017). However, the adoption of strategies will not promote competitive advantage if the staffs are not strategic leaders with improved proactive and reactive skills to utilize the firm's dynamic capabilities (Singh & Rao, 2016). It is affirmed that strategic entrepreneurship can help competitive advantage and value creation in an organization through establishing a balance between exploration and exploitation of opportunities which is in line with Ukenna et al. (2019).

Theoretically, the study findings are validated by survival-based theory which stress on firm's ability to quickly learn, coordinate and reconfigure their capabilities to achieve competitive advantage (Ukenna et al., 2019). The capability of firms to offer services

disparate to competitors by exploiting organisational assets would ensure their survival and achieve competitive advantage (Sarpong & Tandoh, 2015). The survival based theory is more concerned about short term advantage that can be used to build longer term competitive advantage by simply being the best and the fittest of contenders. It is a response to the question of how and why some firms espouse strategies to avert being eradicated by contenders and in order to create and sustain competitive advantage compared with others in the dynamic markets (Singh & Rao, 2016). It could be said that a firm with exceptional proficient tasks can react quickly to the changes in the aggressive competitive environment (Khairuddin, 2005). An organization that is very mindful of its survival in the midst of the turbulent business environment will have an advantage over its competitors because such a firm would ensure that it adapts to the environment, flexible in its resources and adjust existing competencies or developing new ones in order to achieve overall firm performance.

IV. CONCLUSION AND RECOMMENDATIONS

Based on the findings, it can be concluded that, dynamic capabilities, innovation, and strategic leadership are the major predictors of competitive advantage of textile manufacturing firms in Lagos State, Nigeria. Specifically, dynamic capabilities had the most significant relative positive effect on competitive advantage, followed by strategic leadership, and innovation. The study affirmed that strategic entrepreneurship has a significant effect on competitive advantage and the assumption that survival-based theory has universal applicability is sustained. However, the individual coefficient results revealed that dynamic capabilities, innovativeness, and strategic leadership had positive and significant effect on competitive advantage while risk taking and strategic flexibility had positive and insignificant effect on competitive advantage. Based on finding, this paper concludes that strategic entrepreneurship enhances competitive advantage. Thus, recommended that firms should focus on dynamic capabilities and refinement of bundle of self-reconfiguration to drive competitive advantage. In addition, strategic adaptability to remain fit and alignment to turbulent business environment is imperative for longevity. As such, researchers could consider incorporating factors such as government policies and knowledge management, as moderating variables between strategic entrepreneurship components and competitive advantage so as to gain further insight.

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Planning at the Dawn of the XXI Century: The Ambiguous Road to COP26

By Miguel Schloss

How did we Get Here?- Economic and social development in the last few centuries has generated unprecedented progress, overcoming recurrent and widespread famines, extending life expectancy, increasing incomes in large swaths of the world. This has been underpinned by productivity gains in agriculture, industry, advances in communications, transport and energy, never experienced in recorded history before.

Much of this has been propelled by technological changes leading to the industrial revolution, particularly the development of the internal combustion engine, which has powered the productive progress since then. On the other hand, this has brought with it increases in CO2 emissions, whose full implications are as yet somewhat unpredictable and not fully understood.

GJMBR-B Classification: JEL Code: C59



PLANNING AT THE DAWN OF THE XXI CENTURY: THE AMBIGUOUS ROAD TO COP26

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Planning at the Dawn of the XXI Century: The Ambiguous Road to COP26

Miguel Schloss

I. HOW DID WE GET HERE?

Economic and social development in the last few centuries has generated unprecedented progress, overcoming recurrent and widespread famines, extending life expectancy, increasing incomes in large swaths of the world. This has been underpinned by productivity gains in agriculture, industry, advances in communications, transport and energy, never experienced in recorded history before.

Much of this has been propelled by technological changes leading to the industrial revolution, particularly the development of the internal combustion engine, which has powered the productive progress since then. On the other hand, this has brought with it increases in CO2 emissions, whose full implications are as yet somewhat unpredictable and not fully understood.

In addition, this past decade alone was a period of significant disruption and change, where people across geographies, disciplines, and industries transformed the way we live. From how we move, drive, invest, and advertise to how we generate and consume energy, how we take care of ourselves, and both how and what we eat, every single facet of our lives has been challenged or reimagined.

On the other hand, human progress is outpacing the capacity of the resource environment to keep pace with the need for a balanced development. Whether it is economic expansion (at the expense of known resource bases, such as mining and raw materials, forests, land use), and consequent increased emissions; institutional and policy constraints to cope with ever increasing economies; growing and widening societal demands and so many other “unexpected” developments test the limits of human knowledge to develop and settle increasingly complex and emerging discontinuities.

Admittedly, there is some controversy about the underlying science claiming the connection of such developments with climate change, particularly the impact of solar radiation and other cosmological phenomena affecting global temperatures, and thus the

capacity of human beings of influencing climatic conditions. Several studies reconstructing temperature changes over the last 5,000 years, essentially point to large climatic changes over the millennia, related largely to changes in sun radiation rather than other phenomena.

That said, there is an increasing consensus that CO2 emissions generated by human activity need to be curbed to prevent further global temperature increases, and constrain global average temperature increases to less than 2 degrees Celsius above pre-industrial (18th and 19th centuries) levels, and to pursue efforts to limit temperature increase even further to 1.5 degrees Celsius. This is in essence what has been set out in the Agreement reached by the 195 countries in climate talks in Paris.

A change of this magnitude requires, however, an overhaul of historic proportions for energy policies, and investment of the order of \$16.5 trillion, as estimated by the International Energy Agency. Such outlays will require profound transformation in production and transportation practices, and spending on renewables and efficiency, as well as carbon capture and storage through 2030.

This is no small challenge, particularly when seen in the context of competing claims on scarce resource surpluses, particularly in emerging economies whose development needs remain challenging, in an uncertain, if not fragile, international economic environment.

Moreover, with changing pace of technological and other disciplines, and emerging in societal demands (including environmental concerns) there will be an increasing demand to look well beyond our comfort zones.

II. WHAT HAVE WE DONE – WORDS, DEEDS OR RESULTS?

The Paris Agreement mentioned above in effect provides a framework for such effort, and will require significant reductions in hydrocarbons investments, increases in emissions costs, reduction in deforestation, intensive reengineering of energy sources in use, and profound changes in transport systems. Has any of this actually taken place to achieve goals outlined in the Agreement?

With over 25 years since the UN Framework Convention on Climate Change, there is little tangible

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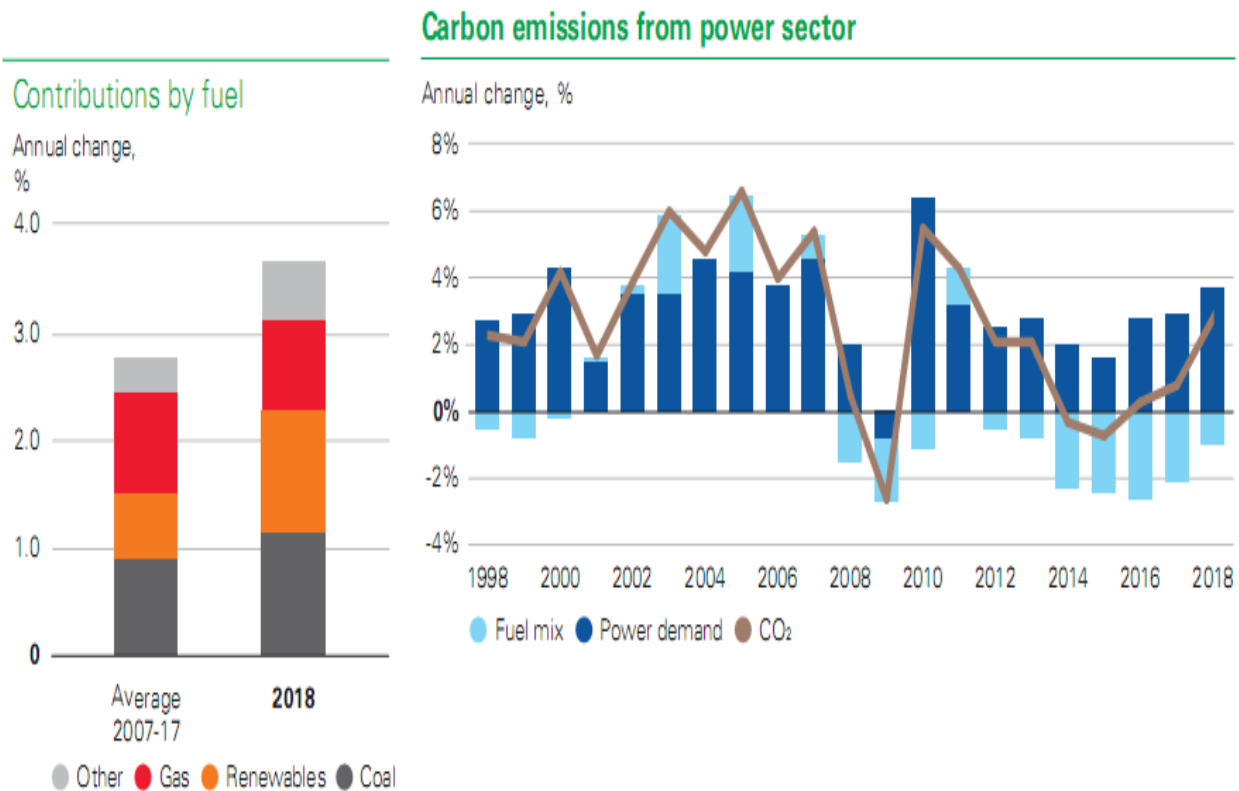
evidence of progress in the climate change agenda. In fact, much of the economic and social development over the last century, and associated improvements in standards of living, have been propelled by massive growth of energy demand, powered by hydrocarbons that brought about increases in CO₂ emissions.

Admittedly, in the last decade, accelerating gains in energy efficiency have muted growth in energy demand; mounting expansion in renewable energy combined with successive falls in global coal consumption, have lead to improvements in fuel mix.

Similarly, some progress has taken place through natural gas (the hydrocarbon-based feedstock

emitting the lowest CO₂ emissions) becoming the largest source of energy growth, boosted by a massive programmed of coal-to-gas switching in industrial and residential sectors in China.

But much more progress is needed to “move the needle” in a tangible manner, particularly in the power sector, which absorbs more primary energy than any other sector. Adding all up, it accounts for over a third of carbon emissions, and despite the push away from coal and rapid expansion towards renewables, the progress has been negligible over the last 20 years, with hardly any changes in CO₂ emissions, as evidenced below:



What the record so far strongly suggests is that none of the large-scale changes needed will take place on its own or be politically, economically and technically easy. Henceforth, emphasis must focus much more sharply on how to move from words to actual deeds in a manner that does not affect negatively economic development – a burning concern of most, if not all emerging economies.

Special attention will thus be required to ensure that future efforts can adequately address concerns of efficiency and effectiveness, which have hitherto received scant attention, with consequent limited incentives to produce progress and results in climate change actions.

III. DIRECTING, REGULATING OR ENABLING CONDITIONS?

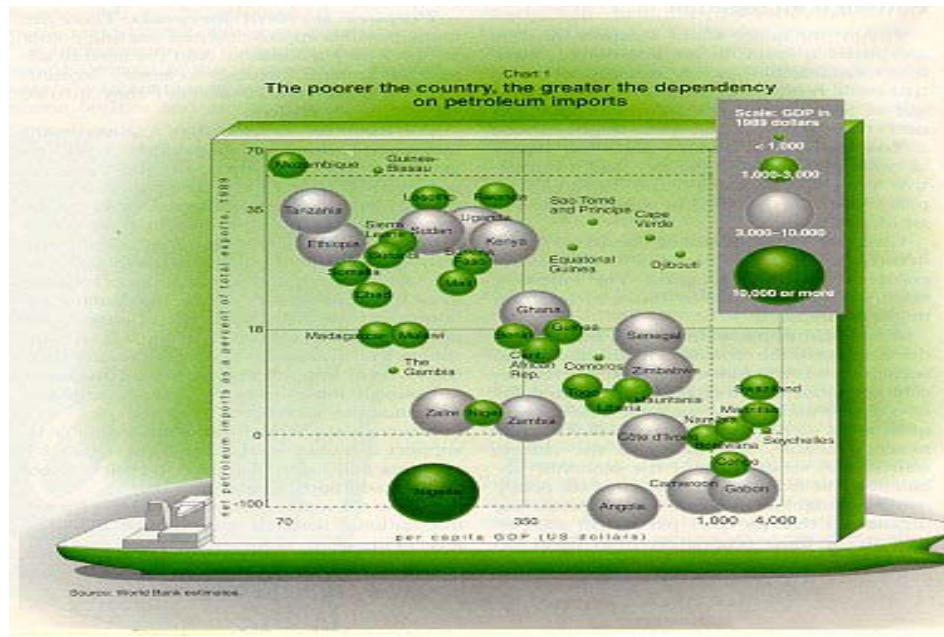
Hitherto, most attention has focused on setting aggregate goals, regulations, time consuming and costly clearance arrangements for new investments and other such administrative interventions that tended to create their share of distortions.

Given the poor outcomes, actions must be refocused to increase attention to efficiency and effectiveness, without adversely affecting economic development.

This is particularly important in countries in their early stages of development, where small engines, such

as small pumps, mopeds or mini-tractors, are replacing human and animal toil. These are for the most part powered by hydrocarbons, thereby making such

countries particularly dependent on imported or locally produced oil, as can be seen in the graph below:



But the secondary effects, downstream, are equally devastating though much more widespread. Petroleum products play a pivotal role in Sub-Saharan Africa's economic development. Their purchase absorbs 20-35 percent of export earnings for the bulk of the countries in the region, and generates approximately 40 percent of tax revenues – thus constituting the single largest item in the balance of payments and fiscal revenues for most countries in this region.

Although the primary energy balance is currently dominated by household consumption of fuel wood, petroleum products are the most important source of commercial energy, supplying approximately 70 percent of commercial requirements in these countries; and they are likely to be the fastest growing portion of the region's energy balance as the continent's modernization unfolds.

As the region becomes more developed, the demand for energy will also grow, thus setting up a vicious circle: Economic growth will be needed to pay for the expanding oil bill, and more imported fuel will be required to generate economic growth.

These countries must make fundamental policy choices with respect to the petroleum industry if they are to escape this self-defeating cycle. Greater efficiency in procuring and distributing petroleum products would reduce the amount of funds these countries devote to paying their oil bills, thus freeing such resources to fund their development needs.

All this requires, however, addressing a broader dysfunction -- the failure of policies, institutions and governance arrangements to align incentives and emerging concerns on externalities, so that investments

and consumption respond more effectively to the delivery of public goods and private services demanded by society.

Decades of attempting to constrain energy demand (so essential for economic development) show the limits to acting through institutional compulsion and cumbersome regulatory clearance arrangements that don't have remotely the flexibility and responsiveness to contemporary dynamic developments.

Policy efforts must accordingly reconcile more effectively the trade-offs necessary for:

- *Efficient resource allocation*, to enable energy producers and users face prices that reflect its scarcity value, including associated externalities;
- *Competitiveness and terms of trade* concerns, to confront growing fears of disadvantaging domestic producers in world markets and the cost and investment implications to meet more exacting environmental concerns;
- *Fiscal considerations*, particularly as hydrocarbons constitute among the largest balance of payments (either in imports or exports) or fiscal revenues in most countries;
- *Revenue, cost compliance and administration* concerns affect interactions with the wider tax system, more generally, and impact both the choice of instruments and the level at which taxes are set, so that associated costs are recuperated in pricing.

There are, however, limited precedents with proven performance to go by. Each country will need to develop its own institutional infrastructure to have a strategic framework on environmental concerns while facing emerging development challenges.

Hitherto, countries have introduced competing and duplicative policies, such as setting up over 15 different climate change ODA funds, with limited attention on standards, the establishment of distortionary pricing and subsidies, difficult to manage, or earmarked taxes on carbon trade to fund adaptation – i.e. taxing one public good to fund another.

Countries must be vigilant to avoid developing institutionally intensive arrangements in institutionally weak conditions. “Institution-building” advocated by various Agreements is a long and difficult road.

Wherever possible, policy frameworks should enable economic actors to interact organically, without

too many constraints or complicated processes. The rule should be to minimize rules, use pricing where possible, and allow legitimate additional costs of compliance to environmental standards to be recouped through output prices.

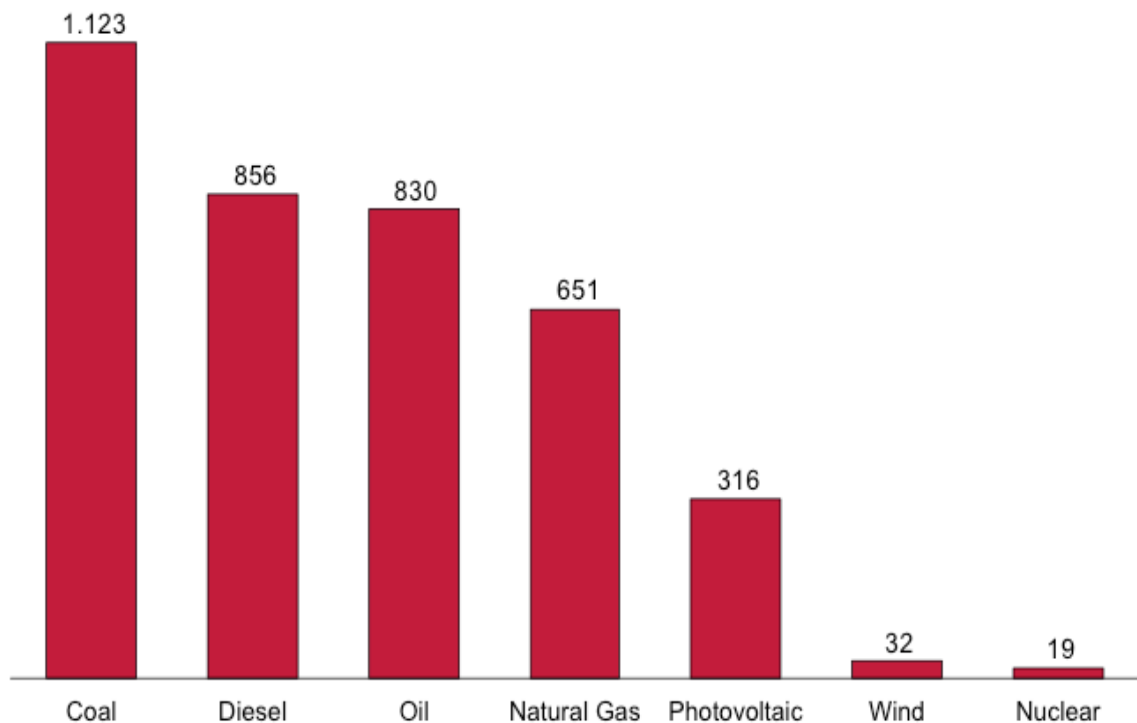
IV. MORE OF THE SAME OR NEW TECHNOLOGIES?

Renewable energy sources, including transitional hydrocarbon sources such as natural gas, must become a growing part of a carbon free energy development, since they tend to have lower CO₂ emissions than traditional sources, as illustrated below:

Environment: Emissions & Local Ecosystems

There are large differences in emissions by energy source

CO₂ Emissions by energy type (kg carbon equivalent/ TEP)



Sources: CNE (Chile Energy Commission); J. Tockman “Current Situation & Perspective”; M. Schloss “Cambo Climático y Energía”, 2019

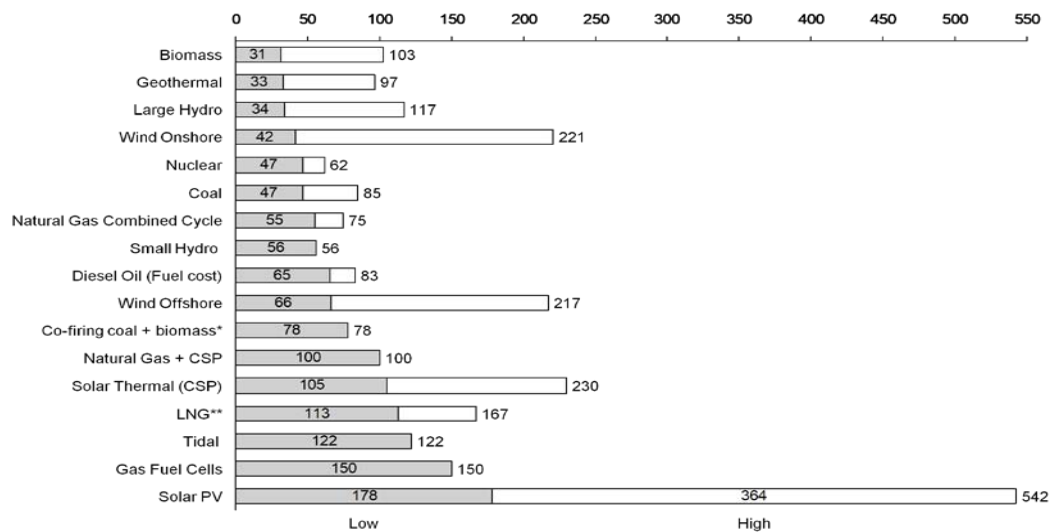
For the time being, though, such sources are still more expensive, and thus constitute in many cases situation-specific solutions, depending on local conditions (such as wind regimes or solar radiation levels), and appropriate for limited load factor requirements.

The need to move towards a decarbonized economy, provide the conditions for enhanced R&D to

develop such technologies to further reduce costs and level the playing field vis-à-vis traditional energy sources.

Some “green” technologies are closing the cost gap, and are bound to become more attractive when considering CO₂ emissions as can be observed below:

Security of Supply in Power Generation

...AND become even more attractive when considering CO2 emissions*"Green" Cost Comparison, Production Costs (USD/MWh & CO2 Emissions in Tons/MWh at 25 USD/ton)**Sources" IEA Energy Technology Perspectives; Ormat Technologies, Inc.*

A long term energy strategy must rely on technological substitution of the current capital stock of non-liquid fossil fuels towards a greater mix of LNG based plant, geothermal and hydro electricity (particularly low head and run-of-river facilities), with renewables playing a niche role, and eventually mainstream option in the energy mix.

V. REFRAMING OR TRANSITIONING?

The massive resources required for overhauling existing systems are unlikely to be successfully absorbed in the near term, and transitional arrangements must thus be considered for:

- Financing *adaptation programs* (while underlying solutions are being worked on) through supporting investments -- e.g. storm barriers, resettlement, carbon capture, use and storage (CCUS) that could be recognized as part of the climate change agenda.
- As *tracking arrangements* leave a heavy burden on countries, as targets rely on "nationally determined contributions", they leave important *global factors* "out of the radar", such as maritime and air transport, the Arctic and Antarctic continents, which have their special environmental issues. For instance, the shipping industry emits more CO₂ per year than any European country.
- The global economic context may keep conditions in a *constrained growth path*, with consequent low commodity prices, and with it low fossil fuel prices (making them more competitive against non-traditional sources), reducing the surplus generation capacity of countries relying on extractives, depriving them from their main source of financing

(and diminishing prospects of retrofitting investments to reduce their energy intensity).

VI. ADDING ALL UP -- WHERE DO WE GO FROM HERE?

This century is set to be shaped by a series of hugely demanding and closely interlocking challenges. The eradication of poverty, dealing with conflict and achieving the sustainable use of natural resources is among them. Linked to all these are difficult issues about energy – particularly having adequate and secure supplies of energy at affordable prices and consuming energy in appropriate ways to avoid environmental damages.

A solution to *either* of these threats is relatively straightforward; however, a solution to *both simultaneously* is one of the great challenges facing the world.

We have been thrust in a situation of high stakes and trade-offs requiring decisions under uncertain conditions. With global energy demand expected to rise by over 50% over the next 30 years, and fossil fuels (the main source of emissions) accounting more than 80% of the overall increase, simply calling for a cut in consumption is not a sufficient solution to the challenges we face, particularly in enhancing energy security and fueling both economic growth and poverty alleviation globally in emerging economies.

Statements, international agreements, regular international meetings and monitoring have their place. But in the end, achieving tangible progress while addressing environmental issues effectively require a much better understanding than what we have at present. To this end, we must overcome the temptation

to look for solutions of problems that are poorly understood, grounded on fragile empirical evidence.

Technological innovations can have a pivotal role to play in harnessing new sources energy supply, but they have their costs and time frames for their development, as well as their policy, institutional and governance requirements to provide the enabling environment to attract resources and deliver progress.

In all, this is not a dash to renewables or curbs in energy use, but a race to reduce carbon emissions across many fronts – an endeavor that requires as much an international effort for innovation, as a series of local, down-to-earth adaptive investments compatible with economic development. This requires a hard-nosed approach distinguishing trend from fad.

Seen in this light, goal-setting, international agreements, awareness-raising can be useful, but only up to a point. A top-down and muscular approach to set targets and nudge towards action through institutional compulsion seemed to have been the preferred way of proponents for corrective action, but there are binding constraints (such as institutional weaknesses, economic incentives, etc.) that in effect explain the limited progress that such approaches have been able to generate.

In the end, the effort will require many players working independently, but coherently. This can only be achieved through proper pricing, taxation and various forms of institutional and economic policies that align interests among multiple stakeholders and provide the environment to invest and innovate in a more decarbonized economy.

Given the unpredictable technological and other changes over time, some room for improvisation may be instrumental in coming up with new approaches, even allowing *form to follow function* in shaping of institutional reforms, to ensure that they respond to emerging concerns.

Accordingly, a certain amount of trial and error or learning by doing will probably be inevitable, if not helpful. A change agenda is not an option but a necessity, not only on fuels but also in strategies, structures, and leadership practices – enticing and harnessing unorthodox thinkers and their mold-breaking notions. Given the obvious shortfalls, businesses and governments are being challenged to renew – or fail. With increasing availability of data to track outcomes and analytical capabilities, new technical skills are bound to free the transformative forces for innovation to enhance conditions to morph fringe and exploratory ideas to mass markets.

But at a minimum, all such efforts must start with a basic understanding or diagnoses of the issues standing in the way for effective action, a thorough program to overcome them, preparedness to weather the pains inherent in any adjustment or modernization process.

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Is Indian Equity Options Market Suitable for Hedging when the Options Pay off Structure Changes?

By James Varghese & Dr. Babu Jose

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Abstract- Investments are essential as the growth of the stock market denoted through increased investments results in the growth of the economy. But they are always subject to various risks in the market. These risks are to be mitigated for the development of an efficient economic system by the market itself. Apart from the stock segment, the Indian financial market is a home for futures and options segments that facilitate the hedging of risks involved in the investments. For considering any derivative market as a hedging tool, one of the prerequisites is the presence of integration between such derivative market and its underlying market. The present study focuses on testing the relationship between Indian stock market and the options market, represented by NSE Nifty 50 index and index options on it respectively, to know whether the options segment is suitable for hedging the risks implicit with investments in the stock market, with substantial consideration to payoff structure of the market denoted by different moneyness groups viz.

Keywords: stock market efficiency, informational efficiency, call options, put options, implied index level, cointegration, error correction model, options payoff structure, options moneyness, hedging, NSE nifty 50.

GJMBR-B Classification: JEL Code: G19



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James Varghese^α & Dr. Babu Jose^σ

Abstract- Investments are essential as the growth of the stock market denoted through increased investments results in the growth of the economy. But they are always subject to various risks in the market. These risks are to be mitigated for the development of an efficient economic system by the market itself. Apart from the stock segment, the Indian financial market is a home for futures and options segments that facilitate the hedging of risks involved in the investments. For considering any derivative market as a hedging tool, one of the prerequisites is the presence of integration between such derivative market and its underlying market. The present study focuses on testing the relationship between Indian stock market and the options market, represented by NSE Nifty 50 index and index options on it respectively, to know whether the options segment is suitable for hedging the risks implicit with investments in the stock market, with substantial consideration to payoff structure of the market denoted by different moneyness groups viz. at-the-money, in-the-money, out-of-the-money, deep-in-the-money and deep-out-of-the-money, for the period from June 2001 to March 2019. This study is an extension of the empirical literature that investigated the efficiency of the stock market and the informational efficiency of the options market. After deriving time-series for call and put options in each moneyness categories from multiple contracts belonging to each class for the same trading day, econometric models including Johansen's co integration and vector error correction model are used to identify the integration and the lead-lag structure among the stock market and options segments, to know whether the hedging mechanism is possible in the options market. The study draws that the Indian equity options market is suitable for hedging, and the relative rapidity of information absorption proves that it is 'informational efficient'. Finally, the study concludes that the options pay off structure has a significant role in making the market informational efficient.

Keywords: stock market efficiency, informational efficiency, call options, put options, implied index level, cointegration, error correction model, options payoff structure, options moneyness, hedging, NSE nifty 50.

1. INTRODUCTION

The ability to be exercised at the sole discretion of the holder keeps the options most dynamic, among other derivative instruments (Hull & Basu, 2016). Moreover, similar to any other derivative instruments, the options market also stands for the vital

purposes of price discovery, hedging, speculation and arbitrage, and focuses on facilitating optimum satisfaction of capital requirements in the economy (Ammann & Herriger, 2002; Dixit, Yadav, & Jain, 2009). All the above fundamental functions of derivative markets are complementary and interconnected. The uses of options market by the market participants, viz. hedging, speculation and arbitrage are facilitated by the price discovery process. Price discovery is the process of incorporating all the available information into the current price level in the market to arrive at an equilibrium price (Booth, So, & Tse, 1999). While comparing both the derivatives and their underlying assets, the knowledge on the market that leads in the price discovery process is of enormous value to the market participants, as it helps in anticipating the price movements in both the segments. From a macro-economic perspective, the efficiency of the capital and allied financial markets are also of keen importance as it indicates the trend in the growth of the economy (Jain, Vyas, & Roy, 2013). The capital market is efficient when the market, inherently, does not allow the participants to make abnormal gains from the transactions in it (Fama, 1970). Market efficiency is possible only when the entire available information is used efficiently by all the market participants instantaneously (Black & Scholes, 1972). Abnormal profits are of little probability from an efficient market as all the information is absorbed and disseminated in the market and instantly reflected in the prices of securities (Khan, Ikram, & Mehtab, 2011). Therefore, the study of the price discovery is an investigation into the market efficiency as well, since it looks for the extent of simultaneity among connected financial markets in absorbing the information to reflect the same in the prices, leaving no further arbitrage possibilities to be explored.

Since the intention of options market is to facilitate hedging the risks involved in the investment in the underlying assets, the concept of informational efficiency becomes significant. Informational efficiency stands for the relative speed of reflection of the information in different related markets, as represented by the changes in the price level. The options market is informational efficient compared to the stock market when it is capable of reflecting the information relatively faster than the other markets. This relative speed of

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adjustment causes lead-lag structure among the related markets, which is based on the idea that price changes due to the new information occur first in a fairly efficient market than others. Thus, the speed of adjustment to the new information indicates the relative informational efficiency of the markets. In other words, the presence of lead-lag relationship shows the informational inefficiency of the related markets. When the markets are efficient, due to the instantaneous reflection of the information in related markets, arbitrage opportunities do not exist and even if they exist, they cause the price discrepancies in related markets to be disappeared (Chan, Chung, & Johnson, 1993). The absence of this simultaneous integration of information causes lead-lag relationships between different financial markets and results in arbitrage profits to the extent that the lead-lag influences outweigh the transaction costs (Hentze & Seiler, 2000). Thus, the literature on exploration of the lead-lag association among allied markets extends to informational efficiency, which denotes simultaneous and chockfull reflection of information among markets. The market efficiency is also related to the predictability of the prices (Joshi, 2012), as predictable market returns questions this efficiency (Dicle, Beyhan, & Yao, 2010). The efficient market hypothesis puts forward that beating the market is impossible when it is efficient. But, a large number of investors believe that there exists exploitable disequilibrium between information in financial markets and the prices of securities (Stakic, Jovancai, & Kapoor, 2016). Thus, the empirical studies on market efficiency include tests for return predictability, event studies and tests for private information (Oprean, 2012).

There are different reasons for the success of the options market, among other derivatives markets. They are the ability to hedge, to speculate and to make arbitrage profits, reduction of costs to investors, provision of leverage to investors and effect of removal of stock market restrictions on the short-sale. But, having a fixed maturity makes options riskier. Moreover, there is faster execution of options contracts on the trading floor. These factors make the options market more attractive and thus cause lead-lag relationship between the options market and the underlying or allied markets (Hentze & Seiler, 2000). The empirical literature existing in the options market on price discovery, informational efficiency and cross-market efficiency (Caralla & Mammola, 2000; Ammann & Herriger, 2002) gives inconclusive evidence. The research on relative price discovery in related markets also results in the same (Hentze & Seiler, 2000; Srivastava, 2004; Gupta & Basu, 2007; Amadori, Bekkour, & Lehnert, 2014). Apart from the above theoretical explanations, there is an argument that the options segment in developing markets is not suitable for hedging (Bakshi, Cao, & Chen, 2000). As far as the options market is concerned, there are large numbers of options contracts being

traded on a single underlying asset, based on differences in time to expiration and strike prices. The changes in strike prices lead to the formation of different groups of moneyness which determines the payoff structure of options. Considering the above, the purpose of this paper is to examine the suitability of the Indian options market in hedging the investments in the underlying stock market effectively using options contracts falling under different moneyness categories. The derivative markets are useful for hedging the risk involved in the underlying spot market only when the theoretical presumption of integration among both the markets stands true. Therefore, the current study focuses on investigating the informational efficiency of the Indian equity options market in terms of its integration with the underlying spot market. The relative informational efficiency is investigated, in such a way that the results of the same would be constructive for market participants who approach the options market for hedging, by assisting them to exploit anticipative market movements.

For an in-depth analysis, the data has been analyzed under all the five moneyness categories viz. at-the-money (hereafter, ATM), in-the-money (hereafter, ITM), out-of-the-money (hereafter, OTM), deep-in-the-money (hereafter, DITM) and deep-out-of-the-money (hereafter, DOTM), and also for both call options and put options. In all phases, price series in both the markets are non stationary and the results from Johansen's cointegration procedure and Vector Error Correction Model (VECM) conclude that the stock market and options market are integrated, and the options segments absorb all information effectively than the underlying market does.

The rest of the paper include part two that summarizes the existing literature on different areas under consideration, part three that explains the empirical methodology used, part four that contains description of the data followed by discussion on empirical results in part five and part six that concludes the paper.

II. REVIEW OF LITERATURE

The economic incentives attached to options trading are lower transaction costs and higher leverage, liquidity and flexibility (Harvey & Whaley, 1992; Kumar, Sarin, & Shastri, 1995; Fleming, Ostdick, & Whaley, 1996; Easley, O'Hara, & Sreenivas, 1998; Hentze & Seiler, 2000; Chakravarthy, Gulen, & Mayhew, 2004). Even though it is a hedging tool, due to the above incentives, trade volume and incidence of trade is more in the options market. Therefore, as theory says, the options market may absorb the currently available information in the market, and it may create a leading effect in the options market when compared to the stock segment.

A study among 25 firms in the USA during the early 1980s considering the trade volume as the indicator proved that the options trade volume leads the stock trade volume and thus options market lead the stock market (Anthony, 1988). This evidence goes in line with the findings of Manaster and Rendleman (1982) and Bhattacharya (1987) in the early literature. Fleming, Ostdick, and Whaley (1996) proved that stock index options led the stock index, consistent to the trading cost hypotheses, but proved otherwise in case of stocks. Amin and Lee (1997) investigated the informational role of equity options market in price discovery in times of dissemination of earnings news in the equity market and showed the presence of abnormal trade volume in the options market during days before the announcements and proved that private information was available with options traders. Further, it was noted that the options market anticipated the direction of the underlying market and the price discovery happened in the derivative segment. Conover and Peterson (1999) conducted an extensive analysis of the lead-lag structure in the relationship between the stock market and its options segments, taking earnings surprises, nature of the news, viz. positive and negative and changes in the regulatory environment in the USA. Their findings were that in the pre-regulation era, the options market led the stock market for negative news. Mazouz, Wu, and Yin (2015), while examining the trading activity in stocks and options around price-sensitive announcements, also found out that informed traders prefer to trade in the options market, in times of negative news. The assumption that the stock market and options market are related market stands as the basis for the studies on the comparative informational efficiency of both the markets. Kumar, Sarin, and Shastri (1995) empirically tested this relationship in Japan around the period of listing of Nikkie index options. Scrutinizing the pre-listing and post-listing data, they found that the introduction of derivative securities caused a reduction in speculative and information-based trading in the underlying market. Boyle, Byoun, and Park (2002) also supported the arguments of price discovery in the derivative markets and proved that the S&P 500 index options market was leading the stock market. Ryu (2016) suggested the investors to postpone their trades to avoid transacting with better-informed traders when the market turns active, characterized by fast and large transactions with dried liquidity. When informed investors choose to use options, it becomes a reservoir of rich information on future stock prices. Lee and Wang (2016) tested the predictive ability of options volume, and found that the trade volume by foreign institutional investors contained rich information relating to future changes in the index, whereas transactions by others were found uninformative, in Taiwan index options market.

Since much empirical literature disprove the theoretical expectation that price discovery should occur in the options market compared to the stock market, using Hasbrouk's (1995) information share methodology, Chakravarty, Gulan, and Mayhew (2004) noted that the options market tended to be more informative on an average when options trading volume was high, when stock trading volume was low, when option effective spreads were narrow and when stock spreads were wide, and the information share was higher for out of the money options and then for at the money options. Bali and Hovakimin (2009) found that information spilled over from KOSPI 200 index options market to the underlying stock market and noted that options trading volume was informative about future volume and volatility of the underlying stock, thus concluded that the options market generally leads the stock market. Byoun and Park (2015) also noted that the options market was efficient in its pricing, and was leading its spot counterpart in its initial phase in the KOSPI 200 index options market. Chung, Park, and Ryu (2016) added that in the KOSPI 200 index options market, fast trading showed informed trading in OTM options while it indicated noisy and uninformed trading in ITM options. Considering the futures market into the lead-lag structure between KOSPI 200 index and its options market, it was found that informed trading is relatively concentrated in the futures market rather than in the options market because the option traders are followers who respond to the spot and futures prices (Ryu, 2015). An examination of how options, futures and spot market prices were adjusted to eliminate mispricing, Ryu and Yang (2017) supported the linkage between the KOSPI 200 index futures and options markets and the fast information streams between the markets and found that price discovery happens in both derivative segments altogether and found that the options market slightly followed the futures market in adjusting price disagreements and the stock market lagged behind the derivative markets. Baltussen, Grient, Groot, Hennink, and Zhou (2012) constructed four options market measures viz. out of the money volatility skew, realized versus implied volatility spread, at the money volatility skew and change in at the money volatility skew from options on 1250 stocks traded in the USA and examined the combined predictive power of the measures. They found that publically available information in the options market was relevant for equity investors, and all the four trading strategies produced significant returns from a well investable universe of liquid stocks. Amadori, Bekkour, and Lehnert (2014) investigated the relative informational efficiency of stocks, options and credit default swaps (CDS) for European firms during the period of the global financial crisis and found that the debt market led the other two markets during the post-crisis period under the study,

but the price discovery occurred in the options market during the pre-financial crisis period.

The price formation in the underlying market and the derivatives market are not only influenced by the price related variables, but by non-price variables like trade volume and open interest. Initial empirical studies on the lead-lag structure of the Indian stock and options market were on non-price variables in the markets. The information content of the trade volume and open interest of stock options were analyzed for price discovery in the Indian context by Srivastava (2004) and Mukharjee and Mishra (2004). Testing the information content of the price predictors developed using both the variables proved that they contained information to predict future price movements in the underlying stocks. Later, a detailed econometric examination of the lead-lag structure of the NSE Nifty fifty index and futures and options on it by Debasish (2009) provided that the derivatives markets lead the stock market in India. The study also pointed out that the futures and options markets were integrated, and index call options lead the futures market and the futures lead put options market. The final conclusion of the study was that the relative transaction cost was one of the central elements causing the lead-lag relationship among the markets.

The design of the options market is to facilitate the mitigation of risk in the investment in the spot market. Therefore, theoretical expectation is that the options market and the stock market are closely associated with each other. The empirical literature on the lead-lag structure and information content of both the stock market and its derivatives counterpart appeared to provide much evidence that the stock market leads the options market, showing the fundamental strength of the stock market. A drawback of early lead-lag literature was the use of daily data, which was suffering from the non-simultaneity of closing prices in both markets. Later the introduction of the use of intraday transaction data solved this shortcoming. Options-implied prices, computed using implied volatility of the call options, were compared with actual values of the US stocks on a high-frequency level and proved that the stock market leads price changes in the options market for actively traded call options in the 1980s (Stephan & Whaley, 1990). As this is against the theoretical expectations, Chan, Chung, and Johnson, (1993) re-examined the results, and found that no profitable lead was possible by trading in options on private information, even in the extreme out-of-the-money options, confirming the results of Stephan and Whaley (1990). They also found that the leading nature of the stocks over the options was spurious, and was due to the price discreteness in the options market.

Even though proved otherwise in case of index options, an empirical analysis on the temporal relationship between stock options and their underlying stocks proved for those included S&P 100 and S&P 500

indices that stock prices led the options prices. This finding is also consistent with the trading cost hypotheses (Fleming, Ostdick, & Whaley, 1996). Focusing on a multi-market linkage of price, volume and information, Easley, O'Hara, and Sreenivas, (1998) investigated on the predictive power of the options volume to forecast the stock prices with the presumption that the information content is evident in the trade volume rather than in the price, and proved that the options volume had no predictive power and the stock price changes led the options volume. This finding supports the fundamental function of the options market as it points out the presence of hedging related transactions in the segment. Further, Chan, Chung, and Fong (2002) investigated the lead-lag structure of options market and the stock market using the information content of the quote revisions and trade volume, based on net trade volume i.e., the difference between buyer initiated volume and seller initiated volume, and the findings were that stock net trade volume had a predictive power on subsequent stock and options quotes and the options net trade volume had no such power. But both stock and option quote revisions had a predictive capacity for subsequent quote revisions, and the options trades contain less information than stock trades. Conover and Peterson (1999) and Mazouz, Wu, and Yin (2015) found out that the stock market led the options market in case of positive news. But during the post-regulation period, no lead-lag structure was identified. The results of Conover and Peterson (1999) show that the institutional factors such as short-sale constraints and regulatory intensity may also affect relative price patterns between the stock market and options market, irrespective of the nature of the information spread. An econometric analysis on the relative intraday price discovery in German stock market and its futures and options segments during the early 1990s shows that the price discovery role was mutually shared by stock market and futures segment, leaving the options without no direct influence on the futures market and stocks and futures react faster to new information than the options market (Booth, Tse, & So, 1999). The reason for this phenomenon was low transaction costs in the stock and futures market. Holowczak, Simaan, and Wu (2007) documented that high transaction costs and micro structural changes caused less information content in the options market of NASDAQ and NYSE and price discovery about future stock price movements took place in the stock market rather than in the options market. But, the options market became more informative when the underlying stock price experienced a large move, and the options quotes became much more informative during periods of significant option trading activities. Kim, Kim, Nam (2009) analyzed the lead-lag relationship from alternative bases like different option pricing models, moneyness of the options and the news spread in the

Korean market, and found that the stock market leads the index options market. But, call options had a role in price discovery when the market turned bullish and put options had a role in price discovery when the market turned bearish. Further, the purpose of trading OTM options were identified as speculation rather than informed trading.

Another set of studies on the temporal relationship between the options market and its underlying spot market were around the informational efficiency of the implied volatility. Computation of the implied volatility is from the current options prices, and it is the measure of volatility that equates the theoretical options price with the actual market price of the same. The implied volatility, as defined as the measurement of the market's expectations on the future realized volatility, is capable of examining the informational efficiency of options market over the stock market. The implied volatility is said to be informational efficient when no other volatility estimation can capture any information beyond the informational content of the implied volatilities. If the options market is informational efficient, the price forecasts based on implied volatility should outperform the forecasts based on the historical returns. The informational efficiency of the implied volatility has been extensively used in Indian empirical literature on the predictability of the options prices over the stock prices. Dixit, Yadav, and Jain (2010) found that implied volatilities failed to capture all the information available in the historical returns intimating that the mispricing of options, and the options market can become efficient only when these erroneous pricings are corrected. Shaikh and Padhi (2013; 2015) found that the ex-ante volatility was more informative and impounded necessary information to explain the future realized return volatility while examining the causal relationship between the pairs of ex-ante and ex-post volatility of S&P CNX Nifty index options.

III. IMPLIED INDEX LEVEL

Manaster and Rendleman (1982) proposed the concept of an implied stock level for the first time while considering the ability of the options prices to predict the long term equilibrium price of the underlying stock. Cremers, Goyenko, Schultz, and Szaura (2019) considered the stock price implied from options prices as a direct and innate measure of assessment by options traders on the value of the underlying stock, and showed that forecasts based on implied index level are more accurate and consistent than estimates based on large empirically used implied volatility and options trade volume. It means, implied index level subsumes plentiful information than those contained in other variables like implied volatility and option trade volume. The options price, as defined under BSOPM, is a function of the current value of the underlying asset, the

variance of the rate of return of the underlying asset, the time to expiration, the risk-free rate of interest and the strike price of the options contracts (Black & Scholes, 1973). Using known and observed parameters in the BSOPM, except observed actual index level, the implied index level for call options and put options can be computed using following equations (1) and (2) respectively:

$$P_{c,t} = \frac{Ke^{-rT} \cdot N(d_2) + C}{N(d_1)} \quad (1)$$

$$P_{p,t} = \frac{Ke^{-rT} \cdot N(-d_2) - P}{N(-d_1)} \quad (2)$$

where,

$$d_1 = \frac{\ln(P_{j,t}/K) + (r - \sigma^2/2)T}{\sigma\sqrt{T}} \quad (3)$$

$$d_2 = d_1 - \sigma\sqrt{T} \quad (4)$$

$P_{c,t}$ and $P_{p,t}$ are the implied index levels based on call options and put options respectively, C and P are actual prices of call options and put options respectively, $N(\cdot)$ is cumulative normal density function, $P_{j,t}$ is the actual index level for call options or put options as the case may be, K is the strike price of options contracts, r is the risk-free rate or return, σ is the annualized standard deviation of the rate of return of the underlying asset and T is the time to maturity of options.

This process is based on the underlying logic that the implied index level is the value of the underlying index for which a constantly revised options bond portfolio would be considered as perfect substitute for the index. Assuming options are really priced according to the pricing model, it is understood that the implied index level is the assessment of the options market on the equilibrium actual index values. In simple words, the implied index level represents the cumulative expectations of participants in the options market.

IV. DATA AND METHODOLOGY

The Indian stock and options markets are represented by the National Stock Exchange of India Ltd. (hereafter, NSE), as it is the largest exchange in India and the third-largest in the world in terms of the amount of transactions, where both stocks and derivatives are traded. The data on both the stock market and the options market is from the NSE Nifty 50 index, which is the flag index of NSE that includes stocks of companies from all prominent industrial sectors in India. The whole period when the options market was active in the Indian financial system i.e., from its inception, is considered for the study. In India, options were first introduced in NSE on 04 June 2001. Therefore, the data period is from 04 June 2001 to 29 March 2019. We classify options contracts into five

categories of moneyness based on the distance between their daily spot price and strike price of the index options contracts (Debasish, 2009; Shaikh & Padhi, 2013; Baltussen, Grient, Groot, Hennink, & Zhou, 2012; Bakshi, Cao, & Chen, 2000; Cassese & Guidolin, 2004; Sehgal & Vijayakumar, 2008; Yang, Choi, & Ryu, 2016) using spot to strike ratio and strike to spot ratio for call and put options, respectively. Considering Pan, Shiu, & Wu (2014) and Yang, Lee, and Ryu (2017), options are classified as DOTM when the ratio is lower than 0.925, as OTM when it is lower than 0.975 but not

less than 0.925, as ATM when it is lower than 1.025 but not less than 0.975, as ITM when its value becomes greater than 1.025 but less than 1.075 and as DITM when it goes greater than 1.075. Due to the insufficiency of the data, the entire period cannot be considered for all the different options segments. The data period for each option segment is selected as given in Table 1. In the case of ATM call and put options, data is available for the whole period under study. But in all other cases, data are unavailable, after applying basic filters (explained below).

Table 1: Data period under study

Moneyness	Call Options	Put Options
ATM	04/06/2001 to 29/03/2019	04/06/2001 to 29/03/2019
OTM	27/07/2007 to 29/03/2019	26/03/2004 to 29/03/2019
ITM	01/07/2005 to 10/05/2011	27/07/2007 to 29/03/2019
DOTM	15/03/2008 to 29/03/2019	28/08/2007 to 29/03/2019
DITM	18/07/2008 to 19/07/2010	15/01/2008 to 29/03/2019

The time-series data for the stock market (hereafter, actual index) is easier to obtain, and daily closing values of the NSE Nifty 50 index are taken for the purpose. But, the challenge is the formation of time-series data for the index options contracts (hereafter, implied index). There are multiple contracts with different strike prices and time to maturity, based on the same underlying asset, i.e., NSE Nifty 50 index, simultaneously traded in the options segment. The following filters are applied to arrive at a time-series representation of the options market.

- To ensure the liquidity of the selected options, only near month options (Mukharjee & Mishra, 2004) having at least one trade on a trading day are selected (Dixit, Yadav, & Jain, 2010).
- To avoid the variability in the implied volatility due to over liquidity during the maturing week of options, the contracts are selected with a jump to the next expiration cycle eight days prior to maturity (Srivastava, 2004; Debasish, 2009).
- Options violating lower arbitrage boundaries are filtered as they clearly violate the general properties of the options pricing model (Jiang & Tian, 2011; Bhat & Arekar, 2016). No evidence for upper arbitrage boundary violations are available from the Indian options market. Therefore, only those options contracts that satisfy the conditions mentioned in equations (5) and (6) are considered for further process.

$$C_t \geq \text{Max}(0, S_t - Ke^{-rT}) \quad (5)$$

$$P_t \geq \text{Max}(0, Ke^{-rT} - S_t) \quad (6)$$

where C_t and P_t are actual call and put options prices for the time t , respectively, S_t is the actual index value for the time t , K is the strike price of

options contracts, r is the risk-free rate of interest, and T is the time to expiry.

- All different moneyness groups, viz. ATM, ITM, OTM, DITM and DOTM, are selected for the study. From the multiple contracts remaining after applying the above filters, the one contract with the highest trade volume on the day is used to represent the day in the concerned moneyness group for the formation of time-series.

Implied index levels are calculated for the selected call and put contracts using equations (1) and (2), respectively. For the computation, the yield on 91 days Treasury Bills issued by the Reserve Bank of India (RBI) is considered to proxy risk-free rate of interest, and number of trading days considered for annualizing the time to expiration of the options is 252. Since the index options traded in India are European in style, dividend yield is not considered while calculating the implied index level. The implied index level, as computed above, is taken to represent both the call options and the put options markets (Debasish, 2009).

For the further analysis, the stationarity property of each data series i.e., actual index level and implied index level, is tested using Augmented Dickey-Fuller (hereafter, ADF) unit root test using equation (7), with the null hypothesis that there is a unit root ($\delta = 0$), to identify the order of integration of the process.

$$\Delta Y_t = \alpha + \beta t + \delta Y_{t-1} + \epsilon_t \quad (7)$$

where t is the time or trend variable.

To establish the possibility of hedging risk in the underlying spot market using derivative counterparts, it is necessary to establish that there is a long-run association among the markets. Since time-series of price data in the actual index and the implied index are

integrated of order one, the long-run equilibrium state is established using equation (8)

$$P_{j,t} - \hat{\beta}_0 - \hat{\beta}_1 P_{s,t} = \hat{\epsilon}_{o,t} \quad (8)$$

where $P_{j,t}$ and $P_{s,t}$ are the contemporaneous implied index level of call options or put options and actual index level at time t , respectively, $\hat{\beta}_0$ and $\hat{\beta}_1$ are

$$r_{s,t} = \alpha_1 + \alpha_s \hat{\epsilon}_{j,t-1} + \sum_{k=1}^n \alpha_{11}(k) r_{s,t-k} + \sum_{k=1}^n \alpha_{12}(k) r_{j,t-k} + \hat{\epsilon}_{s,t} \quad (9)$$

$$r_{j,t} = \alpha_1 + \alpha_j \hat{\epsilon}_{j,t-1} + \sum_{k=1}^n \alpha_{21}(k) r_{s,t-k} + \sum_{k=1}^n \alpha_{22}(k) r_{j,t-k} + \hat{\epsilon}_{j,t} \quad (10)$$

where, $r_{j,t}$ and $r_{s,t}$ are change in implied index values for call options or put options as the case may be and actual index values at time t , respectively.

V. EMPIRICAL RESULTS & DISCUSSION

The descriptive statistics and normality properties of the entire data series are given in Table 2. For both call options and put options and also for each of the moneyness groups, mean and standard deviation are reported to summarize the market movements and skewness, kurtosis and jarque-bera statistics are reported to condense the normality of the data. The whole period comprises 4436 trading days where the average actual index level is 5152.0 with a standard deviation of 2949.4, the average implied index level for call options is 5017.4 with a standard deviation of 2812.7 and the average implied index level for put options is 5240.1 with a standard deviation of 3072.0.

parameters and $\hat{\epsilon}_{o,t}$ is the error that represents the deviation from the equilibrium.

Further, Following Kim, Kim, and Nam (2009), vector error correction models are used in the study to estimate the short run association between the markets using equation (9) and (10).

DOTM call options and DITM, DOTM and ITM put options show the highest average price level with minimum standard deviations, indicating that when the market reaches new heights, there are more transactions in the risky options segments. The normality properties show that actual index level and implied index level for both call options and put options and for each sub-segments are non-normal. These findings are in line with common understandings on the properties of a timed price series. The null hypothesis of normality is rejected in all cases by jarque-bera test and further analysis is conducted after data smoothening procedures. The initial inferences on the data series is that the movements of actual index and implied index levels show the presence of stochastic trend and drift in the series and they have been statistically verified while the ADF was run to test unit root.

Table 2: Summary Statistics

Markets			Mean	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	Prob.	Obs.
Call Options	ATM	Actual Index	5152.0	2949.4	0.31	2.14	208.2	0.00	4436
		Implied Index	5014.7	2812.7	0.26	2.12	189.9	0.00	4436
	OTM	Actual Index	6810.3	2203.3	0.42	2.20	161.3	0.00	2892
		Implied Index	6524.3	1971.0	0.43	2.24	158.4	0.00	2892
	DITM	Actual Index	4282.6	906.3	-0.62	1.90	55.8	0.00	489
		Implied Index	4304.7	882.2	-0.65	1.95	56.7	0.00	489
	DOTM	Actual Index	6875.3	2221.9	0.36	2.14	143.9	0.00	2774
		Implied Index	6564.4	2024.7	0.47	2.32	156.7	0.00	2774
	ITM	Actual Index	4285.1	1098.9	-0.11	1.89	77.6	0.00	1452
		Implied Index	4277.5	1089.2	-0.13	1.91	75.5	0.00	1452
Put Options	ATM	Actual Index	5152.0	2949.4	0.31	2.14	208.2	0.00	4436
		Implied Index	5240.1	3072.0	0.36	2.15	232.1	0.00	4436
	OTM	Actual Index	5903.5	2604.2	0.32	2.25	152.7	0.00	3730
		Implied Index	6015.3	2771.8	0.37	2.21	182.6	0.00	3730
	DITM	Actual Index	6875.3	2221.9	0.36	2.14	143.9	0.00	2774
		Implied Index	6865.0	2232.7	0.35	2.14	139.8	0.00	2774
	DOTM	Actual Index	6828.6	2200.9	0.41	2.19	156.4	0.00	2871
		Implied Index	6878.4	2354.2	0.36	2.13	151.8	0.00	2871
	ITM	Actual Index	6810.3	2203.3	0.42	2.20	161.3	0.00	2892
		Implied Index	6870.5	2275.0	0.39	2.18	156.0	0.00	2892

Source: Computation of researchers

Not surprising, as Khan, Ikram, and Mehtab, (2011) pointed out along with other previous empirical

observations, ADF unit root test, which was tested using equation (7), rejected the null hypothesis that there is a

unit root in the variables, i.e., actual index level and implied index levels for both call options and put options, at level and failed to reject the same at difference, pointing out that the variables are stationary at the first difference level only. Therefore, the further

analysis in this respect is designed to establish the long term association between the markets using Johansen's cointegration procedure, and to test for relative speed of information absorption among the market pairs using vector error correction model(hereafter, VECM).

Table 3: Results of ADF Unit Root test

Moneyness	Market	Call Options				Put Options			
		Level		First Difference		Level		First Difference	
		t stat.	Prob.	t stat.	Prob.	t stat.	Prob.	t stat.	Prob.
ATM	Actual Index	-2.11	0.54	-62.03	0.00	-2.11	0.54	-62.03	0.00
	Implied Index	-1.93	0.64	-70.34	0.00	-2.57	0.30	-68.85	0.00
OTM	Actual Index	-2.91	0.16	-50.43	0.00	-2.85	0.18	-57.30	0.00
	Implied Index	-2.86	0.18	-54.64	0.00	-1.57	0.50	-63.37	0.00
ITM	Actual Index	-2.08	0.26	-36.09	0.00	-2.91	0.16	-50.43	0.00
	Implied Index	-2.14	0.23	-38.47	0.00	-0.99	0.76	-55.47	0.00
DOTM	Actual Index	-0.51	0.89	-49.67	0.00	-2.87	0.17	-50.01	0.00
	Implied Index	-0.34	0.92	-13.26	0.00	-1.29	0.64	-46.90	0.00
DITM	Actual Index	-1.98	0.61	-20.65	0.00	-0.51	0.89	-49.67	0.00
	Implied Index	-1.96	0.62	-21.67	0.00	-0.58	0.87	-52.99	0.00

Source: Computation of researchers

VI. SUITABILITY OF OPTIONS MARKET FOR HEDGING

The derivative counterparts of cash markets can be used suitably for hedging, only when they are closely associated in the long run. The Johansen's cointegration test provides for examining the long-run equilibrium relationship between two price series. From Table 4, it is clear that the null hypothesis that there is no cointegration existing between the stock market and its options counterparts has been rejected in all the cases and the alternate hypothesis on the presence of at most one cointegration existing between the markets are accepted. It shows that the association between the stock market and the call and put options markets is developed in such a way that the price movements are reverted to an equilibrium position in the long-run. If two markets show such a relationship in the long-run, it

stands for a close integration among them. Debasish(2009) has already documented from the Indian context that there exists a cointegrating relationship between the stock market and its options counterparts. Fleming, Ostidick, and Whaley (1996) discussed the presence of the cointegrating relationship as it is a result of arbitrage relationship existing between the market pairs, which makes the rebalancing of equilibrium state possible between the market pairs. When cointegration is present, the lagged differences between the cointegrating pairs of variables provide superior information to those contained in the finite number of changes in each variable. This larger information can be captured by the use of an error correction term, which is derived using the VECM that examines short-run dynamic relationship between the markets.

Table 4: Long run relationship among stock and options markets (Johansen's Cointegration Results)

Moneyness	H_0	Call Options				Put Options			
		Trace Statistic	Prob.	Max-Eigen Statistic	Prob.	Trace Statistic	Prob.	Max-Eigen Statistic	Prob.
ATM	$r = 0$	78.89	0.00	77.64	0.00	36.06	0.00	34.57	0.00
	$r \leq 1$	1.25	0.26	1.25	0.26	1.49	0.22	1.49	0.22
OTM	$r = 0$	69.81	0.00	69.17	0.00	54.15	0.00	52.18	0.00
	$r \leq 1$	0.64	0.42	0.64	0.42	1.96	0.16	1.96	0.16
ITM	$r = 0$	55.39	0.00	49.19	0.00	60.58	0.00	60.02	0.00
	$r \leq 1$	6.20	0.18	6.20	0.18	0.57	0.45	0.57	0.45
DOTM	$r = 0$	134.07	0.00	133.83	0.00	105.46	0.00	105.04	0.00
	$r \leq 1$	0.23	0.63	0.23	0.63	0.42	0.52	0.42	0.52
DITM	$r = 0$	44.45	0.00	43.66	0.00	146.95	0.00	146.81	0.00
	$r \leq 1$	0.79	0.37	0.79	0.37	0.14	0.71	0.14	0.71

Source: Computation of researchers

Note: r stands for the number of cointegrating equations.

When the stock market and options market are cointegrated, it means that there is a long run close association between the markets. This close association demonstrates the ability of both the markets to move in tandem at all times. This long-run co-movement is due to the capability of the markets to adjust back from

deviations from this equilibrium, which can be measured effectively by the VECM. The error correction term, also known as the speed of adjustment coefficient, explains the ability of the markets to respond to the new information coming into the capital market.

Table 5: Short run relationship among stock and options markets (VECM Estimation)

Moneyness	Market	Call Options		Put Options	
		Coeff.	Prob.	Coeff.	Prob.
ATM	Actual Index	0.004	0.689	-0.009	0.381
	Implied Index	-0.052	0.000	-0.042	0.000
OTM	Actual Index	-0.009	0.492	0.011	0.223
	Implied Index	-0.080	0.000	-0.040	0.001
ITM	Actual Index	0.001	0.970	-0.016	0.560
	Implied Index	-0.126	0.000	-0.127	0.000
DOTM	Actual Index	0.001	0.929	-0.008	0.391
	Implied Index	-0.186	0.000	-0.164	0.000
DITM	Actual Index	-0.075	0.364	-0.028	0.562
	Implied Index	-0.393	0.000	-0.290	0.000

Source: Computation of researchers

Table 5 reports the results of VECM tests about the relative rate of information absorption in the pricing of stocks as well as options contracts traded in the stock market and options market in India. At first, the direction of the price discovery process was looked into, and it is noted that only a unidirectional cause and effect relationship is existing among the market pairs. It means when the options market responds to new information and adjusts itself to the long term equilibrium, the stock market shows no such movements. Finally, the significance of the error correction term is examined. It is noted that the DITM call and put options markets respond 39.3% and 29.0% to the new information. The highest level of information absorption is taken place there. The DOTM options also show significant information absorption rate i.e., 18.6% and 16.4% for call and put options, respectively. The ITM options respond approximately 12% to the new information. 8% of the information absorption takes place in OTM call options market and ATM call options absorbs 5% of the new information. ATM and OTM put options capture about 4% of the information coming into the market system afresh. The VECM results show that these relationships are statistically significant too. But the stock market shows no significant information absorption when compared with the options segment. In other words, when the stock market hesitates to respond to the new information being flown into the market, the options market adjusts itself to the equilibrium position within a day's time. The results especially indicate the informational role of DITM and DOTM options, which absorb substantial information rather than the stock market. Because DITM and DOTM options are substantially present only when the stock market is performing sound with the realization of new heights in

the price level, the informational role played by them in Indian market goes extensively consistent with the findings of Ren, Ji, Cai, Li, and Jiang, (2019) who noted that the index option market leads the stock index market in China when the index stands stable and uptrend. It is an indication that the relative informational efficiency among different market components is subject to market conditions and other dynamics.

Even though the options markets are designed to support the functioning of the underlying stock market, the theoretical expectations framed through early empirical evidences of Anthony (1988) Manaster and Rendleman (1982) and Bhattacharya (1987) are that the options market may lead the price discovery process in the stock market. The Indian evidence is also in support of the findings of the study. Srivastava (2004) and Mukharjee and Mishra (2004) noted the price discovery role of the information content of the trade volume and open interest of stock options, and Debasish (2009) provided that the derivatives markets lead the stock market in India. But the results contradict with Mallikarjunappa and Afzal (2008), Dixit, Yadav, and Jain (2010), Shaik and Padhi (2013; 2015), that provided that the Indian options market measures fail to capture all relevant information for forecasting price movements in the stock market. But the current results do not claim that it contains all relevant information for stock market forecasting, rather it aims to provide directional information to the market participants on where to approach for information useful for decision making in connection with hedging transactions. From global literature, the results are in line with the findings of Lee and Nayar (1993) who remarked that cash, futures and options segments on S&P 500 index in the USA are cointegrated, Kyriacou and Sarno (1999) who showed

that there exists a simultaneous temporal relationship between spot market and its derivative counterparts in FTSE 100 index in the U.K, Bali and Hovakimin (2009) who found that information spilled over from KOSPI 200 index options market to the underlying stock market, Byoun and Park (2015) who noted that KOSPI 200 index options market was leading its spot counterpart in its initial phase and Ryu and Yang (2017) who found that the price discovery happens in both futures and options segments altogether and concluded that the stock market lagged behind the derivative markets. The results of the current study gain support from Fleming, Ostdick, and Whaley (1996), Holowczak, Simaan, and Wu (2007), Kim, Kim, and Nam (2009), Ahn, Bi, and Sohn (2018) and Du and Fung (2018) which rigorously employed different techniques and finally concluded this nature of the options market.

VII. CONCLUSION

The integration of the hedging instrument with the asset to be hedged is considered as the base for the suitability of the hedging instrument. The present study is to enquire about the possibilities for hedging the risk of investments in the Indian stock market using options contracts on it. The Indian stock market and the options markets are represented by the NSE Nifty fifty index and the Nifty fifty index options for the period from 2001 to 2019. Both call and put options are considered with all moneyness categories viz. ATM, OTM, ITM, DITM and DOTM. At first, it is found that the stock market and both the call and put options markets are cointegrated, and it shows that the Indian options markets are suitable for hedging risks involved in the stock market investments. Apart from that, the price formation relationship among the market pairs is considered, and it is found that the price formation through information absorption takes place in the options market irrespective of moneyness categories and other market situations.

Further, even though the trade volume is higher for ATM options and OTM options, the DITM and DOTM options that are not traded much absorbs more information in the market. In other words, when the options sellers and buyers take the risk of contracts being expired at extreme values, they use all information to price the same more accurately. It means the implied index level, which represents the options markets' expectation about future movements in the actual index level, is more accurate in case of extreme options pay off structures. To conclude, the stock market and options market are integrated in all the ten market combinations, and the Indian options markets are suitable for hedging. Moreover, looking at the extreme moneyness options contracts, the future movements of the stock market can be identified.

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Effect of Inflation on Economic Growth in Sierra Leone

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Introduction- Economic growth is a key policy objective of any government. In addressing the pertinent issues in economic management, experts and economic planners have had to choose between or combine some of the macroeconomic variables. Economic growth, which is measured by Gross Domestic Product (GDP) confers many benefits which include raising the general standard of living of the population as measured by per capita national income, making income distribution easier to achieve, enhance time frame of accomplishing the basic needs of man to a substantial majority of the population. (Barnes, 2017)

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Effect of Inflation on Economic Growth in Sierra Leone

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1. INTRODUCTION

Economic growth is a key policy objective of any government. In addressing the pertinent issues in economic management, experts and economic planners have had to choose between or combine some of the macroeconomic variables. Economic growth, which is measured by Gross Domestic Product (GDP) confers many benefits which include raising the general standard of living of the population as measured by per capita national income, making income distribution easier to achieve, enhance time frame of accomplishing the basic needs of man to a substantial majority of the population. (Barnes, 2017)

The word inflation in the market economics of the world threatens both the developing and developed countries economy because of its undesirable effect. Among many variables that can be stated as the determinant of economic growth is inflation (Barro, 2017). Even though some studies suggest that moderate inflation helps in economic growth, the overall weight of evidence so far clearly indicated that inflation is inimical to growth. Inflation and economic growth are the main concern of most countries of the world. Thus, inflation and economic growth have gotten attention since the classical period of time. A large variety of factors can affect the rate of both. For example, investment in market production, infrastructure, education, and preventive health care can all grow an economy in greater amounts than the investment spending. Monetarists believe the most significant factor influencing inflation or deflation is how fast the money supply grows or shrinks. They consider fiscal policy, or government spending and taxation, as ineffective in controlling inflation.

Inflation is now one of the major problems facing the Sierra Leone economy and the reduction of its high pressure is considered one of the most critical macro-economic objectives in Sierra Leone. Sierra Leone started having double digits rates of inflation few years immediately after independence. The country experienced double digit within 1965-1970 and this was as a result of the civil war. The next period of high inflation was within 1974-1979, when the wage freeze was discontinued as recommended by Udoji salary review commission. To the policy makers, inflation

endangers economic growth and development because it discourages investment and savings. These factors explain why policy makers put in lots of efforts to reduce inflation and why several researches have been conducted on this issue. The inflation pressure was further provoked by high demand for imports of both intermediate inputs and consumers goods due to over valuation of the naira which made imports relatively cheaper than locally manufactured goods in this case, the impediment to development may be referred to as cost. (Bayo, 2015)

Inflation has been the macroeconomic problem in Sierra Leone that seems to be difficult to manage over the years. It is generally accepted that inflation has a negative effect on medium and long-term growth. Most researches have claimed that inflation and economic growth have a negative relationship which means that that are inversely related (as inflation rises, GDP reduces and vice versa). During the period of inflation, the value of money falls which increases the earnings of business shareholders and others whose income are fixed in money terms but despite these, it also reduced the standard of living of the people whose income are fixed thus increasing their cost of education welfare and culture facilities available. The problem of inflation makes it difficult for the poor masses with fixed income to survive in the economy.

High inflation is known to have many adverse impact, it imposes welfare cost of the society, impedes efficient resources allocation by obscuring the significant role of relative price change, discourages savings and investment by creating uncertainty about further price, inhibit financial development by making intermediate on more costly, hits the poor excessively, because they do not hold financial asset that provide a hedge against inflation and reduces a country international competitiveness by making its exports relatively more expensive, this impacting negatively on the balance of payments and perhaps more importantly reduces long-term economic growth (Dumka, 2018).

The government has been geared towards trying to make inflation rate in Sierra Leone a single digit but all efforts have been to no avail. The government has put all efforts into making the inflation rate a single digit instead of a double digit but alas the inflation rate in 2017 was 16.30. However most previous studies on inflation have focused on the effect it brings about on the economic growth of developed countries, therefore

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this research is going to focus on the effect it has on the economic growth of developing countries with particular focus on Sierra Leone. Over the years we have noticed that the highest rate of inflation was in 2017 with 72.8% which according to Mordi et al (2017) was due to excess money supply, scarce foreign exchange and severe shortages in commodity supply, as well as continual labor and political unrest following the annulment of the June 1993 elections and the lowest was in 2017 with 5.40%.

According to Piano (2017), businesses and households are likely to perform poorly in period of high unpredictable inflation. Even though some studies suggest that moderate inflation helps in economic growth, the general weight of evidence so far clearly indicate that inflation is distress to growth, it is therefore imperative to conduct a research work on the impact of inflation on Sierra Leone economic growth which is the main objective of this research work.

Having a view on the effect of inflation on Sierra Leonean economy and realizing that the problems caused by the effects of the growth of inflation is becoming unbearable to the citizens and the entire economy and it becomes necessary to analyze the effect of inflation on economic growth.

The problem of inflation in Sierra Leone was brought about by the mineral glut in 1980s, which resulted into balance of payment deficits leading to foreign exchange crisis that necessitated various measures of import restrictions. The resultant shortage of goods and services for local consumption spurred the inflation rate to rise from 20% in 1981 to 39.1 % in 1984. With the adoption of the structural adjustment programme (SAP) in September 29, 1986, there was a temporal reduction in fiscal deficit as government removed subsidies and reduce her investment in the economy but as structural adjustment programme (SAP) policies gathered momentum, there was a fall in growth rate of gross domestic product (GDP) in 1990 from 8.3% to 1.2% in 1994 with inflation rising from 7.5% in 1990 to 57% in 1994. In 2017, inflation rate rose to 72.8% due to increased lending rate, the policy of guided deregulation and lagged impact of fiscal indiscipline. Inflation is unfavorable to economic growth but some researches that have been conducted have stated it is sustainable for economic growth if it is stable and maintained at a low rate. The problem of inflation is not new to Sierra Leone because it has been a major problem for the past few years. The relationship between inflation and economic growth has shown that it brings about a positive effect on some countries while some countries experience negative effects. Macroeconomists, policy makers and central monetary authorities of all the nations need to know whether inflation is beneficial to growth or detrimental to growth. We can see the complexity of the relationship between inflation and economic growth from the result of

research conducted by different researchers. Theories also have different views on issue of inflation and economic growth. The direction of causal relationship between inflation and economic growth is also debatable. Some have shown bidirectional causality, unidirectional causality and no causality relationship between inflation and economic growth. Although, the relationship between the inflation rate and economic growth has been studied extensively, the exact relationship is not well defined and the empirical results and policy recommendations from the studies vary and sometimes are in conflict. Although many recent studies have insisted that inflation affects economic growth negatively or that inflation promotes growth.

II. LITERATURE REVIEW

a) *Conceptual Review*

i. *Concept of Inflation*

Inflation can be defined as the increase in the general price level of goods and services and it is usually measured by the Consumer Price Index (CPI) which is traditionally used as a proxy to determine the amount of inflation affecting the Sierra Leonean economy and it can be defined as a measure of the average change over time in the prices paid by consumers for a market basket of consumer goods and services. This basket of goods and services includes: Food and Beverages, Housing, Clothing, Transportation, Medical Care, Recreation, Education and Communication and Other Goods and Services (Bayo, 2015).

Inflation can also be defined as a persistent increase in the level of consumer prices or a persistent decline in the purchasing power of money, caused by an increase in available currency and credit beyond the proportion of available goods and services (Webster, 2000). Mises (1952) opined that inflation is an increase in the quantity of money without a corresponding increase in the demand for money, i.e., for cash holdings. Also, Dubon (2013) explained that inflation is a sustained rise in general price level which is in line with the definition of James (2011). However, he added that this phenomenon occurs when the aggregate demand in normal value is greater than the real productive capacity of the economic which is also in line with the definition of Keynes.

The structuralists argue that inflation is crucial for economic growth while the monetarists posit that inflation is harmful to economic growth (Doguwa, 2012). Several empirical studies confirm the existence of either a positive or negative relationship between these two major macroeconomic variables even Mubarik (2015) argue that low and stable inflation promotes economic growth and vice versa. Omoke (2010) lends him support by emphasizing that despite this surplus of studies both for developing and developed countries, the literature on

inflation and economic growth in Sierra Leone is still very scanty. The formulation and implementation of monetary policy by the central bank of Sierra Leone (CBSL) was aimed at maintaining price stability which is consistent with the achievement of sustainable economic growth.

ii. *Concept of Economic Growth*

Economic Growth is expressed as national income, which is defined by Alfred Marshal in his book, *Principle of Economics* (1890), as the labor and capital of a country acting on its natural resources, producing yearly a certain net aggregate of material and immaterial commodities with all kinds of services, including net income due from foreign investments. Economic growth can be defined as an increase in the capacity of an economy to produce goods and services compared from one period to another (Lefty, 2012). Economic growth can also be defined as the increase in market value of goods and services produced by an economy over a period of time in a country. It is usually measured as percentage increase in real gross domestic product (RGDP) which is gross domestic product (GDP) adjusted for inflation which is defined a measurement of economic output that accounts for the effects of inflation or deflation. It provides a more realistic assessment of growth than nominal GDP. Without real GDP, it could seem like a country is producing more when it's only that prices have gone up.

The positive impact of the long-term growth in an economy is that there will be an increase in national income and the level of employment which will increase the standard of living for the society, generate more tax income for government spending to be used for the further development of the economy which will lead to a reduction in poverty and all this cannot occur without economic development. Important factors that affect economic growth positively are the quality and quantity of available human resources. The quality is dependent on its skills, creative abilities, training and education. Natural resource is also another factor which are the resources that are produced by nature. Then we have capital formation, this refers to all the produced means of further production, such as roads, railways, bridges, canals, dams, factories, seeds, fertilizers, etc. Technological development is also one of the factors and it involves application of scientific methods and production techniques. Finally, we have the social factors which include the customs, traditions, values and beliefs that contribute to the growth of an economy.

b) *Theoretical Review*

The theoretical review of this study will be based on the relevant theories that relate to both inflation and economic growth. There are various theories but the ones that will be discussed are the endogenous growth theory, the Solow-swan growth theory and the Harrod-Domar growth model.

i. *Endogenous Growth Theory*

Endogenous growth theory which was developed by Paul Romer and Robert Lucas which is also known as New Growth Model placed greater emphasis on the concept of human capital. How workers with greater knowledge, education and training can help to increase rates of technological advancement and it claims that economic growth is primarily the result of endogenous and not external forces. Endogenous growth theory believes that investment in human capital, innovation, and knowledge are significant contributors to economic growth. The theory also focuses on positive externalities and spillover effects of a knowledge-based economy which will lead to economic development. The endogenous growth theory primarily holds that the long run growth rate of an economy depends on policy measures. For example, subsidies for research and development or education increase the growth rate in some endogenous growth models by increasing the incentive for innovation. Endogenous growth theory is the rate of economic growth strongly influenced by human capital and rate of technological innovation. The growth rate depends on the rate of return on capital i.e. if inflation decreases the rate of return, it will reduce capital accumulation which will in turn reduce economic growth

ii. *The Solow-Swan Growth Theory*

The Solow-Swan model was developed independently by Robert Solow and Trevor Swan in 1956 and it was set within the framework of neoclassical economics. Their theory attempts to explain long-run economic growth by looking at capital accumulation, labour or population growth and the technological progress. They considered economic growth as a result of external factors in an economy. The neo-classicalist stated that the level of technological change is determined exogenously i.e. it is independent of all other factors including inflation. The Solow growth theory is based on the assumptions that there are constant returns to scale, diminishing returns to capital, independently determined technological progress and substitutability of labour and capital. He explained that higher savings/investment rates will increase capital accumulation per worker which will in turn lead to more output per worker. The model assumes that technological progress will grow at a constant steady-state, which determines the growth of output. The theory states that economic growth will not take place unless there are technological advances, and that if all nations have access to the same technology, then the standard of living will all become equal. Economic growth comes from adding more capital and labour inputs and also from ideas and new technology. The key assumption of the Solow-Swan model is that capital is subject to diminishing returns in a closed economy. The production function of neoclassical growth theory is

used to measure the growth and equilibrium of an economy and it is expressed as;

$$Y = F(K, AL)$$

Where;

Y= Gross Domestic Product (GDP)

K= Share of Capital

L= Labour

A= Technology

The models in this framework can yield diverging results with regard to the inflation-growth relationship, the relationship can either be positive (Tobin Effect), negative (Stockman Model) or no relationship whatsoever (Sidruaski, 2016)

iii. Harrod- Domar Growth Theory

The Harrod-Domar economic growth model is a type of neo-classical growth model and it stresses the importance of savings and investment as key determinants of growth. The model helps to explain how growth has occurred and how it may occur again in the future. Growth strategies are the things a government might introduce to replicate the outcome suggested by the model. However, it depends on how efficient the investment is. If savings is too high it can lead to lower growth because people cannot afford to consume. Basically, the model suggests that the economy's rate of growth depends on: The level of national saving and the productivity of capital investment (this is known as the capital-output ratio). Basically, the Harrod-Domar model says: Rate of growth of GDP = Savings ratio / capital output ratio.

c) Empirical Review

Osuala, Osuala and Onyeike (2013) examined the impact of inflation on economic growth using Sierra Leone as a case study within the period of 1970-2011 using the variables Economic growth and Inflation Rate using OLS, ADF, ECM and Granger causality test. The results from the research show that a statistically significant positive relationship exists between inflation and economic growth in Sierra Leone. Hence, the "bad era of double digit inflation rate" could be effectively utilized by the Sierra Leone government to erase the country's debt burden. In other words, instead of spending billions of naira in negotiation for "debt forgiveness", the government should "inflate away her debt".

Idalu (2015) did a research on the impact of inflation on economic growth using Sierra Leone as a case study within the period of 1970-2013 with the variables as economic growth, inflation rate, unemployment rate using VAR, Granger Causality. The findings from this study shows that the short run model conformed to the prior expectation that there is a positive relationship between inflation and economic activities and a negative relationship between

unemployment and economic activities, while in the long run the result showed that there is a negative relationship between inflation and economic growth.

Olu and Idih (2015) examined the relationship between inflation and economic growth in Sierra Leone from 1980-2011 with the variables as economic growth, inflation rate, exchange rate, input of labor and input of capital using the OLS. The regression result showed that inflation rate in line with prior expectations had a positive relationship but non-significant with the economic growth rate. This suggested that as the GDP rises inflation also rises, suggesting that there has been no effectiveness in the monetary policies aimed at tackling or controlling inflation rate in Sierra Leone.

Aminu, Manu and Salihu (2013) investigated the impact of unemployment and inflation on economic growth in Sierra Leone from 1986 to 2010 by employing Augmented Dickey-Fuller (ADF) approach, Johansen co integration test and Granger causality test. The results of the stationarity test showed that all the variables were stationary at first difference. The results of the Johansen co integration test indicate long run relationship among economic growth, unemployment and inflation. The results of the Granger causality showed that unemployment and inflation granger cause RGDP in the economy.

Omoke and Ugwuanyi (2010) tested the relationship between money, inflation and output by employing co integration and Granger-causality test analysis. The findings revealed no existence of a co integrating vector in the series used. Money supply was seen to Granger cause both output and inflation. The result suggest that monetary stability can contribute towards price stability in Sierra Leonean economy since the variation in price level is mainly caused by money supply and also conclude that inflation in Sierra Leone is too much extent a monetary phenomenon. They find empirical support in context of the money-price-output hypothesis for Sierra Leonean economy.

Ahmed and Mortaza (2015) examined the nexus between inflation and economic growth in Bangladesh for the period 1980-2015 by employing co integration test and error correction model. The study employed consumer price index (CPI) and gross domestic product (GDP) in the investigation. The results revealed that long run relationship exists between inflation and economic growth. Similarly, the results showed that inflation has negative relationship with economic growth in Bangladesh for the period studied.

III. METHODOLOGY

This research highlighted the method through which the data was collected, techniques used for the analysis of the data. and the reserch design for easy interpretation, as well as method employed for data presentation and analysis techniques. It also specified

apriori expectation in relation to the stated hypothesis, estimated and evaluated the model in the making of sound statistical inference to the model. This study employed quantitative secondary data and analysed this data with the software E-views 9.0 to generate an appropriate result to the research work.

a) Model Specification

The model used in the study which had earlier been reviewed are specified below:

$$GDP = f \{INFR, INTR, EXCHR\}$$

Where;

GDP= Gross Domestic Product at constant prices

INFR= Inflation Rate

INTR = Interest Rate

EXCHR = Exchange Rate

However, this study modified the scholars' work by using Annual Growth Rate as dependent variable rather than just GDP at constant price to measure economic growth. In that regard, the model used is specified thus:

$$GR = f \{INFR, REER, RIR\} \dots\dots\dots [i]$$

$$INFR = f \{REER, RIR\} \dots\dots\dots [ii]$$

Where;

GR= Annual Growth Rate

INFR= Inflation Rate

RIR = Real Interest Rate

REER = Real Effective Exchange Rate

$$Y = f(x) \dots\dots\dots (3.1)$$

$$GR = f(INFR, REER, RIR) \dots\dots\dots (3.2)$$

$$INFR = f(REER, RIR)$$

The model can be written explicitly as:

$$\Delta GR = \beta_0 + \beta_1 GR_{t-1} + \beta_2 INFR_t + \beta_3 INFR_{t-1} + \beta_4 REER_t + \beta_5 REER_{t-1} + \beta_6 RIR_t + \beta_7 RIR_{t-1} + \mu_t \quad (3.3)$$

$$\Delta INFR = \beta_0 + \beta_1 INFR_{t-1} + \beta_2 REER_t + \beta_3 REER_{t-1} + \beta_4 RIR_t + \beta_5 RIR_{t-1} + ECM_{t-1} \dots\dots\dots (3.4)$$

Where: t is the Time series; β_0 is the intercept; β_1 to β_7 are the parameters to be estimated.

Where model {i} was used to achieve objective 1 and model {ii} was used to achieve objective 2.

i. Justification of Variables in the Model

GR (Annual Growth Rate): This can be defined as the change in the value of a measurement over the period of a year. It is also a useful tool in identifying the trends of investment.

INFR (Inflation Rate): This is an increase in the general level of prices which is generally measured by consumer price index.

REER (Real Effective Exchange Rate): This is the weighted average of a country's currency in relation to the index or basket of other major currencies, adjusted for the effects of inflation. This is an important measure when assessing the trade capability of a country's currency and current import/export situation.

RIR (Real Interest Rate): This is an interest rate that has been adjusted to remove the effects of inflation to reflect the real cost of funds to the borrower and the real yield to an investor.

μ (Random Error Term): This is the stochastic variable that is included in a model to account for variables that affect the dependent variables but has been excluded in the model. The random error has its probabilistic properties such as:

The Heteroscedasticity will be reduced by converting the explicit model which are the data from rates and absolute terms into the log-log form.

$$GR = \hat{\beta}_0 + \hat{\beta}_1 INFR + \hat{\beta}_2 REER + \hat{\beta}_3 RIR + \mu_t \dots\dots\dots (3.4)$$

b) Ethical Consideration

Compliance with the relevant principles of acknowledging various authors used in the work to avoid plagiarism was ensured. Dishonest conduct includes manipulation of design and methods, retention or manipulation of data. The researcher avoided any form of dishonesty by using data as obtained by the research instrument.

IV. RESULTS AND DISCUSSION

This research focused on the estimation of the effect of Inflation on the Economic growth of Sierra

Leone using the models specified in the previous research. Therefore, the analysis was broken down into two models which was estimated differently in order to determine their effects distinctively. This research commenced with the data presentation, a discussion of the descriptive statistics and trend analysis of the variables involved in the model and consequently proceeded to pre-test the data for unit roots using the Augmented Dickey-Fuller and Phillip Perron tests. Upon determining the order of unit root test, this study proceeded to use Auto regressive distributions lag (ARDL) to determine the short run and long run co-

integrating relationship of the explanatory variables on the dependent variable. This research concluded with the post estimation tests.

a) Descriptive Statistics

The summary of the descriptive statistics of the variables is presented in table below. The median for the Annual growth rate, Inflation rate, Real effective exchange rate and Real interest rate are 4.345171, 12.54679, 95.52759, 5.879259 respectively and this shows this is the average value of the variables over the period of years covered. The large difference between the minimum and maximum values of the series gave the result that there is a significant variation in the trends of the variable over the period of consideration. Also, the results based on the statistical distribution of the series shows that all the series are positively skewed except real interest rate which implies that there are

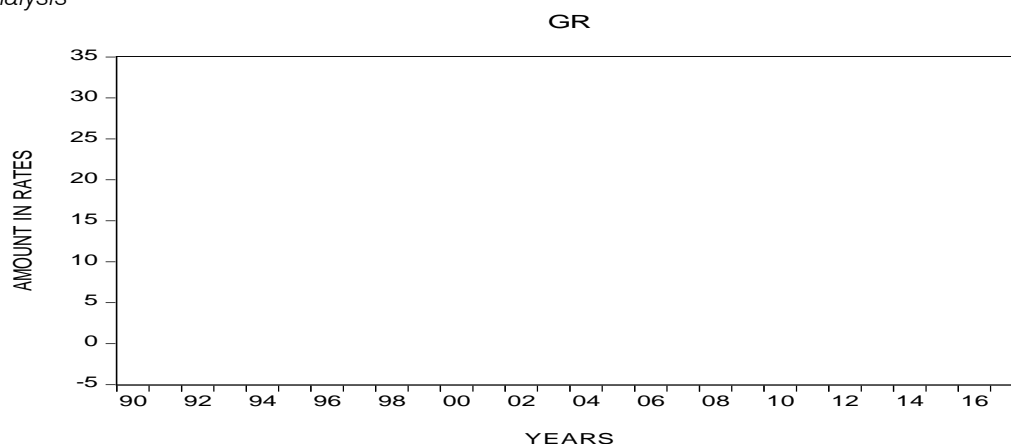
disturbances in the variable. However, Annual growth rate has the longest tail. The value of kurtosis indicates the flatness of the distribution of the values on a variable over time. The values of the kurtosis fall in the range of less than 3, greater than 3 or equal to 3 depending on the flatness of the values of the variable over time. Variants of the kurtosis are platykurtic ($k < 3$), mesokurtic ($k = 3$) and leptokurtic ($k > 3$). The kurtosis value as shown in the descriptive statistics for Growth Rate, Inflation rate, Real Effective Exchange Rate and Real Interest Rate are 14.21331, 5.654853, 5.558344 and 4.277908 respectively and this indicates that the variables are leptokurtic indicating that the variables have a normal distribution. The Jacque-Bera statistics is a goodness of fit to check whether the sample data have the skewness and kurtosis matching a normal distribution.

Table 4. 2: Descriptive Statistics

	GR	INFR	REER	RIR
Mean	5.218349	18.68734	107.0648	2.263398
Median	4.345171	12.54679	95.52759	5.879259
Maximum	33.73578	72.83550	269.2031	25.28227
Minimum	-1.616869	5.382224	48.96753	-43.57266
Std. Dev.	6.527226	17.42595	52.17844	17.29455
Skewness	3.073019	1.962213	1.736876	-1.225439
Kurtosis	14.21331	5.654853	5.558344	4.277908
Jarque-Bera	190.7640	26.19092	21.71408	8.913161
Probability	0.000000	0.000002	0.000019	0.011602
Sum	146.1138	523.2456	2997.815	63.37513
Sum Sq. Dev.	1150.326	8198.922	73509.91	8075.739
Observations	28	28	28	28

Source: Author's computation using E-views 9.0 (2019)

ii. Trend Analysis

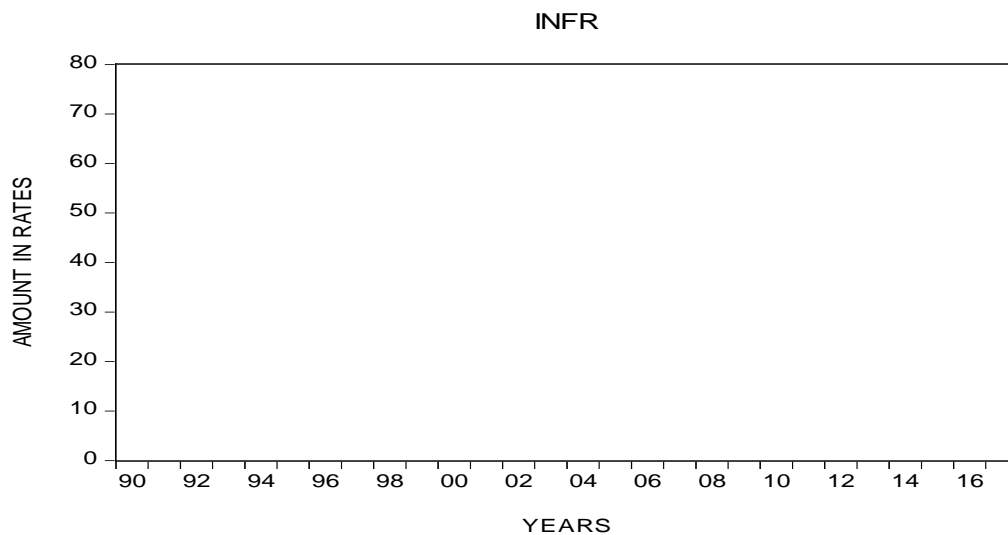


Source: Author's computation using E-views 9.0 (2019)

Figure 4.1: Trend of Annual Growth Rate from 1990 -2017

Figure 4.1 represents the trend of the Annual Growth Rate of Sierra Leone. There were major fluctuations in the growth rate in Sierra Leone. In 2013 and 2004 we had 10% and 33% respectively which were the highest growth rates within the period covered then

it drastically fell in 2015 to 3.44% and we continued to experience positive fluctuations until 2016 where we had -1.86% which was a result of the economic recession that was observed during that period of time.

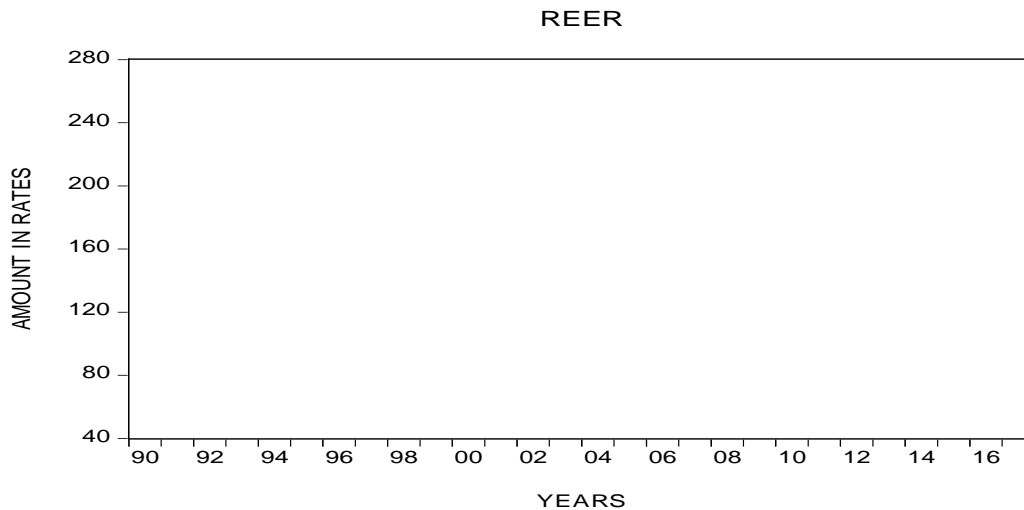


Source: Author's computation using E-views 9.0 (2019)

Figure 4.2: Trend of Inflation Rate from 1990 -2017

Figure 4.2 represents the trend of the Inflation rate of Sierra Leone. There were major fluctuations in the inflation rate of Sierra Leone. From 1990, inflation rate started at 7.36% then it rose to 57% in 1993 and was at its peak in 2017 at 72.8%. and was then followed by

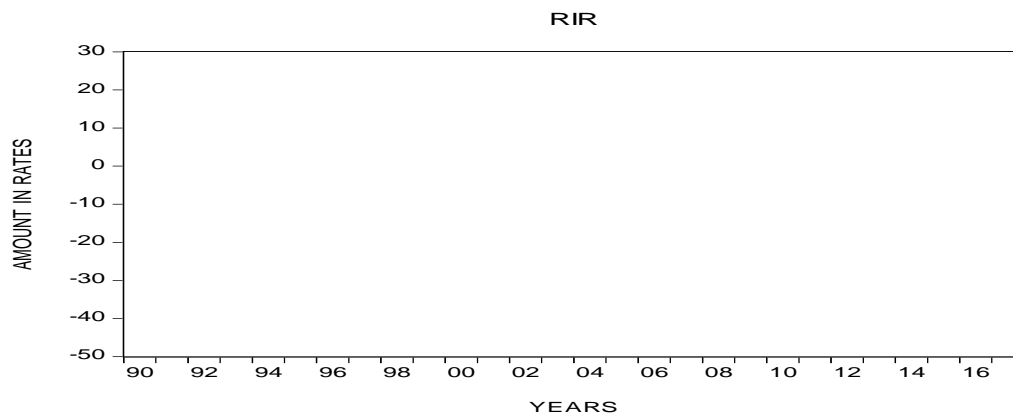
a drastic fall in 1998 than it maintained minor fluctuations from 2000 up to 2017 which was its lowest value at 5% and we experienced fluctuations within 2014 - 2016 which was a result of the economic recession that was observed during that period of time.



Source: Author's computation using E-views 9.0 (2019)

Figure 4.3: Trend of Real Effective Exchange Rate from 1990 -2017

Figure 4.3 represents the trend of Real Exchange Rate. The trend reveals that over the years the naira has depreciated and struggled to appreciate. In 1998 it skyrocketed to 269.203% which was the highest value within the years covered and then it dropped drastically in 1999 to 68.26% and this might be as a result of civilian government assessing power in Sierra Leone. After that Real Effective Exchange Rate has since then struggled on a steady movement at a decreasing rate. The fluctuations in 2014-2017 could be as a result of the devaluation in naira that occurred at that time. The exchange rate is trying to find its way upwards but has not made any substantial progress.

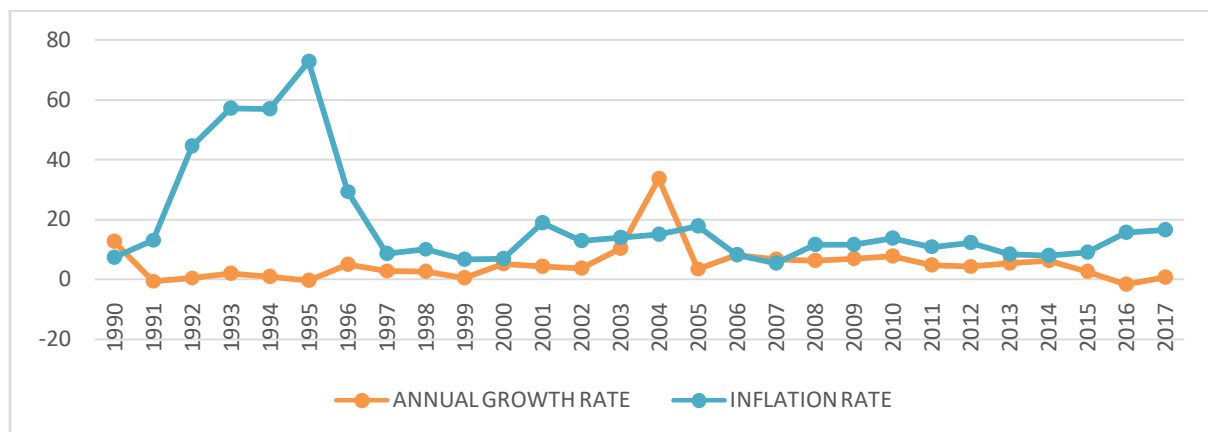


Source: Author's computation using E-views 9.0 (2019)

Figure 4.4: Trend of Real Interest Rate from 1990 -2017

From 1990, it rose in 1992, fell in 1997 and climbed up again in 1998. From 2000 it fell and climbed up again in 2002 and fell again in 2013. The variable real interest rate did not have any major rise again with substantial increase after that. It maintained minor fluctuations from 2004 up to 2018 when it had a drastic

fall in 2018 then another rise in 2010 and continued to slightly move upward. After 2012 there was a decline and the real interest rate has continued to fluctuate on that low level. The fluctuation in values can be attributed to various changes in the monetary policies over time.



Where: GR=INFR

Source: Authors computation using Microsoft Excel Work package 2016

Figure 4.5: Trend of the Annual growth rate and Inflation rate from 1990-2017

Figure 4.5 represents the trend of Annual Growth Rate and Inflation Rate. In 1990, Annual Growth Rate and Inflation Rate had 12% and 7% respectively. In 2017 when inflation was at its peak which was 72%, Sierra Leone experienced a negative growth rate which was -0.3%. In 2000, both variables were on the same level which was 5%, in 2015 we also experienced high inflation rate at 17% and a 3% growth rate. During the period of recession which was between 2014-2016 we had 15% as the average inflation rate while growth rate has negative values. It can be seen that during the period of high inflation, Sierra Leone experienced low growth rate and vice versa

b) Data Analysis

Empirical analysis was done with the use of Econometric Views 9.0 (E-Views) analytical software which was used to estimate the model and the following results were reflected in the subsequent sections.

i. Unit Root / Stationary Test Results

This section explained the application of the unit root test which was carried out on the variables to determine their stationarity levels. Two tests were implemented here which were the Augmented Dickey Fuller (ADF) test and the Phillip Perron test to provide reliability and credibility on the data before further carrying out subsequent tests. This test was based on two statement of hypothesis which are the null and alternative hypothesis. The null hypothesis stated that the variable is not stationary while the alternative hypothesis postulated that the variable is stationary. The decision rule upon on which difference was selected is based upon the decision criteria which states that if the absolute test statistic is greater than the absolute critical value then reject the null hypothesis and accept the alternative hypothesis while if the absolute test statistic is lesser than the absolute critical value then accept the null hypothesis and reject the alternative hypothesis.

Table 4.3: Results of the Augmented Dickey Fuller Test

Series	5% Critical value	ADF (prob.)	ADF Test Statistics	Equation Specification	Order of Integration
GR	-2.976263	0.0026	-4.265394	INTERCEPT	I(0)
INFR	-2.981038	0.0032	-4.195171	INTERCEPT	I(1)
REER	-2.981038	0.0007	-4.840307	INTERCEPT	I(1)
RIR	-2.976263	0.002	-5.233210	INTERCEPT	I(0)

Source: Author's computation using E-views 9.0 (2019)

In the table above, we can see the results whereby the variables, growth rate, Inflation rate and real interest rate in the previous year were all stationary at levels because their respective absolute test statistic was greater than their 5% critical values at constant at intercept which made the rejection of the null hypothesis but to accept the alternative hypothesis. To promote the reliability of the results, the probability was also tested and each of the variables respective probabilities were lower than the 5% level of significance but the variable, inflation rate and real effective exchange rate were not stationary at levels but at first difference. The results of

the variables being stationary at first difference made it inappropriate for the usage of the Ordinary Least Square (O.L.S) method.

The second stationarity test used was the Phillip Perron Test which its decision upon on which difference should be selected is based upon the decision criteria which states that if the absolute test statistic is greater than the absolute critical value then reject the null hypothesis and accept the alternative hypothesis while if the absolute test statistic is lesser than the absolute critical value then accept the null hypothesis and reject the alternative hypothesis.

Table 4.4: Results of the Phillip Perron Test

Series	5% Critical value	Phillip Perron (prob.)	Phillip Perron Test Statistics	Equation Specification	Order of Integration
GR	-2.976263	0.0025	-4.281466	INTERCEPT	I(0)
INFR	-2.981038	0.0035	-4.160126	INTERCEPT	I(1)
REER	-2.981038	0.0007	-4.839997	INTERCEPT	I(1)
RIR	-2.976263	0.0002	-5.239671	INTERCEPT	I(0)

Source: Author's computation using E-views 9.0 (2019)

In the table above, we can see the results whereby the variables, growth rate, Inflation rate and real interest rate in the previous year were all stationary at levels because their respective absolute test statistic was greater than their 5% critical values at constant at intercept which made the rejection of the null hypothesis but to accept the alternative hypothesis. To promote the reliability of the results, the probability was also tested and each of the variables respective probabilities were lower than the 5% level of significance but the variables, inflation rate and real effective exchange rate was not stationary at levels but at first difference. The results of the variables being stationary at first difference made it inappropriate for the usage of the Ordinary Least Square (O.L.S) method, therefore the tests to be carried out will be achieved with the aid of the Auto Regressive Distribution Lag (ARDL). Therefore, the optimal lag

length had to be determined and was shown in the next section.

For disaggregation purpose, the estimation was grouped into Model A and B, where Model A was used to determine the result of objective 1 and Model B was used to determine the major determinants of inflation in Sierra Leone which is objective 2. It is pertinent to note that Autoregressive Distributed Lag (ARDL) method and Error Correction Model (ECM) was applied to both models.

ii. Optimal Lag Length Selection

A lag length with the lowest value of any of the criteria will be considered as the optimum lag length and thus be selected.

Model A- [GR = INFR + REER + RIR]

Model B - {INFR = REER + RIR}

Table 4.5: Results of the Lag Length Criteria for Model A

Lag	LogL	LR	FPE	AIC	SC	HQ
1	-421.2668	NA	4.81e+09*	33.63591*	34.41012*	33.85886*
2	-409.5096	16.27921	7.17e+09	33.96228	35.51071	34.40817

Source: Author's computation using E-views 9.0 (2019)

* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

The results in table above portrays different lag length criterions and the respective lag length chosen. Schwarz information criterion, Akaike Information criterion, The Final Prediction error, and Hannan-Quinn information criterion selected the lag length 1. The

implication of the lag length selected at 1 explains how the outcomes of the previous year has an effect on the current year. In this research, the lag length selected was 1.

Table 4.6: Results of the Lag Length Criteria for Model B

Lag	LogL	LR	FPE	AIC	SC	HQ
1	-336.9709	NA	72755243*	26.61315*	27.04864*	26.73855*
2	-328.1927	13.50496	75675843	26.63021	27.50120	26.88102

Source: Author's computation using E-views 9.0 (2019)

* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

The results in table above portrays different lag length criterions and the respective lag length chosen. Schwarz information criterion, Akaike Information criterion, The Final Prediction error, and Hannan-Quinn information criterion selected the lag length 1. The implication of the lag length selected at 1 explains how the outcomes of the previous year has an effect on the current year. In this research, the lag length selected was 1.

iii. Auto Regressive Distributed Lag (ARDL)

This test is suitable when the variables or series have different order of integration that is, if all variables

are stationary at levels I (0) and first difference I (1). The Autoregressive Distributed Lag test was proposed by Pearson, Shin and Smith (2010).

Model A- [GR = INFR + REER + RIR]

Model B - {INFR = REER + RIR}

iv. Bounds Co-Integration Test

This test is conducted in order to determine if there is a long run relationship among the variable.

H_0 : There is no long run relationship among the variables

H_1 : There is a long run relationship among the variables

Table 4.7: Bounds Co integration Test Result for Model A

Test Statistic	Value	k
F-statistic	4.851091	3
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	2.72	3.77
5%	3.23	4.35
2.5%	3.69	4.89
1%	4.29	5.61

Source: Author's computation using E-views 9.0 (2019)

From the table above, the bounds co-integration test was employed to test for co-integration among variables or series. The F-statistic which is 4.851091 is greater than lower and upper bound of the 5% level of significance of the critical value bounds and at all level of significance. Therefore, we reject the null

hypothesis and accept the alternative hypothesis that there is co-integration among the variables.

Table 4.8: Bounds Co integration Test Result for Model B

Test Statistic	Value	K
F-statistic	2.157762	2
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	3.17	4.14
5%	3.79	4.85
2.5%	4.41	5.52
1%	5.15	6.36

Source: Author's computation using E-views 9.0 (2019)

From the table above, the bounds co-integration test is employed to test for co-integration among variables or series. The F-statistic which is 2.157762 is lesser than lower and upper bound of the 5% level of significance of the critical value bounds and at all level of significance. The results indicated no co integration, as it was inconclusive at the 5 per cent level,

with the calculated F-statistics falling between the lower and upper critical values. Therefore, we accept the null hypothesis and reject the alternative hypothesis that there is no co-integration among the variables which results to following the process of Error Correction Model (ECM) which will analyze the short run relationship.

v. Short Run and Long Run Model Estimation for Model A

Table 4.9: Short Run Auto Regressive Distributed Lag (ARDL) for Model A

Variables	Coefficient	t- Statistics	Prob.
INFR	-0.609630	-3.382502	0.0277
REER	-0.259311	-4.282523	0.0128
RIR	0.021872	0.283197	0.7911
C	51.27620	4.135758	0.0144
CointEq(-1)	-2.023150	-4.000816	0.0161

Source: Author's computation using E-views 9.0(2019)

The estimated short run model

$$GR = 51.27620 - 0.609630 \text{ INFR} - 0.259311 \text{ REER} + 0.021872 \text{ RIR}$$

Inflation rate has a negative coefficient of - 0.609630, Real effective exchange rate has a negative coefficient of - 0.259311 which was in conformity with Thayaparan (2014) and Ezeanyej and Ejefobihi (2015), Real interest rate has a positive coefficient of 0.021872 and the intercept has a positive coefficient of 51.27620 which is the value of annual growth rate when the independent variables are zero (0).

Inflation Rate is significant in the short run. Real Effective Exchange Rate is significant in the short run. Real Interest Rate is not significant in the short run which

was in conformity with Kasidi and Mwakanemela (2013) and Prasanna and Gopakumar (2010).

For Inflation Rate, a one percent increase in inflation rate will lead to about 0.609630% decrease in Annual growth rate, also, and this is currently evident in Sierra Leone presently. For Real Effective Exchange Rate, a one percent increase real effective exchange rate will lead to about - 0.259311% decrease in Annual growth rate. For Real Interest Rate, a one percent increase in real interest rate will lead to about 0.021872% increase in Annual growth rate.

Table 4.10: Long Run Auto Regressive Distributed Lag (ARDL) for Model A

Variable	Coefficient	t-Statistic	Prob.
LOGCPI	-0.009515	-0.113590	0.9150
REER	-0.182170	-6.255907	0.0033
RIR	0.025517	0.187193	0.8606
C	25.344742	8.712669	0.0010
R-squared		0.940225	
Adjusted R-squared		0.656292	
F-statistics		3.311432	
Prob.(F-statistic)		0.127010	
Durbin-Watson stat		2.565689	

Source: Author's computation using E-views 9.0 (2019)

The estimated long run model is:

$$GR = 25.344742 - 0.009515 \text{ INFR} - 0.182170 \text{ REER} + 0.025517 \text{ RIR}$$

Inflation rate has a negative coefficient of 0.009515, Real effective exchange rate has a negative coefficient of -0.182170 which was in conformity with Thayaparan (2014) and Ezeanyej and Ejefobihi (2015), Real interest rate has a positive coefficient of 0.025517 and the intercept has a positive coefficient of 25.344742 which is the value of annual growth rate when the independent variables are zero (0).

Inflation Rate is insignificant in the long run. Real Effective Exchange Rate is significant in the long run. Real Interest Rate is not significant in the long run which was in conformity with Kasidi, and Mwakanemela (2013), Prasanna and Gopakumar (2010) and Chude and Chude (2015)

For Inflation Rate, a one percent increase in inflation rate will lead to about 0.009515 % decrease in Annual growth rate, also, and this is currently evident in Sierra Leone presently. For Real Effective Exchange Rate, a one percent increase real effective exchange rate will lead to about 0.182170% decrease in Annual growth rate. For Real Interest Rate, a one percent increase in real interest rate will lead to about 0.025517% increase in Annual growth rate

Table 4.11: Result of the Parsimonious error correction model for model B

Variable	Coefficient	t-Statistic	Prob.
C	17.60462	2.576283	0.0172
REER	0.022539	0.399221	0.6936
RIR	-0.414942	-2.357183	0.0277
ECM(-1)	0.664623	2.201697	0.0389

Source: Researcher's computations using E-views 9.0 (2019)

The short run model can be estimated from the parsimonious error correction model and it is written as;
 $INFR = 17.60462 + 0.022539REER - 0.414942RIR$

The table above represents short run dynamics of the model.

From the result, real effective exchange rate has a positive insignificant relationship with annual growth rate in Sierra Leone while real interest rate has a negative significant relationship with annual growth rate in Sierra Leone. The result above shows that the coefficient of the error correction coefficient is positive and is also statistically significant at 5% level. Thus, the result shows that it will diverge towards equilibrium within the system, if there is any deviation from it in the short run. Its coefficient, which measures the speed of adjustment to equilibrium in the event of displacement from it, indicates that about 66% of the disequilibrium in the system is offset by the short run adjustment annually to enable it maintain long run equilibrium. The constant value remains positive. The rule of thumb is that the error correction term (ECM) must reflect a negative value and be statistically significant. The ECM value implies that 66% error in the model would be corrected if there is a deviation in the variables or in the long run.

vi. Error Correction Model for Model B

The Error Correction Model (ECM) is done to integrate the multivariate time series with details in the appendix. The error correction model is performed to determine the short run implications of the variables. The ECM involves using the lagged residual to correct for short run deviations from equilibrium. The lagged residual in the error correction model therefore plays the role of error correction in the model and for it to adequately play this role, its coefficient is meant to be negatively signed and statistically significant. The negative sign shows the convergence of the variables towards equilibrium while the positive sign shows the divergence of the variables from equilibrium. The absolute value of the co-efficient of the lagged residual represents the speed of adjustment and indicates how quickly equilibrium is restored in the system in the event of temporary deviations or displacements. With the ECM, the long run empirical relationship which was lost in the process of differencing to secure stationarity is gotten. However, note that the ECM is being used because model B did not pass the bounds test.

vii. Adjusted Coefficient of Determination

Model A

The R^2 is the square of the correlation coefficient. R^2 is for simple regression, while the Adjusted R^2 is for multiple regression. From the regression result, the Adjusted R^2 is 0.656292. It reveals that 65.6292% of the variation in the dependent variable, annual growth rate is explained by the independent variables (inflation rate, real exchange rate and real interest rate), while 34.3708% is not explained in the model.

Model B

The R^2 is the square of the correlation coefficient. R^2 is for simple regression, while the Adjusted R^2 is for multiple regression. From the regression result, the Adjusted R^2 is 0.335012. It reveals that 33.5012% of the variation in the dependent variable, inflation rate is explained by the independent variables (real exchange rate and real interest rate), while 66.4988% is not explained in the model.

viii. *t*-test or *t*-statistic

The *t*-test is used to check for the significance of each variable. The hypotheses are stated below:

H_0 : the variable is not significant

H_1 : the variable is significant.

The decision rule is that if the probability value of the *t*-statistic is lesser than 0.05 level of significance, reject the null hypothesis and accept the alternative hypothesis that explains significance of the variable.

Table 4.12: *t*-test for Model A

Variables	Short run t-Statistic	Short run Prob.(t-statistic)	Long run t-Statistic	Long run Prob.(t-statistic)
INFR	-3.382502	0.0277	-0.113590	0.9150
REER	-4.282523	0.0128	-6.255907	0.0033
RIR	0.283197	0.7911	0.187193	0.8606

Source: Author's computation using E-views 9.0 (2019)

From the result above, we can deduce the following:

Inflation Rate has a *t*-statistics of -3.382502 and the probability value is 0.0277 in the short run. This is significant because the probability value is lesser than 0.05 level of significance. In the long run, the variable is not significant because its probability value is greater than 0.05.

Real Exchange Rate has generated a *t*-statistic of -4.282523 and a probability value of 0.0128 in the short run showing that it is significant at 0.05 level of significance because the probability value is lesser than 0.05. Also, it is significant in the long run because Real

Effective Exchange Rate has a *t*-statistic of -6.255907 and a probability value of 0.0033 which is lesser than 0.05 level of significance.

Real interest rate has a *t*-statistic of 0.283197 and a probability value of 0.7911 in the short run. The value is not significant at 0.05 level of significance because its probability value is greater than 0.05. However, it is also not significant in the long run because the probability value is greater than 0.05 level of significance.

Table 4.13: *t*-test for Model B

Variables	Short run t-Statistic	Short run Prob.(t-statistic)
REER	0.399221	0.6936
RIR	-2.357183	0.0277

Source: Author's computation using E-views 9.0 (2019)

From the result above, we can deduce the following:

Real Exchange Rate has generated a *t*-statistic of 0.399221 and a probability value of 0.6936 in the short run showing that it is insignificant at 0.05 level of significance because the probability value is greater than 0.05.

Real interest rate has a *t*-statistic of -2.357183 and a probability value of 0.0277 in the short run. The value is significant at 0.05 level of significance because its probability value is lesser than 0.05.

The F-statistics measures the overall statistical significance of the variables. It is used to check for the joint significance of the model.

H_0 : There is no statistical significance

H_1 : There is statistical significance

The decision rule is that if the probability value of the F-statistics is lesser than 0.05 level of significance, reject the null hypothesis and accept the alternate hypothesis which states that there is statistical significance when testing the parameters in the model simultaneously.

xi. *F*-test or *F*-statistic

Table 4.14: *F*-test for Model A and B

Model	F-statistic	Prob. (F-stat)
1	3.311432	0.127010
2	5.198215	0.007251

Source: Author's computation using E-views 9.0 (2019)

The value of the F-statistic as shown in table below is 3.311432 with the probability of F-statistic as

0.127010, this indicates that the model is insignificant because it is greater than 5% level of significance.

Therefore, the independent variables do not jointly explain the changes in the annual growth rate.

The value of the F-statistic as shown in table below is 5.198215 with the probability of F-statistic as 0.007251, this indicates that the model is significant because it is lesser than 5% level of significance. Therefore, the independent variables jointly explain the changes in the annual growth rate.

c) Post-Estimation Tests

i. Breusch-Godfrey Serial Correlation LM Test

This test was aimed at ascertaining if the errors are correlated. In order to achieve this, the Breusch-

Godfrey Serial correlation LM test will be employed. The null hypothesis stated absence of serial correlation but the alternative hypothesis states the presence of serial correlation. The decision rule is that if the probability of the F-statistic is greater than 0.05 level of significance, do not reject the null hypothesis and accept the alternate hypothesis if the probability of the F-statistic is lesser than 0.05 level of significance.

Model A- [GR = INFR + REER + RIR]

Model B - {INFR = REER + RIR}

Table 4.15: Results of Breusch-Godfrey Serial Correlation LM Test Result for Model A

F-statistic	0.532298	Prob. F (2,2)	0.6526
Obs*R-squared	8.337254	Prob. Chi-Square (2)	0.0155

Source: Authors computation using E-views 9.0 (2019)

From the result above, the probability of the F-statistic is 0.6526 which is greater than 0.05 level of

significance. Therefore, we accept the null hypothesis that states that there is no serial correlation in the model.

Table 4.16: Results of Breusch-Godfrey Serial Correlation LM Test Result for Model B

F-statistic	1.883812	Prob. F(2,20)	0.1780
Obs*R-squared	4.121499	Prob. Chi-Square(2)	0.1274

Source: Authors computation using E-views 9.0 (2019)

From the result above, the probability of the F-statistic is 0.1780 which is greater than 0.05 level of significance. Therefore, we accept the null hypothesis that states that there is no serial correlation in the model.

ii. Durbin Watson Model

This test was performed to determine the level of auto-correlation.

Table 4.17: Results of the Durbin Watson Test Results for Model A

D*	D-UPPER	D-LOWER	DECISION
2.565689	1.747	1.104	Absence of autocorrelation

Source: Authors computation using E-views 9.0 (2019)

From the statistical tables, we obtained that $d_L = 1.104$, $d_U = 1.747$ and $d^* = 2.565689$ respectively. Therefore, $d_U < d^* < 4 - d_L$, that is, $1.747 < 2.565689 <$

2.896 we therefore accept the null hypothesis and conclude that there is no presence of autocorrelation in the model.

Table 4.18: Results of the Durbin Watson Test Results for Model B

D*	D-UPPER	D-LOWER	DECISION
1.405569	1.650	1.181	Absence of autocorrelation

Source: Authors computation using E-views 9.0 (2019)

From the statistical tables, we obtained that $d_L = 1.181$, $d_U = 1.650$ and $d^* = 1.405569$ respectively. Therefore, $0 < d^* < (4 - d_U)$, that is, $0 < 1.405569 < 2.350$, we therefore accept the null hypothesis and conclude that there is no presence of autocorrelation in the model.

iii. Heteroscedasticity Test

The Breusch-Pagan-Godfrey heteroscedasticity test is used to test for heteroscedasticity and it is centered on the variance of the error term. This test helps to ascertain whether the variance of the error term is constant.

The hypotheses are stated below:

H_0 : Homoscedasticity (there is constant variance in the error term)

H_1 : Heteroscedasticity (there is no constant variance in the error term)

The decision rule is that if the probability of the F-statistic is greater than 0.05 level of significance, do not reject the null hypothesis of homoscedasticity and accept the alternate hypothesis if the probability of the F-statistic is lesser than 0.05 level of significance.

Model A- [GR = INFR + REER + RIR]

Model B - {INFR = REER + RIR}

Table 4.19: Result of Heteroscedasticity Test for model A

F-statistic	2.568074	Prob. F(19,4)	0.1864
Obs*R-squared	22.18159	Prob. Chi-Square(19)	0.2753
Scaled explained SS	0.552429	Prob. Chi-Square(19)	1.0000

Source: Author's computation using E-views 9.0(2019)

The probability of the chi-square as shown in the table above is 0.2753. Therefore, given that the prob. chi-square is greater than 5% level of significance, there is no heteroscedasticity in the model.

Table 4.20: Result of Heteroscedasticity Test for model B

F-statistic	1.024053	Prob. F(3,22)	0.4011
Obs*R-squared	3.185850	Prob. Chi-Square(3)	0.3638
Scaled explained SS	2.981733	Prob. Chi-Square(3)	0.3945

Source: Author's computation using E-views 9.0(2019)

The probability of the chi-square as shown in the table above is 0.3638. Therefore, given that the prob. chi-square is greater than 5% level of significance, there is no heteroscedasticity in the model.

iv. Normality Test

The test for normality was carried out using the Jarque-Bera Normality Test.

Model A- [GR = INFR + REER + RIR]

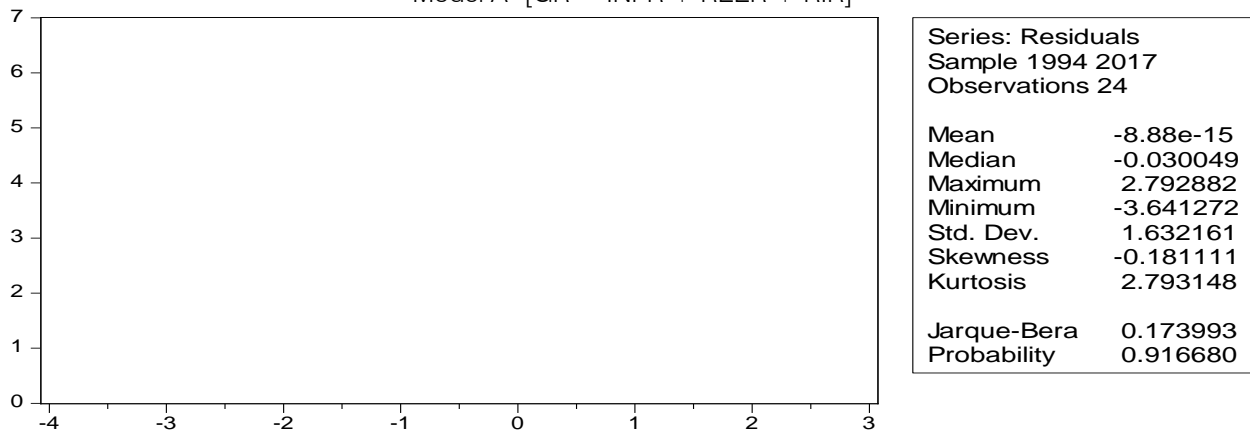


Figure 4.6: Normality Histogram for Model A

This test was carried out to check if there is a normal distribution among variables. The null hypothesis which says there is normality will be accepted because the probability value (0.916680) is higher than the critical value of 0.05. The test also confirmed that the variables are not statistically significant because the probability value is higher than the critical value. The variables are negatively skewed which means that the distribution has a long tail to the left.

Model B - {INFR = REER + RIR}

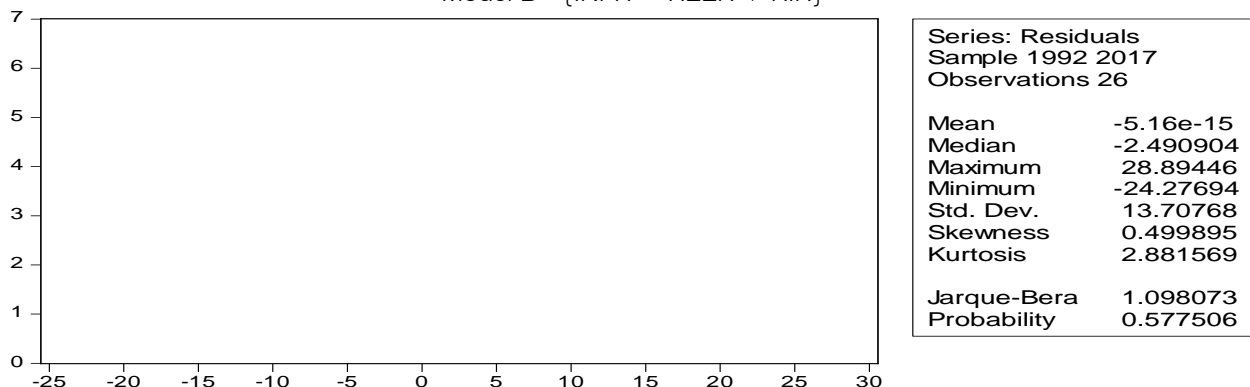


Figure 4.7: Normality Histogram for Model B

This test was carried out to check if there is a normal distribution among variables. The null hypothesis which says there is normality will be accepted because the probability value (0.577506) is higher than the critical value of 0.05. The test also confirmed that the variables are not statistically significant because the probability value is higher than the critical value. The variables are negatively skewed which means that the distribution has a long tail to the left.

v. Linearity Test

Table 4.21: Result of Ramsey RESET test for Model A

	Value	Df	Probability
t-statistic	3.130800	3	0.0520
F-statistic	9.801909	(1, 3)	0.0520

Source: Author's computation using E-views 9.0(2019)

Therefore, given that the probability of the F-statistics as shown in the table above is 0.0520, we do

The Ramsey reset test is used to test for linearity in a model. The Ramsey Reset test jointly explains whether the coefficient in the predicted squared or predicted cubed as the case may be equals to zero. The decision criteria for linearity is to accept the null hypothesis when the probability of the F-statistics is greater than 0.05 and accept alternative hypothesis when the probability is less than 0.05.

Model A- [GR = INFR + REER + RIR]

Model B - {INFR = REER + RIR}

not accept the alternative hypothesis, that is, there is linearity in the model.

Table 4.22: Result of Ramsey RESET test for Model B

	Value	Df	Probability
t-statistic	4.678710	21	0.0001
F-statistic	21.89033	(1, 21)	0.0001

Source: Author's computation using E-views 9.0(2019)

Therefore, given that the probability of the F-statistics as shown in the table above is 0.0001, we accept the alternative hypothesis, that is, there is no linearity in the model.

V. CONCLUSION

Inflation has been a constant problem to developing countries since time immemorial as its constant increase reduces the chances of proper allocation of resources, skilful exchange of knowledge, better health care services, better job opportunities, better standard of living, per capita income and technology among countries and boosting of the economy, therefore this research paper sought to examine the relationship between inflation and economic growth in Sierra Leone from the period 1981 to 2017. After proper research and analysis were done on this study, it brought to my knowledge the fact that inflation still has a significant effect on the economic growth of Sierra Leone. Also, the major determinants of inflation in Sierra Leone are interest rate and exchange rate.

Based on the empirical research analysis and evaluation carried out in the previous research, this study has proposed the following economic recommendations below to enhance the economic growth of Sierra Leone;

1. Government should make tight fiscal and monetary policies to reduce the inflation rate of the country and have the most advantageous interest rate, and so as to increase the gross domestic product of the

country and thereby attract more foreign investors to the country.

2. Government should increase the degree openness of the economy and this can be viable and thereby increase the percentage of foreign investors.
3. Government should provide infrastructural facilities to create an enabling environment to attract foreign investors.

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Impact of Government Revenue and Expenditure on Employment and Poverty Reduction in Plateau State

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Abstract- This study examined the impact of government revenue and expenditure on employment and poverty reduction in Plateau State for the period of 1999 – 2019. The main objective of this study is to analysis the impact of government revenue and expenditure on employment and poverty reduction in Plateau State. The major findings shows that government expenditure on education have a positive significant effect on employment and a unit increase will increase employment and reduced poverty level. While that of agriculture and health have positive relationship on employment and insignificant a unit increase will reduced employment and increase poverty level. The major recommendations are that government should channel its revenue and expenditure to productive projects in all sectors of the economy. Priority should be given to education, health care, tourism, agriculture and industry. These will provide employment and reduce poverty level in Plateau State

Keywords: *government revenue, government expenditure, poverty, employment, chain theory.*

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Impact of Government Revenue and Expenditure on Employment and Poverty Reduction in Plateau State

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Abstract- This study examined the impact of government revenue and expenditure on employment and poverty reduction in Plateau State for the period of 1999 – 2019. The main objective of this study is to analysis the impact of government revenue and expenditure on employment and poverty reduction in Plateau State. The major findings shows that government expenditure on education have a positive significant effect on employment and a unit increase will increase employment and reduced poverty level. While that of agriculture and health have positive relationship on employment and insignificant a unit increase will reduced employment and increase poverty level. The major recommendations are that government should channel its revenue and expenditure to productive projects in all sectors of the economy. Priority should be given to education, health care, tourism, agriculture and industry. These will provide employment and reduce poverty level in Plateau State.

Keywords: government revenue, government expenditure, poverty, employment, chain theory.

1. INTRODUCTION

The Nigerian economy over the years has witnessed several macroeconomic imbalances which had greatly affected the poverty level of its citizens. The economy depends heavily on crude oil exports, which contributes about 90% of government revenue, which is usually collected at the federal level and allocated to the 36 states based on Federal Character. With its large reserve of human and natural resources, Nigeria has the potential to build a prosperous economy, reduce poverty significantly, and provide the needed employment, healthcare, education and infrastructural services. Despite the country's relative oil wealth, poverty is a wide spread and majority of the population in Nigeria still live in abject poverty. (Oghojafor, Olayemi, Okonji and Olayiwola, 2011).

Plateau State is one of the 36 states in Nigeria. It has over 50 indigenous ethnic groups, approximately 16,000 square miles in area; plateau state was created in 1976, but its present boundaries revisited in 1996, with a population of 3,383,027 million makes up about

2.3% of Nigeria's 180 million people. Its estimated population for year 2015 was 4,131,870, based on an annual growth rate of 2.83%, (NPC, 2006). Its estimated annual primary school enrolment is 775,601. It has 17 Local Government Area councils and is located in the North Central Zone of Nigeria. Similar to the rest of the country, the predominant occupation of its population is agriculture, although a significant proportion of the population is involved in mining. Its internally generated revenue is low both at state and LGA levels, as most other states, while its revenue comes mainly from federal government allocation.

Abundant agricultural and mineral resources provide the state with solid base for industrialization creating opportunities in activities such as food processing, and production of beer and beverages and milk products. The Jos Plateau abounds in natural scenic vistas which present opportunities for tourism and recreation. Among the most famous tourist attraction points in the State are Wase Rock, Shere Hills, Kerang volcanic mountains, Ampang Crater Lake, Kura, Assop. Kahwang. Sha Burukut and Farin Ruwa Falls, Wase Grazing Reserve, Jos Museum and Zoological Garden. Plateau State has a number of sport stadia and golf courses in the metropolitan city of Jos, Mining in Nigeria started as far back as the eighteenth century. Over 500 occurrences and deposits of different minerals are known so far to exist within the country with the exploration of some of them being on a small scale (Adegbulugbe, 2017). One of the major cases of mineral exploration and exploitation that boomed within the nation has been that of tin in Jos.

A careful observation of the budgets of plateau state over the past three decades, from 1980 to 2019, shows that Plateau State Government has tilted its budgetary policies toward deficit budgeting, with the exception of two years, 1995 and 1996, when surplus budgets were prepared (Dang, Bako and Lalu, 2015). Deficit comes with the attendant consequence of deficit financing, which may come from local sources or foreign sources (Kosimbei, 2009).

Nigeria's budget has been in deficits over time, coupled with economic crisis which comes in a cycle. The Gross Domestic Product (GDP), investment and

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consumption spending, savings rate, imports and exports, capacity utilization, household income, trade, capital flows, business profits and inflation rates have been the multiple transmission mechanisms, while indebtedness, illiquidity, bankruptcies and the unemployment rate rise. Nigeria is faced with the twin problems of mono product volume of exports and volatile price of crude, resulting to reduced revenue. The implications are that the federal and state budgets cannot be funded adequately, resulting to external borrowing and debt financing. These have negative implications on foreign exchange and imports of raw materials, low absorptive capacity, job losses, increased tax evasion and avoidance, low purchasing power, low standard of living caused by economic recession (Eneji, et.al 2017).

Fayemi (1991), defines revenue as all tools of income to government such as taxes, rates, fees, fines, duties, penalties, rents, dues, proceeds and other receipt of government to which the legislature has the power of appropriation.

Government revenue and expenditure are considered as fiscal instruments which the government can apply to solve macroeconomic problems such as poverty, reduction in inequality, inflation, exchange rate fluctuation, unemployment, dwindling oil price and the desire to restore the economy on the part of full employment, price stability, balance of payment equilibrium and above all, achieve consistent economic growth. State governments as the second tier of government in Nigeria derive its revenue from various sources. However, it should be noted that sources of revenue are by no means uniform among the states. States derive their revenue depending on the resources available to them (Adam, 2006; Dang, 2013).

II. STATEMENT OF THE PROBLEM

Poverty and unemployment are major problems in developing countries, Nigeria inclusive. The level of poverty in Nigeria has been on the increase for the past three decades. Unemployment is surging, poverty is increasing, while confidence in governance is falling. This problem of high incidence of poverty at national level mirrors the situation at the states, local and community levels. Plateau state, though rich in natural and human resources, is also faced with poverty and under utilization of capacity, where the absolute poor can hardly meet their basic needs of subsistence. Thus, poverty is generating multiple problems such as high level of illiteracy, low life-expectancy, unemployment, high crime rate, insecurity, inadequate infrastructure, low GDP, and tragic waste of human resources. There is need to investigate whether government revenue and expenditure has had any significant relationship with unemployment and poverty over the years 1980-2019. Given the current realities and challenges, it is

incumbent on the government to use its fiscal instruments to turn around the economic fortunes of Plateau State for sustainable development. Besides, , there seems to be challenges of mismanagement of government revenue and misappropriation of public expenditure in the economy. This is manifested in inability to maximize the benefits associated with economic booms.

Thus, the quantity and quality of government expenditure has not translated to sustainable development or improvement in the welfare of the citizens. The standard of living of majority of plateau state is low; many wallow in abject poverty, while more than 50 percent live on less than US\$1 per day. Plateau state is among the poorest states in Nigeria, despite the natural endowments and the amount of public spending claimed to have been made by the government. This study focuses on public expenditure on healthcare, agriculture, education and infrastructures for the provision of employment which leads to economic growth and poverty reduction.

In line with the stated problems and scope, this study will attempt to answer the following questions:

- i. To what extent has government revenue and expenditure in plateau state significantly contributed to employment?
- ii. What is the significant relationship between government revenue and expenditure and poverty reduction in plateau state?
- iii. What are the factors significantly responsible for limited of government revenue and expenditure in plateau state?

III. OBJECTIVES OF THE STUDY

This study aims at examining the impact of government revenue and expenditure on employment and poverty reduction in plateau state. The major objectives of this study are:

- i. To examine the impact of government revenue and expenditure on employment and poverty reduction in plateau state.
- ii. To determine the direction of relationship between government revenue and expenditure on employment and poverty reduction in plateau state.
- iii. To Identify the factors responsible for the ineffectiveness of government revenue and expenditure in reducing poverty and provide employment in plateau state.

IV. SIGNIFICANCE OF THE STUDY

The significance of this research lies in the problem of study stated above and the need to provide solutions. Plateau state government has been embarking on revenue mobilization and expenditure; however, unemployment and poverty persist in plateau

state, government after government. Governments in successive years have talked about poverty reduction, outlining beautiful programs, spending billions of dollars in various relevant programs. Development partners including private bodies, NGOs, and donor countries are also incorporated to those pro-poor activities of the government. However, millions of people still live abject poverty. This indicates that government efforts and spending are not appropriate and/or inefficient in attaining the targeted goals. It is significantly important to look at trends, levels and composition of public expenditures, and to assess the causes of changes in the poverty and unemployment rates over time. This study therefore has significance in finding out the effectiveness of government intervention, the result of which will be useful to the government, policy makers, the poor, donor countries, NGOs, other researchers, students and the general public. Reliable information is crucial in designing effective policy for the field of public finance and State intervention.

V. LITERATURE REVIEW

Available statistics show that total government spending in Nigeria has continued to rise steadily all through the years observed. Following the work of Desmond et al (2012), government capital expenditure on economic services, social and community services, and transfers increased from N15.5 million, N41.4 million and N100.7 million, respectively, in 1970 to N809120.5 million, N120049.2 million and N211758.1 million, respectively, in 2009. Likewise the recurrent expenditure has witnessed the same upward trend from N25.95 million in 1970 to N622171.10 million in 2009. The total government recurrent expenditure has consistently been on the increase, with about 18 percent rise from 1985-1995, and about 10 percent increases from 1995-2010. In the same manner, the capital expenditure has maintained similar upward trend. Whether this continuous increase has provided employment, reduced poverty and has accentuated the level of growth of the Nigerian economy, has generated a lot of debate, which is of interest to more researchers. The size of government spending and its effect on poverty reduction, and vice versa, has been an issue of sustained interest for decades.

Scholars such as Abdullah, (2000), Ranjan, (2000), Al-Yousif, (2000), Abdullah, (2000) Sharma, (2008) and Cooray, (2009) all concluded that expansion of government expenditure induce economic growth positively. Their studies simply suggest that government expenditure on health and education raises the productivity of labour and increases the growth of national output. Similarly, expenditure on infrastructure such as roads, communications, power, etc, reduces production costs, increases private sector investment and profitability of firms, thus fostering economic growth.

Generally, the main government revenues in Nigeria are categorized into oil revenue, non-oil revenue and federal government independent revenue. These sources of revenue in Nigeria are:

Oil Revenue; Oil revenue is the most important source of revenue to the federation account. It is made up of Crude oil and Gas sale and Oil Taxes. This includes, Royalties, Petroleum profit taxes, Rent and others.

Non-Oil Revenue; this is the second category of revenue to the federation account.

This category refers to revenue that are not derived from or associated with oil. They include; companies' income tax (CIT), Custom and Excise Duties (CED), Valued Added tax (VAT), Levies and Others. The third source of revenue to federal government is the independent sources which accrue to federal government directly without passing through the federation account. The federal government also maintained an account called the VAT POOL outside the federation account. Government also sources for funds when expenditure outstrips its current revenue. This calls for another option of revenue using the instruments of monetary and fiscal policy. Such options include deficit financing which include money creation, domestic and external borrowing. These sources of revenue together with government domestic revenue are collectively called government revenue.

Black (2003) emphasized that it is spending by government at any level. "Government expenditure consists of spending on real goods and services purchased from outside suppliers; spending on employment in state services such as administration, defense and education; spending on transfer payments to pensioners, the unemployed and disabled; spending on subsidies and grants to industries; and payment of debt interest". In Nigeria, government expenditure is shared among the three tiers of government; the federal government deposits tax receipts and revenues from the sale of oil into the federation account which is then shared among Federal, State and Local Governments according to a sharing formula (World Bank, 2007; 2013).

Jhingan (2004), stated that public expenditure, by increasing social welfare, helps in reducing inequalities of income and wealth and as well can be used to create trade as well as to correct externalities and regional disparities if employed judiciously, thereby fastening economic growth.

Olaniyan and Bankole (2005) conducted a research on Human capital, Capabilities and poverty reduction in rural Nigeria. They found out that health and education have significant effect on poverty reduction in Nigeria. Their findings suggested a conscious effort at the policy level to reduce poverty by increasing public expenditure on health and education so as to improve the human capital of individuals and consequently

reduce poverty. Adegoke (2009) carried out an econometric study on the role of education in alleviating poverty in Nigeria. She found out that there was a bi-directional relationship between expenditure on education and poverty reduction in Nigeria. She concluded that expenditure on education which has gone very low in Nigeria contributed to worsening situation of poverty, whether measured in income term or non-income terms.

Ayeni (2005) carried out an empirical research on the impact of government expenditure on poverty reduction in Ekiti State, Nigeria using multiple regression analysis. He found out that education as an investment has positive relationship with job creation which consequently can help to reduce poverty.

Asghar, Hussain and Rehman (2012) studied the long run impact of government spending in various sectors on poverty reduction in Pakistan for the period of 1972-2008 applying co-integration and Error Correction Mechanism (ECM). Poverty as the dependent variable was measured using headcount index while the independent variables were: government spending on health government spending on education; government spending on law; order and government spending on economic and community service and budget deficit. The study found that the coefficient for government spending on health was insignificant.

Seetanah, Ramessur and Rojidi (2009) conducted a study to answer whether transport and communication infrastructure alleviated urban poverty in developing countries. The study covers twenty developing countries and uses panel data for years 1980-2005. From running a cross section regression, length of paved road was found to be statistically significant and negatively related to poverty head count ratio. Fixed telephone line per 1000 people is used as a measure of communication infrastructure and is found to negatively relate to poverty headcount ratio but not significantly. Thus, infrastructure is seen to increase participation by the poor in economic activities and increase access for the poor to more economic activities.

In the earlier study by Awe (2013), public spending on infrastructure had a wide scope to include road network, access to electricity and water and public utilities. The study found that public expenditure on infrastructure played a significant role in reducing poverty in Ekiti State. Khan (2005) finds a correlation between public expenditure, growth, and poverty in developing countries.

The oil industry, though a major contributor to foreign exchange earnings, employs less than one percent of the labour force in Nigeria, hence, the need to diversify the economy, (Sodipe and Ogunrinola, 2011; Obadan, 1996; World Bank, 1996). This present study focuses on the impact of government revenue and

expenditure on employment and poverty reduction in Plateau State.

A review of available literature has shown that there is no general consensus on the definition of poverty. Since poverty affects many aspects of human condition such as physical, moral and psychological, a concise and acceptable definition of poverty is elusive as it cannot be captured only by income and consumption based measures (Abimiku, 2006; Khan 2001; 2004). Despite these views, different experts have defined poverty based on their individual perspective.

Dike (1997) defines poverty as the inability of an individual or population to meet the basic need of food, education, housing, health and clothing. According to Okumandewa (1997), poverty is a multi-faced deprivation, characterized by lack of purchasing power, exposure to risk, insufficient access to social and economic services and limited access to opportunities for income generation. Poverty condition is dehumanizing since by its very nature, it deprives individuals' right to basic needs and to exploit their full potentials, hence, the need for poverty reduction, (UN, 2015). In ordinary usage, poverty is applied to three distinct conditions, economic inequality, economic dependence and economic insufficiency.

The World Bank (2011, 1999), defines poverty as "pronounced deprivation in well-being". Haighton, and Khandker (2009), maintain that poverty describes a state of 'lack of key capabilities which may be income or education, or poor health, or insecurity or low self-confidence or a sense of powerlessness, or the absence of rights such as freedom of speech'.

VI. THEORETICAL FRAMEWORK

Peacock and Wiseman Theory of Government Expenditure

Alan T. Peacock and Jack Wiseman's study is probably one of the best known analyses of the time pattern of public expenditures. They founded their analyses upon a political theory of public expenditure determination, namely, that governments like to spend more money and citizens do not like to pay taxes, and that government needed to pay some attention to the wishes of their citizens. Wiseman and Peacock in their study (1961), of public expenditure in the United Kingdom for the period 1890-1955, revealed that public expenditure does not increase in a smooth and continuous manner, but in jerks or step like fashion. In other words, government fiscal activities rise step by step to successive new plateau, sometimes, some social or other disturbance like war takes place creating a need for increased public expenditure which the existing public revenue cannot meet (Anyanwu, 1993; 1997). Peacock and Wiseman have considered the role of emergency such as war, in raising the level of public

expenditure. In normal times, size of public expenditure is limited broadly by the level of taxation which the general public is prepared to tolerate.

Theory of Social Exclusion and Social Capital

Social sciences have identified poverty to be exacerbated due to social exclusion and lack of social capital inherent in the structural characteristics of society. Social exclusion occurs when an individual or a community is wholly or partially excluded from full participation in the society in which they live. Morazes and Pintak (2007) note that regarding poverty, consensus on exclusion as non-participation in consumption, production and political engagement. Socially excluded individuals and communities fail to access opportunities and resources that are necessary to improve their economic welfare. One form of social exclusion may lead to another form of exclusion resulting to multiple permanent disadvantages (Sameti, Esfahani, and Haghighi, 2012; Kure 2002). Social exclusion is defined in terms of relative disadvantaged position to the rest of the society and generally applies to underdeveloped countries unlike in developed countries where most people are excluded in one dimension or another (Davis and Sanchez-Martinez, 2014). Social exclusion has been seen to be determined by social capital held whereby social capital relates to one's social position and connections. Sirovatka and Mares (2008) summarize various definition of social capital 'as a quality, as a social resource or a social glue that is the property of a group, a community or a society, and as such it is available to its members.' Low levels of social capital worsen the possibility that one can climb out of poverty and reinforces unemployment and economic distress among low income earners. Policy interventions based on theories of social exclusion and social capitals have been derailed due the difficulty in measuring the two aspects. However, studies that have been done on social exclusion have used a proxy of median income in which falling below a population income median; one is regarded as poor and excluded. Intervention through expansion of public expenditure and provision of public goods would be expected to provide a form of bridging to poor in the society particularly investment in social welfare.

Chain Theory of Macroeconomics

The Keynesian theory emphasizes the role of government in raising the level of aggregate demand, employment, interest rate and money supply. The chain theory of macroeconomics, (Eneji 2020) draws inspiration from both Keynesian and neoclassical postulations (historical materialism) to explain the behavior of modern economies. Certain factors (internal and external) could impact on the role of government in macroeconomic stabilization in a chain relationship or reaction. The theory tries to explain the cause and effect of economic decisions. The entire economy operates as a chain system and any disturbances or dislocation in the chain affects the whole system in the form of leakages or injections. This explains the principles that govern the macro economy. Everything is related to something, and something is related to everything. The actual level of output in the economy (products market) depends largely on the level of money supply in the economy (the money market), which in turn, determines the aggregate employment (the labor market). Equilibrium conditions in the three markets jointly determine the equilibrium levels of output, employment, the general price level and interest rates. What happens in one market affects all the markets in general equilibrium framework. Economic theory and policy are interrelated or interdependent. Thus, it is almost impossible to talk about economic theory without implying possibilities for economic policy, and the best way to approach policy is probably by studying macroeconomic theory and its empirical implications.

A good example is the corona virus that started in Wuhan, China in 2020. The pandemic has rapid chain reaction on domestic and international trade, the global stock markets, sports, travel ban, causing economic slowdown. It has consequences as trading slowed down at the NYSE and other major stock markets around the world. Corona virus has chain reaction on the financial market volatility. Economic recession and global financial crisis was caused by oil price volatility and variations in oil outputs. Equally, Boko Haram and ethnic conflicts are worst than corona virus in Africa, impacting on government revenue and expenditure, and its efforts to reduce poverty and unemployment.

Plateau State: Internally Generated Revenue, Federally Allocated Revenue, NBillion (1999-2016).

Year	Internally generated Revenue	Federally Allocated Revenue
1999	0.301,998,083	3,707,204,172
2000	0.597,494,089	6,736,749,965
2001	0.745,334,984	7,611,358,901
2002	0.832,238,138	9,332,379,644
2003	1,230,471,292	12,850,128,586

2004	1,397,475,419	17,075,295,606
2005	2,119,733,466	20,633,602,630
2006	2,375,336,328	26,306,412,156
2007	2,443,705,521	26,824,004,918
2008	4,185,159,880	27,852,739,987
2009	4,403,016,360	29,151,671,769
2010	4,426,556,564	38,864,027,201
2011	5,384,536,130	38,546,936,881
2012	7,129,219,596	38,105,373,494
2013	8,830,318,790	43,832,240,944
2014	7,661,510,382	45,440,656,580
2015	7,199,695,392	32,374,156,787
2016	9,191,372,277	23,969,193,488

Source: Plateau State Government Fiscal Year Approved Budget 1999-2016

As the price of crude oil in the global market moved from about \$115 per barrel in June 2014 to less than \$30 per barrel in February 2016, government across the three tiers are experiencing fiscal crunch. Revenue accruing to federal government and consequently amounts of grant to states has significantly reduced due to fall in oil prices as a result of the fact that Nigeria is a mono- economy. The situation is particularly acute in states where internally generated revenue is low. Stella (1993) opined that ineffective tax administration is a chronic problem in many developing countries.

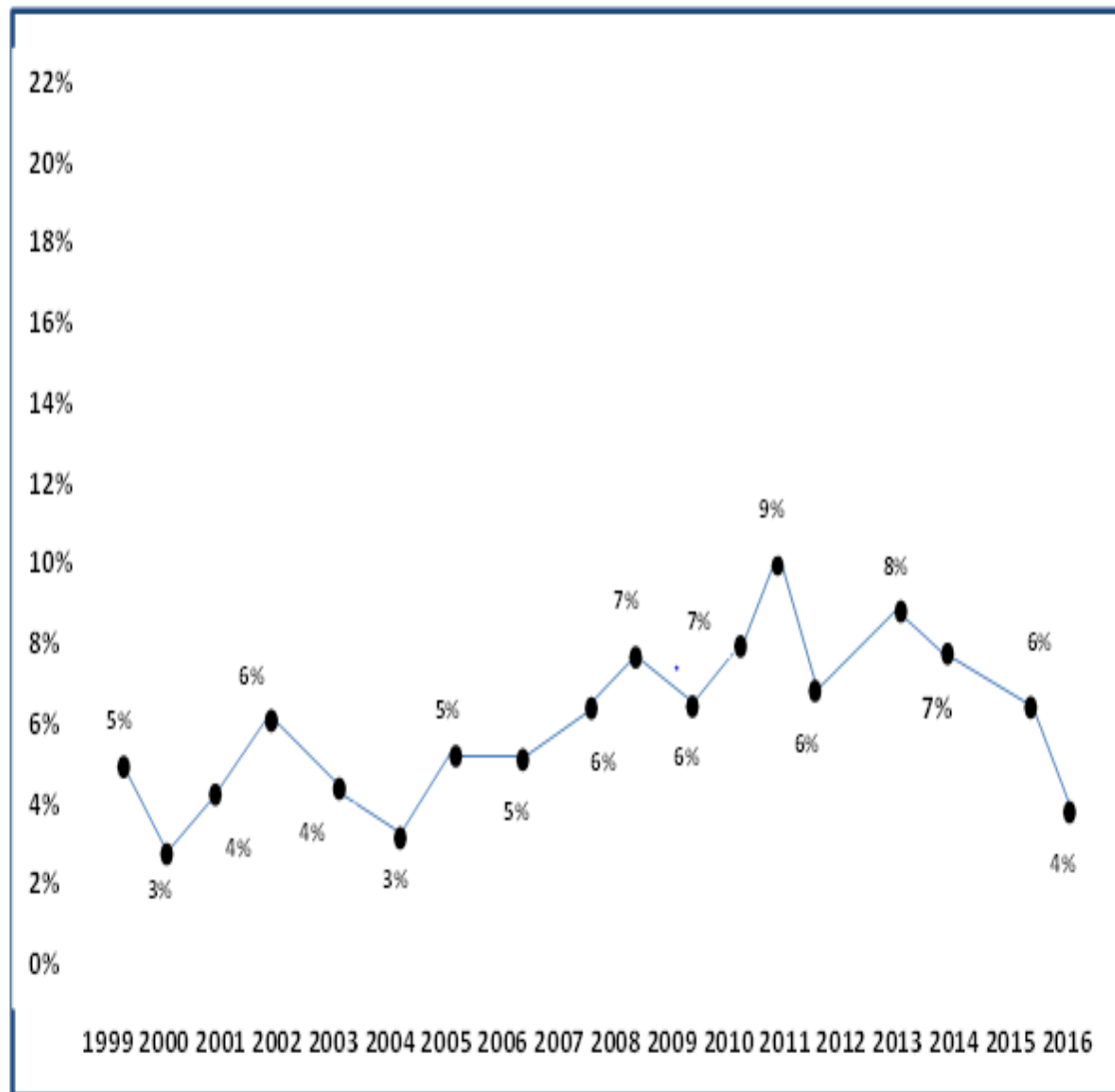
The past few years have witnessed greater emphasis than ever before on the need to improve or accelerate the internally generated revenue by the three tiers of government in Nigeria (Federal, State and local Governments). The poor revenue accruing to government has created serious financial stress for all tiers of governments. The inflationary effects on the general price index have further increased the cost of service and infrastructure provided by the state government against dwindling revenue. The aggregate effect of all this development have been the near bankruptcy of most state governments which leaves most of them living in abject poverty, every month after meeting salary payment marginally. The challenge of initiating any meaningful capital project or even keeping the existing infrastructure properly maintained has virtually become history. Some of the state and local governments hardly pay their staff salaries regularly or even resolve to pay half salary, (Abudullahi, et.al, 2017). The internally generated revenue declined from 13.38% in 2002 to 8.11% in 2006 (CBN, 2006).

The reality is that in recent times the revenue mobilized from the federation account is hardly enough

to meet the immediate needs of the states. It is the responsibility of the state governments to look inwards for ways to mobilize more IGR. When these revenues are mobilized, they are expected to be utilized to provide social services to the citizens. Plateau State is richly endowed in agriculture and tourism, hence it is expected that government expenditure on agriculture and infrastructure could boost employment and poverty reduction.

a) *Government Revenue and Expenditure in the Agriculture Sector*

The contribution of agricultural sector to the economy cannot be overemphasized when considering its building roles for sustainable development, in terms of employment potentials, export and financial impacts on the economy. Figure 1 below shows the percentages of revenue utilization in the agriculture sector for the period 1999 to 2016. . It shows that an average rate of 6 % as the PLSG revenue expenditure in the agriculture sector with the highest in 2011 at 9%. This shows a low investment of revenue by PLSG in providing public services in the agriculture sector of Plateau State.



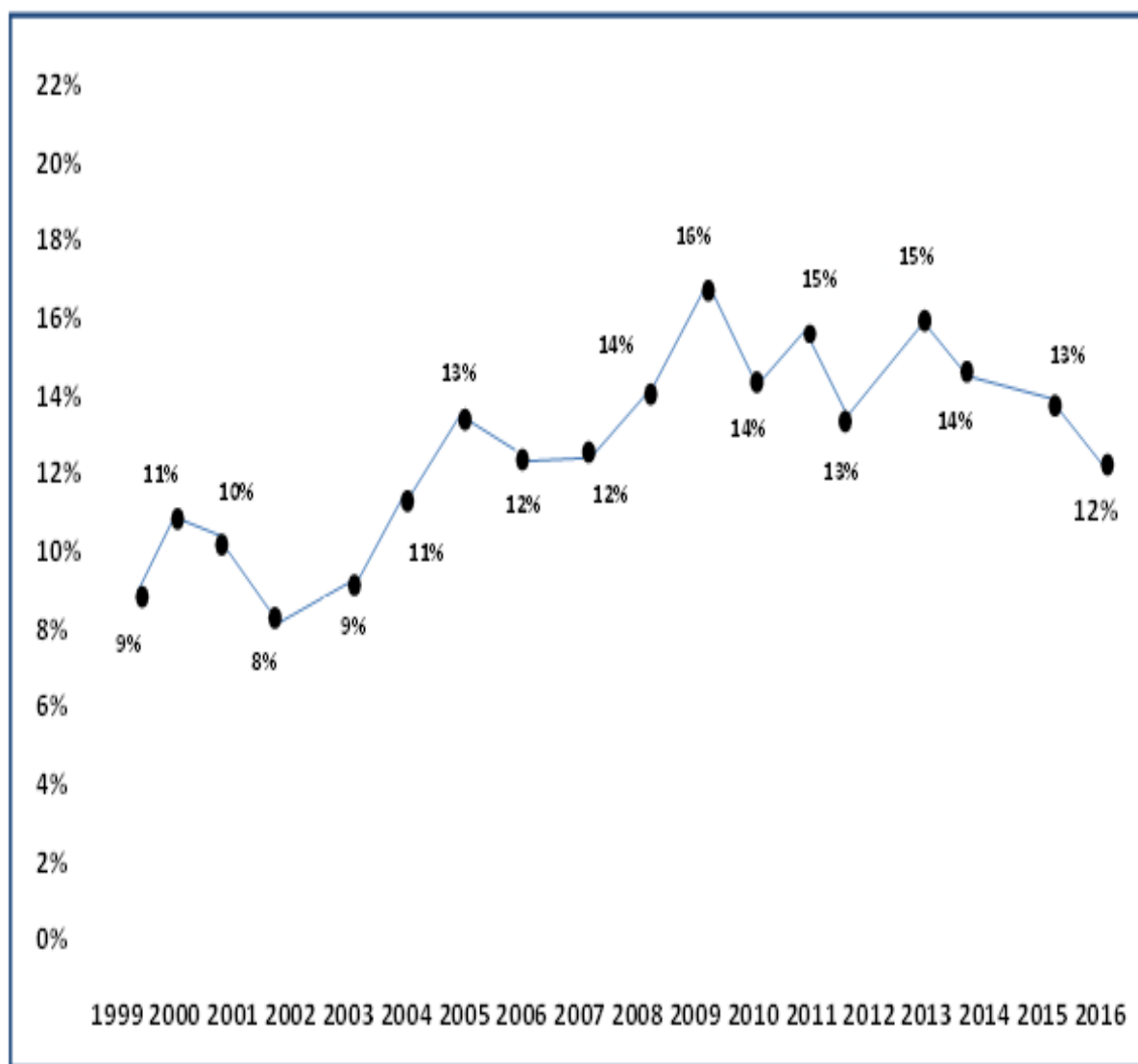
Source: plateau State Government Fiscal Year Approved Budget and Expenditure 1999-2016

Figure 1: Government Revenue and expenditure in the Agriculture sector 1999-2016.

b) Government Revenue and Expenditure in the Infrastructure Sector

Although, the general view is that public expenditure either recurrent or capital expenditure, notably on social and economic infrastructure can be growth-enhancing although the financing of such expenditure to provide essential infrastructural facilities-including transport, electricity, telecommunications, water and sanitation can be growth-retarding (for example, the negative effect associated with taxation and excessive debt). The size and structure of government revenue and expenditure will determine the pattern and form of growth in output of the economy. Figure 2 below shows the percentages of revenue utilization in the infrastructure sector for the period 1999

to 2016. . It shows that an average rate of 12 % as the PLSG revenue expenditure in the infrastructure sector with the highest in 2009 at 16%. Perhaps, this shows a low investment of revenue by PLSG in providing public services in the infrastructure sector of Plateau State.



Source: Plateau State Government Fiscal Year Approved Budget and Expenditure 1999-2016

Figure 2: Government Revenue and Expenditure in the Infrastructure Sector 1999-2016

VII. METHODOLOGY

The type of data for this study is time series data on Plateau State government finances. These data are secondary data obtained from secondary sources, which are documents published internally and externally on the Plateau State government finances covering the period 1999-2016. The internally published documents are published Plateau State Government Approved Budgets and Plateau State Internal Revenue Service

(PSIRS) Revenue Reports. The external published documents are basically the publications of National Bureau of Statistics (NBS) and CBN Statistical Bulletins. The econometrics technique of multiple regression analysis is adopted, combined with descriptive statistics. The multiple regression model is specified thus:

EMPR = f(GEXA, GEXEDU, GEXH)	-	-	-	-	-	-	-	-	(1)
POVR = f(AGEX)	-	-	-	-	-	-	-	-	(2)
AGEX = f(AGREV)	-	-	-	-	-	-	-	-	(3)

The econometrics form of the structural equation in (1) above is given as:

$$EMPR_t = \alpha_0 + \alpha_1 GEXA_t + \alpha_2 GEXEDU_t + \alpha_3 GEXH_t + \mu_t \quad (4)$$

The parsimonious error correction model derived from equation (4) above is expressed below as:

$$\Delta EMPR = \alpha_0 + \alpha_1 \Delta GEXA + \alpha_2 \Delta GEXEDU + \alpha_3 \Delta GEXH + \mu_t \quad (5)$$

Where: Δ denotes the first difference,

$EMPR_t$ = employment rate in period t

$GEXA_t$ = government expenditure on agriculture at time t

$GEXEDU_t$ = government expenditure on education at time t

$GEXH_t$ = government expenditure on health at time t

$AGREV_t$ = Aggregate Government Revenue at time t

$AGEX_t$ = Aggregate Government Expenditure at time t

α_0 is the intercept in the error correction model and α_1, α_2 and α_3 are coefficient of the explanatory variables.

μ_t = error term at time t in the error correction model

Summaries of Augmented Dickey-Fuller Unit Root Tests

At Levels			At Differences		
Variable	ADF Statistic	Remarks	Variable (Δ = 1 st and 2 nd difference)	ADF Statistic	Remarks
EMPR	-1.8952	Non-stationary	$\Delta EMPR$	-5.0758	Stationary
GEXA	-2.1274	Non-stationary	$\Delta GEXA$	-5.3527	Stationary
GEXH	-2.7819	Non-stationary	$\Delta \Delta GEXH$	-8.157016	Stationary
GEXEDU	-2.5712	Non-stationary	$\Delta GEXEDU$	-5.0308	Stationary

Notes: The test was conducted at 0.05 level of significance with a critical value of -3.09. "Δ" depicts differencing of the variables.

Source: Author's computation using E-views 9

Unrestricted Co-integration Rank Test (Trace) for EMPR

Hypothesized No. of CE(s)	Eigen value	Trace Statistic	0.05 Critical Value	Probability**
None*	0.896587	62.99911	47.85613	0.0010
At most 1	0.697138	26.69467	29.79707	0.1093
At most 2	0.274508	7.583036	15.49471	0.5110
At most 3	0.141900	2.448548	3.841466	0.1176

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

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

Unrestricted Co-integration Rank Test (Maximum Eigenvalue) for POVR

Hypothesized No. of CE(s)	Eigen value	Max-Eigen Statistic	0.05 Critical Value	Probability**
None	0.468720	10.11947	14.26460	0.2042
At most 1	0.160146	2.792442	3.841466	0.0947

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: Author's computation using E-views 9

Error Correction Model (ECM) for (EMPR)

Dependent Variable	Variable	Coefficient	Standard Error	t-Statistic	Prob.
D(EMPR)	D(GEXA)	0.303977	0.381358	0.797091	0.4409
	D(GEXEDU)	0.501495	0.152259	3.293688	0.0064
	D(GEXH)	0.727524	0.402458	1.807701	0.0958

	ECM(-1)	-0.540720	0.208160	-2.597619	0.0233
	C	0.313535	0.597917	0.524378	0.6096

$R\text{-squared} = 0.599615$, $Adjusted R^2 = 0.466153$ $F\text{-Statistic} = 4.492788$,

$Prob. (F\text{-Statistic}) = 0.018941$, $Durbin\text{-Watson Stat} = 1.367224$

*means significant at 0.05 level.

Included observations: 17 after adjustments

Source: Author's computation using E-views 9

Ordinary Least Square (OLS) Estimated Result for (model 6)
Dependent Variable: LOG(POVR)

Method Least Squares

Sample: 1999 2016

Included observations: 18

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.244986	0.429757	5.223852	0.0001
LOG(AGEX)	0.075561	0.017975	4.203640	0.0007
R-squared	0.524808	Mean dependent var		4.049994
Adjusted R-squared	0.495108	S.D. dependent var		0.105734
S.E. of regression	0.075130	Akaike info criterion		-2.234761
Sum squared resid	0.090312	Schwarz criterion		-2.135831
Log likelihood	22.11285	Hannan-Quinn criter.		-2.221120
F-statistic	17.67059	Durbin-Watson stat		1.188526
	Prob(F-statistic)	0.000673		
0.05 level significance				
Source: Author's computation using E-views 9				

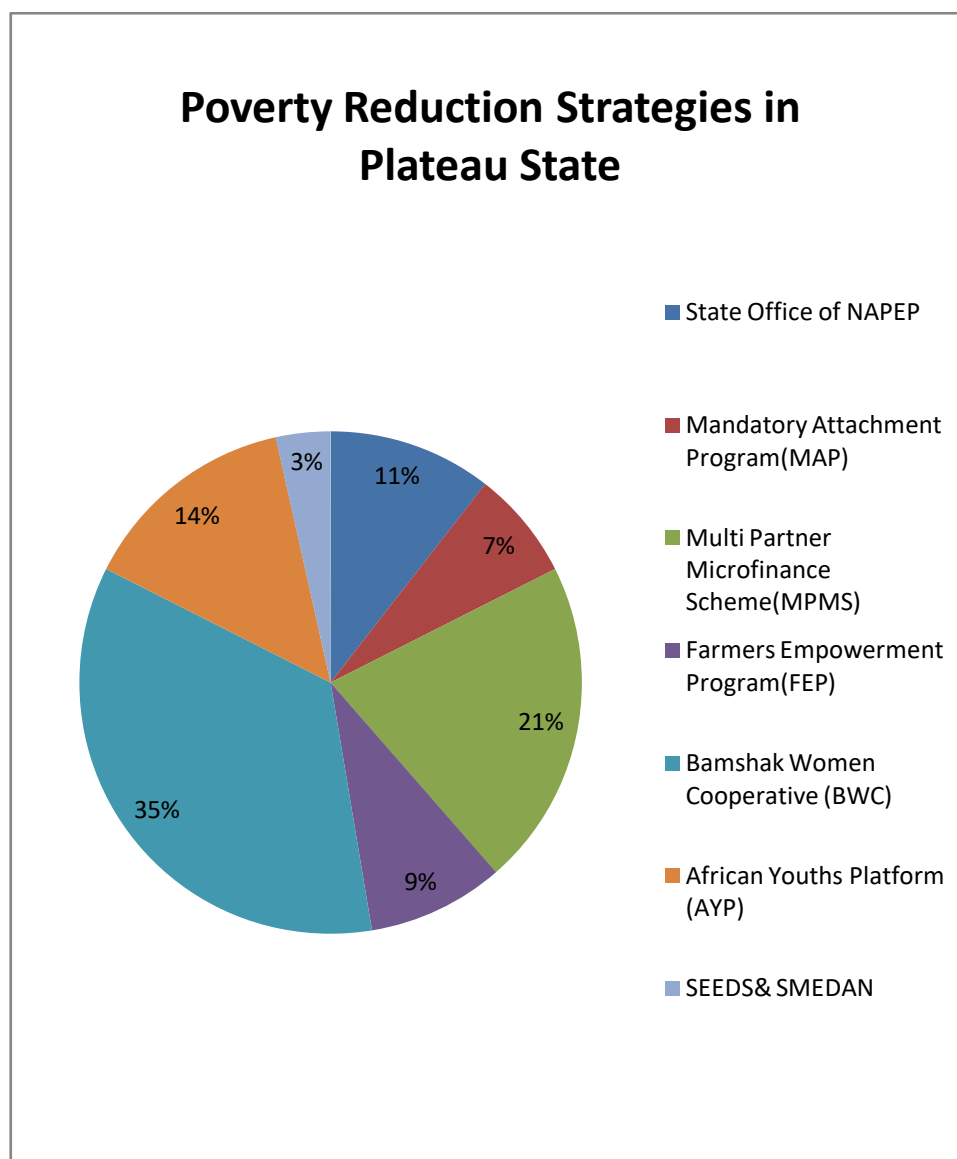
The result of the regression of aggregate government expenditure on poverty reduction has been summarized in Table 5.6 above. The result reveal that the intercept is positive (2.244986) and significant. This is because its probability value of 0.0001 is less than 0.05. This means that factors other than aggregate government expenditure (such as ethnic and religious crises, bombings and killings, official corruption and impunity) tend to have a positive relationship with poverty rate in Plateau State, (about 240.49 percent). Aggregate government expenditure also positively impacted on poverty and unemployment within the study period. The positive sign is a negation of a priori expectations of this study. In line with Keynesian theory,

government expenditure should bring about macroeconomic stability, create employment and reduce poverty. Where a unit increase in aggregate government expenditure would translate into a significant increases in unemployment and poverty rates by 0.075561 units, it shows that something is structurally and fundamentally wrong. As government increases its expenditure, the unemployment and poverty rates in Plateau State have been increasing. The result, tested by p-values (0.0007), shows that aggregate government expenditure was statistically significant on poverty rate (though in a negative direction) at 5 percent level of significance since the p-value was less than 0.05.

Descriptive Statistics

Government Revenue and Expenditure, Poverty Reduction in Plateau State

item	SA	%	A	%	DA	%	SD	%
Households lacking access to opportunities and basic needs.	137	35.9	225	58.0	15	3.9	5	1.3
There are isolated Rural areas without basic infrastructures.	153	40.1	199	52.1	10	2.6	20	5.2
The number of state-wide unemployed graduates is increasing..	139	36.3	218	57.7	10	2.6	15	3.9
There are marginalized ethnic and religious minorities.	180	47.1	178	46.3	11	2.8	13	3.4
Out of school children is increasing poverty for generations.	117	30.6	230	60.2	15	3.9	20	5.2
Increased poverty rate due to internally displaced persons	130	34.0	230	60.2	7	1.8	15	3.9
People traumatized and impoverished by crises/conflicts in Plateau State.	199	52.1	180	47.1	3	0.7	0	0.0
Households with zero paid jobs or earned income.	163	42.6	199	52.1	10	2.6	10	2.6



VIII. DISCUSSION OF FINDINGS

The mandatory attachment program (MAP) was targeted at the unemployed graduates where 3 percent of them were picked and engaged in skills acquisition for a period of 6 months with monthly stipend of N10000 (\$28.6). The skills acquisition program extended coverage to non-graduates. Beneficiaries were trained in various skills such as tailoring, computer services, hair dressing, carpentry, electronics repairs, and auto-mechanics. By 2004, the Promise-Keepers Program (PKP) was executed. The promise-keepers program (PKP) is a credit facility meant for religious organization such as churches and mosques, in which the leaders (Imams and Pastors) served as guarantors for their followers. A total of ten churches and two mosques benefited from the program. The pilot loan scheme of the farmers empowerment program (FEP) in 2005 was executed during which the sum of N20, 000.000.00 was

disbursed to women group and farmers. In 2006, another credit facility scheme called Multi-Partner Microfinance Scheme (MP-MFS) was introduced. The money was given to some institutions like ECWA Empowerment Program, Bamshak Women Cooperative Association, and African Youth Platform for Development, by the state government for disbursement. The national poverty eradication program (NAPEP) and the office of the secretary to the state government participated in the selection of the micro finance institutions, (NAPEP Impact/output Assessment Report, 2010). NAPEP also extended coverage to the purchase and distribution of tricycle (popularly known as Keke-NAPEP) to facilitate commercial transportation.

Revenue generation is the nucleus and the path to modern development. In raising revenues, Plateau State is faced with some challenges namely; multiple taxation, pervasive illegal fees, arbitrariness of revenue collectors, lack of a central tax complaint and resolution

center, low level of compliance, lack of concise and up-to-date tax payer database, massive tax revenue leakages and losses, poor information system about tax obligations, and obsolete tax laws. There were also constraints to the tax administration system, including lack of required facilities for tax administrators, low remuneration and morale, lack of skills, under assessments, arbitrary assessments and non-assessments, diversion and non-remittance of revenues, and inconsistencies in the application of enforcement standards.

There is both rural and urban poverty in Plateau State. It is a common sight to see a whole family squatting and squeezing in a room for accommodation amidst the dangers it poses to health, epidemics and diseases. There are also households where no member of the family is working for any paid job or earned income, households that have not accessed any hospital for orthodox medication, households that have not eaten any cooked food for the past 24 hours, have not seen or used electricity for the past two months, and households where no member has attained education beyond secondary school, yet they have more than eight children.

Other key findings are itemized thus:

1. Government recurrent expenditure has been given priority at the expense of capital expenditure in the face of fiscal deficits and borrowing, as well as wrong targeting of the poor. These have led to environmental degradation, neglect and decay of infrastructure, increased poverty and unemployment, corrupt practices, and huge expenditure on maintenance of government.
2. Government revenue has been increasing at a decreasing rate due to underutilization of capacities. Strategies for internal revenue mobilization should be put in place. The strength of the states lie in internally generated revenue and not allocation from the Federation account. The informal economy contributes about 80% of employment, 75% of Gross Domestic Product, yet this vital sector is not properly captured in the tax net. There should be workshops and training for tax administrators and the public on identification and mobilization of tax revenue from the informal sector in a digital economy.
3. Budget implementation has been a major challenge. In most of the years under review, less than 60% of government budget was actually implemented.
4. There have been the challenges of mismanagement of government revenue and misappropriation of public expenditure in the Plateau State economy.

IX. CONCLUSION

This study focused on analysis the impacts of government revenue and expenditure on employment

and poverty reduction in Plateau State from 1999 to 2016, using the Error Correction Model and Ordinary Least Square regression analysis. Results from the empirical analysis of this study provide strong evidence indicating that government revenue and expenditure on economic sectors (agriculture, infrastructure, education and health) has not yielded the expected impact on the employment rates and poverty reduction in Plateau State. Instead, as government revenue and expenditure increased over the study period, unemployment and poverty rates also are increasing in the state. This calls for employment and poverty policies reforms in order to target the absolute poor. The findings of this study suggest that the problem of misallocation and mismanagement of government revenue and expenditure calls for a holistic approach to the allocation and management of public expenditure as it triggers different unfavorable effects on the selected macroeconomic variables in Plateau State. Greater emphasis should be placed on increasing budgetary allocation and prudent management of resources, improvement of quality education, health and agriculture, if the government revenue and expenditure on these sectors is to contribute significantly to employment and poverty reduction.

X. RECOMMENDATIONS

- i. Government on priority basis has to review its policy of cost sharing and increase its investment and spending on health services. Health sector expenditures must be allocated in a way that increases the provision of necessary infrastructure, services and easy access to health care services. And in order to attain the goals and objectives of the world health organization (WHO) and also to reduce high infant and maternal mortality rate, HIV/AIDS and other killers diseases.
- ii. Government should consider investment in education sector as a priority and persistent effort to reduce poverty. Budgetary allocation to education should be increased for the purpose of procuring educational materials, equipments, conducive environment for both staff and students and enhance technical skills acquisition in all schools to enhance human capital development which will also lead to self-employment. Students at primary, secondary and tertiary levels should be taught to acquire skills and look beyond their paper qualifications for employment and sustainable livelihoods.
- iii. The various poverty alleviation programs in Plateau State should be consistent, co-ordinated and consolidated with the development of a comprehensive framework geared towards human capital development, entrepreneurship and poverty reduction.

- iv. The Plateau State government should implement tax reforms to increase internally-generated revenue. There should be improved tax planning, professionalism, and staff morale which will rapidly improve tax collection and tax compliance among large number of enterprises. Expand outreach and monitoring capacities of revenue staff who regularly visit formal businesses and informal sector organizations to identify potential taxpayers, explain the tax payment process, and check for payment certificates.

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APPENDIX

Table A: Plateau State Fiscal Data on Employment Rate, Poverty Rate, Government Expenditure on(Health, Education and Agriculture), Aggregate Government Expenditure and Aggregate Government Revenue (1999-2016)

Years	Employment Rate (Empr) (%)	Government Expenditure On Agriculture (Gexa) (%)	Government Expenditure On Health (Gexh) (%)	Government Expenditure On Education (Gexedu) (%)	Poverty Rate (Povr) (%)	Aggregate Government Revenue (Agrev) ₦' Billion	Aggregate Government Expenditure (Agex) ₦' Billion
1999	28.00	5.0	4.0	9.0	47.00	2,823,436,132	4,134,795,427
2000	26.00	3.0	5.0	8.0	49.54	9,853,956,316	10,115,706,200
2001	27.00	4.0	3.0	10.0	48.76	10,078,130,529	9,334,348,964
2002	31.20	6.0	4.0	11.0	54.09	9,527,767,717	12,174,833,375
2003	37.90	4.0	5.0	9.0	55.26	9,101,811,385	13,847,462,745
2004	35.10	3.0	4.0	10.0	49.40	8,763,687,133	19,549,079,527
2005	32.92	5.0	4.0	12.0	58.12	17,336,228,841	22,753,336,096
2006	31.34	5.0	5.0	11.0	61.24	16,054,865,702	28,681,748,484
2007	34.70	6.0	4.0	12.0	61.49	15,994,888,306	30,483,461,892
2008	39.30	7.0	6.0	14.0	60.87	29,989,342,751	33,483,969,293
2009	43.20	6.0	5.0	22.0	62.30	36,687,884,454	42,093,825,949
2010	41.00	7.0	6.0	13.0	62.00	41,430,906,615	50,781,481,397
2011	38.42	9.0	6.0	9.0	63.00	48,829,992,800	71,424,751,695
2012	36.71	6.0	3.0	10.0	69.10	57,037,703,434	69,830,087,957
2013	40.15	8.0	6.0	14.0	58.25	102,530,485,086	96,915,907,926
2014	37.30	7.0	5.0	11.0	57.10	108,569,104,826	102,967,348,741
2015	41.00	6.0	6.0	18.0	59.80	60,458,575,176	58,993,202,844
2016	39.17	4.00	8.0	16.0	61.20	68,005,668,705	72,310,204,073

Source: Author's Computation Based on Underlying Data from Plateau State Government Approved Budget Fiscal Year, Plateau State Ministry of Finance and Economic Planning, Plateau State Internal Revenue services (PSIRS), National Bureau of Statistics (NBS) and CBN Statistical Bulletins(1999-2016).



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Effect of Public Debt on Economic Growth in Sierra Leone

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Introduction- The government of Sierra Leone in 2017 indicated that increasing borrowings along with tax measures are the only options available to drive the economy out of recession and sustain growth for now Smith (2017). Debt can be defined as any money owed by an individual, firm or government to a lender. Luke (2017) defined debt as a contractual obligation of owing or accumulated borrowing with a promise to payback at a future date. A developing country like Sierra Leone, wanting to mobilize capital resources to foster economic growth may at one-point resort to borrowing. But why do countries borrow? Countries borrow because of their inability to generate enough savings which could be used for investment. According to Johnson (2018) the amount of capital available in most developing countries treasury is grossly inadequate to meet their economic growth needs due to low productivity, low savings and high consumption pattern.

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Effect of Public Debt on Economic Growth in Sierra Leone

Alpha Bernard Bangura

I. INTRODUCTION

The government of Sierra Leone in 2017 indicated that increasing borrowings along with tax measures are the only options available to drive the economy out of recession and sustain growth for now Smith (2017). Debt can be defined as any money owed by an individual, firm or government to a lender. Luke (2017) defined debt as a contractual obligation of owing or accumulated borrowing with a promise to payback at a future date. A developing country like Sierra Leone, wanting to mobilize capital resources to foster economic growth may at one-point resort to borrowing. But why do countries borrow? Countries borrow because of their inability to generate enough savings which could be used for investment. According to Johnson (2018) the amount of capital available in most developing countries treasury is grossly inadequate to meet their economic growth needs due to low productivity, low savings and high consumption pattern. Borrowing is also required if the public sectors do not have enough revenue to provide certain facilities to the public. Public Sectors consists of all government-controlled enterprises including the national and local government which provides basic needs to the society, they do not generate profit. Public debt therefore is a situation whereby a country is experiencing budget deficit which is also referred to as the amount by which spending exceeds revenue or income generated, it occurs when the government borrows to offset her deficit for the development of the economy.

Public debt is grouped into: external or foreign debt and domestic or internal debt. External or foreign debt is the portion of a country's debt owed to foreign creditors. In other words, it is the total debt borrowed from non-residents of a country and does not involve the same currency. It requires the debtor to pay with interest and is not a good way of acquiring revenue because it involves currency risk except it is engaged in productive activities. Domestic or internal debt is the total debt owed to lenders within the economy. It involves the same currency because it is within a country. For external debt or domestic debt to lead to economic growth, a high sense of responsibility must be applied in handling public funds.

Economic growth indicates that a country or economy is making progress following increased labour productivity, improved standard of living and GDP (This is defined as the total value of goods produced in a country by all residents of that country including foreigners) growth. When a nation experiences increase in productive capacity compared to previous years, such a nation is said to be growing. According to Simon (2015), he said that "the capacity to sustain rapidly increasing numbers or slightly lower levels of living can be seen as economic growth. Economist's measure economic growth using different methods including GDP (gross domestic product) and GNP (gross national product). Appropriate use of both domestic and external debt would lead to economic growth.

Sierra Leone like most highly indebted countries has low economic growth and low per capita income with domestic savings insufficient to meet developmental and other national goals. Sierra Leone obtained the first foreign loan of \$1billion in 1978 from the international capital market which did not impact the economy positively in any way. Sierra Leone's external borrowing in the 1980s, was not linked to any growth Osman (2017). As at 2015, Sierra Leone owed the Paris Club of Creditors a sum of \$30billion. Sierra Leone's foreign reserves as at December 31, 2015 was \$29.1billion, according to the data provided by the Sierra Leone apex Bank, the debt management office reported that Sierra Leone's foreign borrowing was Le\$2.11trillion (\$10.7billion), while domestic debt was Le\$10.6trillion (\$54.7billion). Data from the Debt management office showed that Sierra Leone's total public debt as at June, 30 2017 was Le\$ 19.64 trillion (\$64billion) comprising of Le\$15trillion (\$49.2billion) for domestic debt and Le\$4.6trillion (\$15billion) for external debt. Economic growth in Sierra Leone is still very slow because foreign loans carry a lot of exchange rate risks (that is it does not involve the same currency) which makes the economy vulnerable to external shocks Sanusi (2011).

Foreign debt is also linked to different uncertainties as an increase in the value of the United States dollar or increase in the interest rate will increase the debt burden in Sierra Leone. Hence, public debt must be efficiently utilized in order to reach the peak of growth and development in Sierra Leone. It is important to note that the main aim of every economy is to experience growth and improve the standard of living of

the people in it. Any slight mismanagement of funds will lead to a long –term disaster which Sierra Leone is currently facing as excessive public debt in the past has created burden for our future leaders. This study seeks to check whether public debt has an effect on economic growth in Sierra Leone.

a) *Conceptual Review*

According to James (2017), public debt arises as a result of the gap between domestic savings and investment. As the gap expands, debt accumulates and this makes the country to continually borrow. Debt crisis occurs when a country has accumulated a huge amount of debt such that it can no longer effectively manage the debt which leads to several casualty in the domestic political economy. Alfred, James and Thomas, (2010). Mimiko (2017) defined debt crisis as a situation whereby a nation is severely indebted to public sources and is unable to repay the principal of the debt.

The effect of public debt on an economy has been a subject for discussion among academics. Some are of the view that public debt accelerates economic growth Hameed, Ashraf and Chaudhary (2018). This view is in line with Neoclassical model of economic growth in which capital accumulation is viewed as a catalyst to economic growth. This was confirmed by the significant growth by the Asian Tigers (Malaysia, Singapore, Indonesia and Taiwan) and Brazil. These nations were able to transform their economies using public debt Momodu (2012).

The proponents that public debt has negative impact on the economy comes from the fact that at a certain level, debt accumulation becomes a burden and will no longer stimulate economic growth Fullah, James and Thomas (2016). Moreover, the liquidity constraint referred to as 'crowding out' effect of debt, (that is the need to service debt) reduces funds available for investment and growth.

The guiding rules for debt management are: debt to GDP ratio, which global maximum ratio is 40%; total debt to total revenue ratio and debt to debt service ratio. Efficient debt management strategy should result in debt service ratio between 20-25% of GDP Omoruyi, (2016).

i. *Why countries borrow*

Generally, the need for public borrowing arises from the recognized role of capital in the developmental process of any nation as capital accumulation improves productivity which in turn enhances economic growth. There is abundant proof in the existing body of literature to indicate that foreign borrowing aids the growth and development of a nation. Soludo (2015) is of the opinion that countries borrow for major reasons. The first is: macroeconomic intent that is to bring about increased investment and human capital development while the other is to reduce budget constraint by financing fiscal and balance of payment deficits. Furthermore, Sankoh

and Umaru (2017) stressed the fact that countries especially the less developed countries borrow to raise capital formation and investment which has been previously hampered by low level of domestic savings.

Ultimately the reasons why countries borrow balls down to two major reasons which are to bridge the "savings-investment" gap and the "foreign exchange gap". Cherinor (2016) pointed out that the main reason why countries borrow is to supplement the lack of savings and investment in that country. The dual-gap analysis justifies the need for public borrowing as an attempt in trying to bridge the savings-investment gap in a nation. For development to take place it requires a level of investment which is a function of domestic savings and the level of domestic savings is not sufficient enough to ensure that development take place (Sankoh, 2014). The second reason for borrowing from foreign countries is also to fill the foreign exchange (imports-exports) gap. For many developing countries like Sierra Leone the constant balance of payment deficit have not allowed for capital inflow which will bring about growth and development. Since the foreign exchange earnings required to finance this investment is insufficient public borrowing may be the only means of gaining access to the resources needed to achieve rapid economic growth.

ii. *Profile of public debt in Sierra Leone*

According to Matthew, Sellu and Peters (2017), the phenomenon of public debt by Sierra Leone was dated back to 1958, when a loan of US\$ 28.0 million (Le\$19.9 million) was contracted from the World Bank for railway construction. In 1960, Sierra Leone's public debt rose to US \$69.7 million (Le\$49.5 million), by 1970 the public debt was US\$246.0 million (Le\$174.7 million), representing 252 percent increase, and then to US\$346.0 million (Le\$249.1 million) in 1977 due to the fall in mineral prices in the late 1970s which has harmed government financially to meet its obligations. AFRODAD (2017), also affirms that the outrageous increase in Sierra Leone's public debt was as result of a proportional shortage of foreign exchange to meet its developmental needs. Between 1983 and 1988 Sierra Leone's public debt rose to US\$9.8 billion (Le\$44.3 billion) due to Sierra Leone's inability to settle its import bills. In 1990, according to AFRODAD (2017), Sierra Leone's public debt rose again to US\$33.1 billion (Le\$266.1 billion). In 1991 it was reduced to US\$27.5 billion (Le\$221.1 billion) but rose steadily to US\$32.6 billion (Le\$713.9 billion) at the end of 1995. As at 2015, according to CBSL (2014), Sierra Leone's public debt stock was US\$28.0 billion (Le\$2,585.5 billion), 73.2 per cent of this was owed to the Paris Club while the rest was owed to the London Club, the multilateral creditors, promissory note holders and others during the period 2015-2017.

Government pursued debt cancellation which eventually led to drastic reduction of public debt to US\$3.4 billion (Le\$427.8 billion) in 2017. Since then, the nation's debt has steadily increased from US\$3.4 billion (Le\$427.8 billion) in 2017 to US\$3.7 billion (Le\$438.6 billion) in 2018, US\$3.9 billion (Le\$580.7 billion) in 2009, US\$4.5 billion (Le\$676.4 billion) in 2010, US\$5.7 billion (Le\$877.0 billion) in 2011, US\$6.5 billion (Le\$1,023.8 billion) in 2012, US\$9.0 billion (Le\$1,415.8 billion) in 2013, US\$9.5 billion (Le\$1,506.2 billion) in 2014, US\$10.72 billion (Le\$2,062.9) in 2015 and US\$11.41 billion (Le\$3,634.8 billion) in 2016 (Myers, 2015).

iii. *An analysis of Sierra Leonean Public debt management strategies*

Matthew, Sellu and Peters (2017), the gravity of Sierra Leone's debt problem became very obvious in the mid -1980s, and several measures were adopted to manage the debt which includes the following:

II. REFINANCING OF TRADE DEBT

This started with the refinancing of trade arrears in respect of letters of credit outstanding as at July 1983 amounting to \$2.1 billion. This involved repayment period of 30 months January 1984 – July 1986 with a six-month grace period and interest fixed at 1.0 per cent above the LIBOR (London interbank offered rate). Promissory notes were also issued in respect of trade arrears arising from transactions on open account and bills for collection for the sum of \$3.8 billion. The promissory note agreement involved a maturity of six years with a grace period of two and half years. Note that redemption was expected in 14 equal instalments beginning from October 1986. The difficulty in meeting these terms necessitated the capitalizing outstanding interest of \$1.050 billion which brought total commitment on the promissory notes to \$4.89 billion.

1. Negotiation with the London Club of creditors with respect to Commercial Bank debts commenced in 1986.

The total exposure of the banks amounted to \$5.8 billion and Sierra Leone was expected to pay \$1.345 billion per annum. The country could not meet the obligation because of cash flow problem. This resulted in prolonged rounds of negotiation as Sierra Leone demanded the restructuring of the entire debt into a 30 years bond with a grace period of 10 years and interest of 3.0 percent per annum. Eventually both sides agreed on a revised agreement requiring that the principal amount be collateralized with US Treasury Zero Coupon Bonds; interest rate was fixed at 5.5 per cent for the first 3 years and at 6.25 per cent per annum thereafter; and banks which opted for the traditional rescheduling were required to provide 20 per cent of the amount to the option as new money. No bank opted for new money. The agreement was successfully closed on

January 21, 1992. Sierra Leone bought back 62 per cent of the debt and issued collateralized par bonds for the remaining 38 per cent. This allowed Sierra Leone to achieve a debt and debt service reduction as pictured under the Brady Plan.

2. Paris Club Debt Negotiations

Several rounds of rescheduling were undertaken with respect to this class of debt in order to secure relief which was essentially in the form of deferral of debt payment rather than offering debt reduction. Indeed, the approach ensured rapid growth in debt stock largely as a result of the high interest rate attached. The first and second agreement (December 1986 and March 1989) provided for the consolidation and rescheduling of only debt service payments which was due within a period of 15 months. Under the third agreement (Jan. 1991), the debt was rescheduled on terms applicable to the middle income heavily indebted countries. The December 2017 Agreement which was structured in Houston. Terms provided for the rescheduling of Sierra Leone's debt of \$21.4 billion over 18-20 years at relatively high interest rate, but with 10 years grace period.

The latest rounds of debt negotiation concluded in an agreement in principle with the Paris Club to treat Sierra Leone's debt on the "Evian Terms" which allowed a 60 per cent debt reduction. This is however, built on a successful conclusion of a Policy Support Instrument (PSI) currently being put together for the IMF consideration. This agreement provides for a reduction by \$18.0 billion in Sierra Leone's debt to the Paris Club. It also requires that the balance of Le\$12.0 billion should be paid in two equal instruments in less than one year.

Although this offers significant relief to the country if Sierra Leone could strive to raise the outstanding \$12.0 billion, it does not still provide sufficient resources to meet the MDGs. Furthermore, the terms of settling the outstanding debt will seriously create fiscal strain with adverse consequences for the economy.

3. *Debt Conversion and Buy-Back Programme:* This was adopted in July 1988 and designed to achieve debt reduction and reduce debt service burden, encourage capital inflow and assist in recapitalization of the private sector investment and create employment opportunities. Eligible debt for conversion was initially limited to promissory notes, but later extended to cover banks and the Paris Club debts. This method has been used to reduce the value of outstanding promissory notes from \$4.5 billion in 1991 to barely \$783.2 billion in 2014.

4. *Servicing of Multilateral Debt:* Deliberate and conscious efforts were made, in spite of the poor state of the economy, particularly in the mid-1980's and 1990s, to ensure regular servicing of this class of debt. The priority attached to this class of debt is

not unconnected with the consequences of default in debt servicing. These include, the stoppage of further disbursements on such project tied loans and other loans under consideration as well as the loss of credit worthiness of the country.

5. Adoption of Guidelines on public Borrowings

In order to avoid uncontrollable growth of public debt, the Federal Executive Council and the Council of States approved in 2001, a new guideline on public borrowing. The guidelines specified the terms and conditions under which foreign loans could be contracted. For example, the guidelines limit borrowings to financing of projects in the area of poverty reduction and infrastructure development which are assessed on the basis of cost benefit analysis. They must be loans from concessional sources with favourable terms of repayment.

i. *Problems and Prospects of Public debt management in Sierra Leone*

Alfred, James and Thomas (2010) posit that: a major challenge faced by the Debt Management Office is ensuring that a reasonable level of resources is earmarked for debt servicing to avoid the risk of default and to maintain conducive relations for debt relief negotiations with our creditors. The DMO also faces the related challenge of ensuring that budget resources are released in time to effect debt service payments

Managing public debt in Sierra Leone is bedevilled with the following problems:

1. Absence of appropriate institutional framework for the coordination of debt management activities at the sub-national level.
2. Weak public finance management institutions and practices at the state and local government levels.
3. Lack of Coordination of fiscal policies and operations of all tiers of government, amongst others."

For many decades, creditor countries have relied on a "traditional approach" towards addressing Sub-Saharan Africa's debt crisis. This has taken the form of debt rescheduling and refinancing, complemented in varying degrees by minor cancellations especially for debt buy-back; debt conversion and other restructuring mechanisms. In general, debt rescheduling was initially negotiated with debtor countries on a case-by-case basis. This was however replaced by a more systematic framework that applied standard terms to debtor countries and provided little concessions. African countries have been taken through several arrangements, which have evolved over time, for the resolution of official debts. These are briefly reviewed below.

1. The Venice Terms was introduced in 1987 for the poorest countries that were undertaking adjustment. Several African countries benefited from this

rescheduling arrangement, which provided for lower interest rates, and longer payment and grace periods;

2. The Toronto Terms succeeded the Venice Terms in June, 1988 and were made available for the low income, heavily indebted IDA-only countries. Some African countries benefited from this arrangement, which provided lower interest rates, further lengthening of maturities and partial debt service write-offs that together could provide about 33 percent debt service relief.
3. The Houston Terms were proposed in July, 1990 for the middle-income countries and allowed for deferrals of payments, rather than debt reduction. Sierra Leone's debts have been rescheduled four times under this arrangement.
4. The Enhanced Toronto Terms was formulated in 1991 to provide 50 percent debt service reduction as well as other enhancements that could ensure more even spread of debt service payments.
5. The Naples Terms was adopted in December 1994 for the poorest and most-indebted countries. They provided up to 67 percent relief on the net present value of the debt, which could apply to both stock and flows, depending on each country's balance of payments situation. The traditional debt relief efforts highlighted above are centered on a number of key elements which includes:
6. The requirement for adoption of macroeconomic stabilization and structural reform programs endorsed by the Bretton-Woods institutions; and
7. The requirement for establishing a track record of economic reform performance before qualifying for debt relief.

African countries have gone through numerous rescheduling arrangements involving a series of annual negotiations and renegotiations in the endless cycle of debt rescheduling into which many of them have been plunged. These initiatives have failed to alleviate the heavy debt service burden. Indeed, in some cases, they contributed towards increasing the debt stock. The amount of debt rescheduled, the total debt forgiven and the amount of debt stock reduced remain very insignificant, compared with the overall debt stock.

Traditional debt rescheduling has failed and Sub-Saharan Africa still remains in the debt trap. Indebtedness ratios continued to remain very high for Sub-Saharan African countries as a whole. Debt stock to export ratio and Debt stock to GNP ratio remained well above 200 percent and 70 percent respectively up to 2016. This resulted in the launching of the HIPC initiative by the World Bank and the IMF, which sought to place debt relief within an overall framework of poverty reduction.

The case of Sierra Leone is very illustrative of the inadequacies characterizing the current eligibility criteria for debt relief and merits further elaboration here.

The eligibility criteria under the Enhanced HIPC Initiative focus on macroeconomic aggregates in assessing a country's debt burden. Arbitrary thresholds are set for these parameters. Furthermore, little regard is given to human and socio-economic development indices. Based on these economic criteria, Sierra Leone has been adjudged ineligible for relief under the HIPC Initiative. However, in sharp contrast with the illusory-image of an "mineral-rich" country, Sierra Leone is a heavily indebted poor country. A HIPC review, which embraces the so-called "medium-income" debtors, will create the critical mass and momentum of economic activities across the African continent. This will surely accelerate the recovery and growth process to the mutual advantage of all parties concerned.

a) *Theoretical Review*

The Keynesian theory of increasing government activity as a catalyst to economic growth was deemed most appropriate for this study $Y = C + I + G$. According to the theory, for an economy to grow and be stable, active government intervention is required. The Keynesian Economists argue that private sector decisions sometimes lead to inefficient macroeconomic outcomes. Therefore, monetary policy action by Central Bank and fiscal policy action by the government are required to direct the economy. These actions will bring about stability in output over the business cycles.

Keynes stated that during depression, a combination of two approaches must be applied namely: a reduction in interest rate (monetary policy), and government investment in infrastructure (fiscal policy). Both Keynesians and monetarists believe that both fiscal and monetary policies affect aggregate demand (Blinder, 2018). The monetary policy requires CBSL to reduce interest rate to commercial banks and the commercial banks to do the same to their customers. Government investment in infrastructure injects fund into the economy by creating business opportunities, employment and demand. One of the sources of fund for infrastructural development is public borrowing during fiscal deficit.

This implies that Keynesian theory which views capital accumulation as a catalyst to economic growth is supportive of public loans as it injects fund into the economy to increase economic activity resulting in growth. It therefore supports a positive relationship between public debt and economic growth.

Several other theoretical contributions have been made as regards the subject matter of public debt and economic growth and they include:

i. *The dual gap Theory*

Omoruyi (2015) stated that most economies have experienced a shortfall in trying to bridge the gap between the level of savings and investment and have resorted to public borrowing in order to fill this gap. This gap provides the motive behind public debt as pointed

out by Cherinor (2016) which is to fulfil the lack of savings and investment in a nation as increases in savings and investment would lead to a rise in economic growth Hunt (2017). The dual-gap analysis provides a framework that shows that the development of any nation is a function of investment and that such investment requires domestic savings which is not sufficient to ensure that development take place Sankoh (2014). The dual-gap theory is coined from a national income accounting identity which connotes that excess investment expenditure (investment-savings gap) is equivalent to the surplus of imports over exports (foreign exchange gap).

ii. *The dependency theory*

The dependency theory outlined the factors that have contributed to the development of the underdeveloped countries. This theory is based on the assumption that resources flow from a "periphery" of poor and underdeveloped states to a "core" of wealthy states thereby enriching the latter at the expense of the former. The phenomenon associated with the dependency theory is that poor countries are impoverished while rich ones are enriched by the way poor states are integrated into the world system Todaro (2015).

Dependency theory stated that the poverty of the countries in the periphery is not because they are not integrated or fully integrated into the world system as is often argued by free market economists, but because of how they are integrated into the system. From this standpoint a common school of thought is the bourgeoisie scholars. To them the state of underdevelopment and the constant dependence of less developed countries on developed countries are as a result of their domestic mishaps. They believe this issue can be explained by their lack of close integration, diffusion of capital, low level of technology, poor institutional framework, bad leadership, corruption, mismanagement, etc. Momoh and Fehn (2015). They see the under-development and dependency of the third world countries as being internally inflicted rather than publicly afflicted. To this school of thought, a way out of the problem is for third world countries to seek foreign assistance in terms of aid, loan, investment, etc, and allow undisrupted operations of the Multinational Corporations (MNCs). Due to the underdeveloped nature of most LDC's, they are dependent on the developed nations for virtually everything ranging from technology, aid, technical assistance, to culture, etc. The dependent position of most underdeveloped countries has made them vulnerable to the products of the Western metropolitan countries and Breton Woods institutions Ajayi (2017). The dependency theory gives a detailed account of the factors responsible for the position of the developing countries and their constant and continuous reliance on public for their economic growth and development.

iii. *The Solow growth model*

The Solow-growth model was published in 1956 as a seminar paper on economic growth and development under the title, "A contribution to the theory of economic growth". Like most economic growth theories, Solow growth model is built upon some assumptions:

1. Countries will produce and consume only a single homogenous good.
2. Technology is exogenous in the short run.

The Solow growth model is developed based on a Cobb - Douglas production function given by the form:

$$Y = F(L, K) = BL^\alpha K^\beta$$

Where

Y = output

K = Capital input

L = Labour input

B = total factor productivity

α and β are output elasticities of capital and labour respectively and α is a number between 0 and 1.

The other important equation from the Solow growth model is the capital accumulation equation expressed in the form:

$$\dot{K} = sY - dK$$

Where:

\dot{K} = change in capital stock

sY = gross investment

dK = depreciation during the production process

With mathematical manipulation Solow derives the capital accumulation equation in terms of per worker i.e. $\dot{k} = sy - (n+d)k$. This implies that the change in capital per worker is a function of investment per worker, depreciation per worker and population growth. Out of these three variables only investment per worker is positively related with change in capital per worker.

iv. *Solow growth model and public debt*

The Solow growth model was built on a closed economy which makes use of labour and capital as its means of production. Under this scenario the implication of public debt on growth can be seen through its effect on the domestic saving which in turn used as investment in a closed model. The general effect of public debt on the Solow growth model can be analysed by looking at the individual effects of the debt overhang and debt crowding theories on the Solow growth model. According to the debt overhang hypothesis, the government in an attempt to amortize the accumulated debt will increase tax rate on the private sector (as means of transferring resources to the public sector). This will discourage private sector investment and also reduce government expenditure on infrastructure as the resources are used to pay up huge

debt service payments instead of being put into good use. This will lead to a reduction of total (private and public) investment in the economy and a shift downward of both the investment and production function curves in Solow growth model. On the other hand in the case of debt crowding out, in a bid to clear their outstanding debts use their revenue from export earnings and in some cases transfer resources including foreign aid and foreign exchange resources to service their forthcoming debt. Those countries which transfer revenue from export earnings which can be used in investment in the economy to avoid huge debt payments will discourage public investment. This in turn will decrease economic growth and will shift both the investment and production function curves in Solow growth model downward Dereje (2013).

b) *Empirical Review*

The motive behind public debt was to boost economic growth and development of any nation but as a result of future high debt service payments, it posed a serious threat to the economy of that nation. Development Economists have therefore sought out to investigate the implication of public debt burden on the economies of debtor nations using different models, and have come up with diverse views.

Sulaiman and Azeez (2012) carried out a study on the effect of public debt on the economic growth of Sierra Leone using annual time series data covering the period of 1970-2010. The empirical analysis was carried out using econometric techniques of Ordinary least squares (OLS), Augmented Dickey-Fuller unit root test, Johansen Co-integration test and error correction method. The co-integration test shows long-run relationship amongst the variables and findings from the error correction model revealed that public debt has contribute positively to the growth of the Sierra Leonean economy.

An empirical investigation conducted by Audu (2014) examine the impact of external debt on the economic growth and external investment of Sierra Leone. The study used time series data covering the period 1970-2014. The Johansen Co-integration test and Vector Error correction econometric techniques were employed in the study. The study concluded that Sierra Leone's debt service burden has had a significant adverse effect on the growth process and also negatively affected public investment. Another study by Ogunmuyiwa (2011) examined whether public debt promotes economic growth in Sierra Leone using time-series data from 1970-2017. The model was estimated using Augmented Dickey-Fuller test, Granger causality test, Johansen co-integration test and Vector Error Correction Method (VECM). The result revealed that causality does not exist between public debt and economic growth in Sierra Leone.

Clement, Bhattacharya and Nguyen (2015) observed that aside the effect of high debt stock on investment, public debt can also affect growth through accumulated debt service payments which are likely to "crowd out" investment (private or public) in the economy. The crowding-out effect refers to a situation whereby a nation's revenue which is obtained from foreign exchange earnings is used to make debt service payments. This limits the resources available for use for the domestic economy as most of it is soaked up by public debt service burden which reduces the level of investment.

Johnson (2018) examined the impact of the huge public debt, with its servicing requirements on economic growth of the Sierra Leonean and South African economies. The Neoclassical growth model which incorporates public debt, debt indicators, and some macroeconomic variables was employed and analysed using both Ordinary Least Square (OLS) and Generalized Least Square (GLS) techniques of estimation. Their findings revealed that debt and its servicing requirement has a negative impact on the economic growth of Sierra Leone and South Africa. Faraji and Makame (2013) investigated the impact of public debt on the economic growth of Tanzania using time series data on public debt and economic performance covering the period 1990-2010. It was observed through the Johansen co-integration test that no long-run relationship between public debt and GDP. However, the findings show that public debt and debt service both have significant impact on GDP growth with the total public debt stock having a positive effect of about 0.36939 and debt service payment having a negative effect of about 28.517. The study also identified the need for further research on the impact of public debt on foreign direct investments (FDIs) and domestic revenues. Safdari and Mehrizi, (2011) analysed public debt and economic growth in Iran by observing the balance and long term relation of five variables (GDP, private investment, public investment, public debt and imports). Time series data covering the period 1974-2017 was used and the vector autoregressive model (VAR) technique of estimation was employed. Their findings revealed that public that has a negative effect on GDP and private investment and public investment has a positive relationship with private investment.

Ejigayehu (2013) also analysed the effect of public debt on the economic growth of eight selected heavily indebted African countries (Benin, Ethiopia, Mali, Madagascar, Mozambique, Senegal, Tanzania and Umarunda) through the debt overhang and debt crowding out effect with ratio of public debt to gross national income as a proxy for debt overhang and debt service export ratio as a proxy for debt crowding out. Panel data covering the period 1991-2010 was used. The empirical investigation was carried out on a cross-

sectional regression model with tests for stationarity using Augmented Dickey Fuller tests, heteroscedasticity and ordinary regression. The concluding result from estimation showed that public debt affects economic growth through debt crowding out rather than debt overhang.

In their study on public debt relief and economic growth in Sierra Leone, Ekperiware and Oladeji (2012) examined the structural break relationship between public debt and economic growth in Sierra Leone. The study employed the quarterly time series data of public debt, public debt service and real GDP from 1980-2009. An empirical investigation was conducted using the chow test technique of estimation to determine the structural break effect of public debt on economic growth in Sierra Leone as a result of the 2015 Paris Club debt relief. The result revealed that the 2015 public debt relief caused a structural break effect in the relationship between public debt and economic growth. Based on these findings they concluded that the public debt relief made available resources for growth enhancing projects. Umaru, Hamidu and Musa (2013) investigated into the relationship between economic growth, external debt and domestic debt in Sierra Leone for the period 1970-2010 using OLS method. They showed that external debt had a negative impact on economic growth while domestic debt impacted positively on economic growth. Amassoma (2011) examined the causal relationship between external debt, domestic debt and economic growth in Sierra Leone (1970-2009) using the Vector Autoregressive (VAR) and Vector Error Correction (VEC) models. They found out that there was no long run relationship between domestic debt and economic growth while external debt and economic growth showed a long run relationship. He also found a bi-directional causality between domestic debt and economic growth and an un-directional causality from economic growth to external debt in Sierra Leone. He concluded that domestic debt will stimulate economic growth in Sierra Leone. Fajana (2014) he sees nothing wrong with external debt but that debt crisis emanates from mismanagement of such funds. To him, borrowing is desirable and also unavoidable because external debt/borrowing is a first order condition for bridging the domestic gap while the second order condition is that such funds should be invested in viable project whose rate of return is higher than that of the interest rate on the loan. He therefore concluded that for external debt to serve as an engine of growth, it has to be properly managed and resources needs to be prudently and efficiently utilized.

III. METHODOLOGY

Research methodology is a way to systematically solve a research problem. It may be seen as the various steps that a researcher adopted in



studying his research problem along with the logic behind them. This chapter aimed at itemising and discussing the various steps that will be adopted in gathering and processing the research data, it sheds light on the sources of secondary data that will be subjected to econometric analysis. A model with dependent and explanatory variables to be estimated is specified, a-priori expectations of these variables, techniques of estimation and method of data analysis are all treated in this chapter.

a) Model Specifications

The models that will be used for the purpose of this research is formulated based on the dual gap theory, both a simple and multiple regression model will be specified below. One of the sources of fund for infrastructural development is public borrowing during fiscal deficit, this implied that Keynesian theory which viewed capital accumulation as a catalyst to economic growth is supportive of public loans as it injects fund into the economy to increase economic activity resulting in growth (Blinder, 2018). It therefore supports a positive relationship between public debt and economic growth. The following variables, Real Gross domestic product (GDP), External debt (EXTD), Domestic debt (DOMD), Exchange rate (EXCH) are assumed to be determining factor of economic growth in Sierra Leone and will be incorporated into the model. The multiple regression model is stated as:

$$Y=f(x)$$

Y=Dependent variable

X=Independent variable

Where,

$$LRGDP = F (LEXTD, LDOMD, EXCH) \dots\dots\dots (1)$$

$$LRGDP = a_0 + (a_1 LEXTD)_t + (a_2 LDOMD)_t + (a_3 EXCH)_t + U_t \dots\dots\dots (2)$$

$$a_0 > 0, a_1 > 0, a_2 < 0, a_3 < 0$$

Where:

LRGDP = Gross Domestic Product

LEXTD = External Debt

LDOMD = Domestic Debt

EXCR = Exchange Rate

a_0 = Constant intercept

a_1, a_2, a_3 = Slopes of the regressions

U = Error term

t = year

b) Ethical Consideration

Compliance with the relevant principles of acknowledging various authors used in the work to avoid plagiarism was ensured. Dishonest conduct includes manipulation of design and methods, retention or manipulation of data. The researcher avoided any form of dishonesty by using data as obtained by the research instrument.

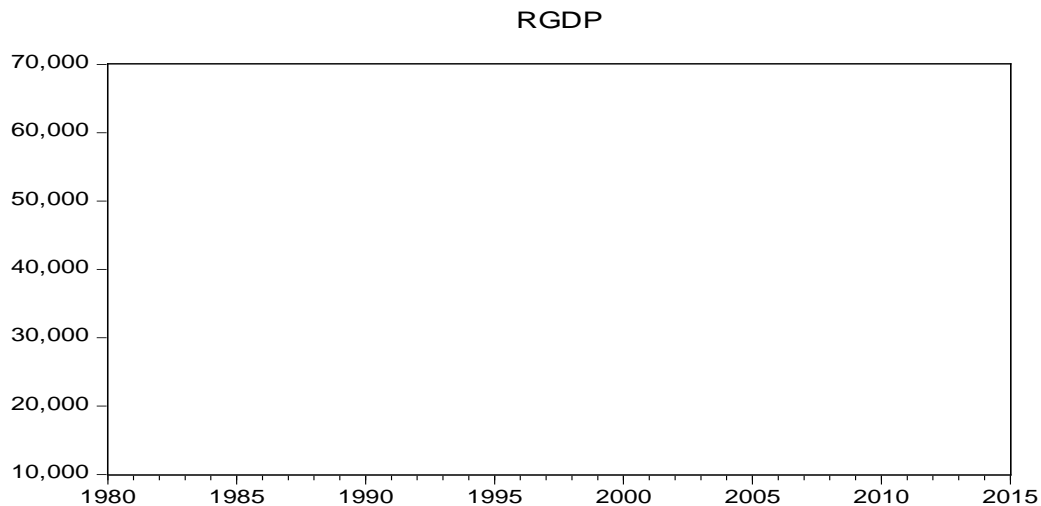
IV. RESULTS AND DISCUSSION

The data for real gross domestic product (RGDP), external debt (EXTD), domestic debt (DOMD) and exchange rate (EXCR) for the period (1980-2015) is presented in Table 4. 1..

Table 4.1: Descriptive Statistics

Statistics	RGDP	EXTD	DOMD	EXCR
Mean	30372.06	1116.329	1706.324	69.444
Median	22060.98	606.6260	531.2906	22.03070
Maximum	69023.93	4890.270	8836.996	192.4405
Minimum	13779.26	2.134250	8.523425	0.617708
Std. Dev	17273.36	1348.268	2485.067	66.28884
Skewness	0.982278	1.464226	1.671655	0.273182
Kurtosis	2.588298	4.034445	4.535015	1.367446
Jarque- Bera	6.043463	14.46885	20.30100	4.445621
Probability	0.048717	0.000721	0.000039	0.108304
Sum	1089794	40184.61	61435.22	2500.004
Sum. Sq. Dev	1.04E+10	63623973	2.16E+08	153797.4
Observations	36	36	36	36

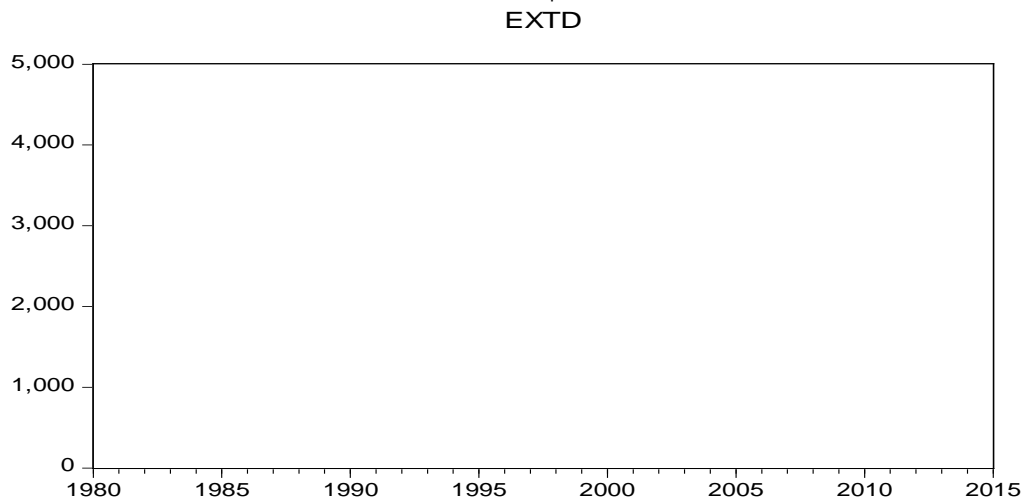
Source: Author's compilation using E- views



Source: Author's compilation using E views 9.0 2018

Figure 4.1: Trend analysis of RGDP

Figure 4.1.1 shows the trend analysis of real gross domestic product (RGDP) from 1980-2015. It shows continuous increase only in the trend of real GDP from the year 1980-2015. RGDP increased from 14,468.02 in 1980 to 15,258.00 in 1981. It fell slightly to 14,985.03 in 1982 and again to 13,849.73 in 1983 and gradually to 13,779.26 in 1984 before attaining an upward trend until 2015 where it stood at 69,023.93



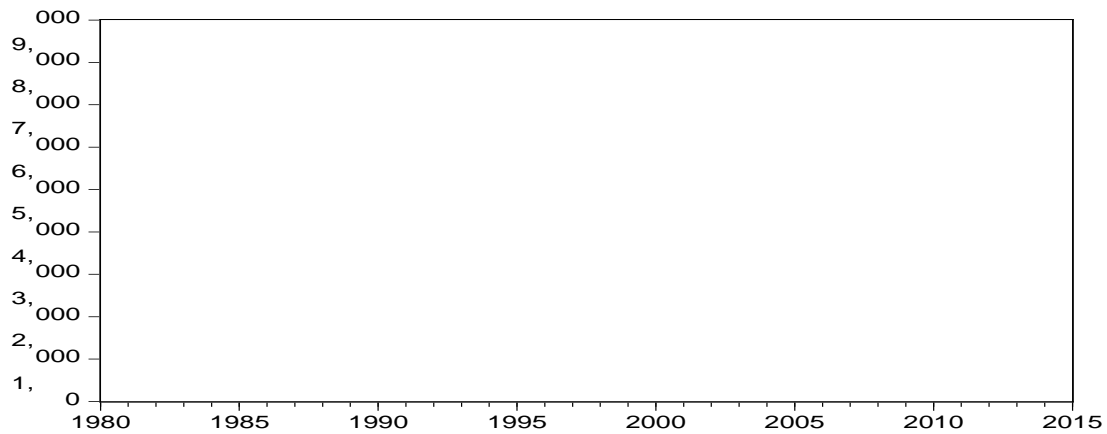
Source: Author's compilation using E views 9.0 2018

Figure 4.2: Trend analysis of EXT D

The trend analysis for external debt (as presented in figure 4.1.2) shows some years where external debt is so low from 2.13 in 1980 to 10.58 in 1983, thereby leading to a rising trend in external debt (EXTD). There was a sharp increase from 1998-2016. Sierra Leone's external debt was 14.81 billion and since then, external debt has constantly increased. In 1985 it was 17.30 billion as it increased again from 41.45 billion in 1986 to 240.39 billion in 1989, indicating an increase of over 200 billion. The situation did not improve in the years that followed as it increased to 298.61 billion in 1990 and then to 716.87 in 1995. Sierra Leone's external debt then reduced to 595.93 billion in 2017 but the value increased again in 1998 to 633.02 billion. A drastic rise

occurred in 2015 as it increased to 2,577.37 billion. The figure then fluctuated from 2015-2015, and reached its highest point which was at 4,890.27 in 2014. Later on, in 2015, Sierra Leone was granted a debt cancellation by the Paris Club and the effect was sudden as there was a drop in the figure to 451.46 as at 2016. Thereafter, Sierra Leone acquired huge loans which rose again to 2,111.53 in 2015.

DOMD

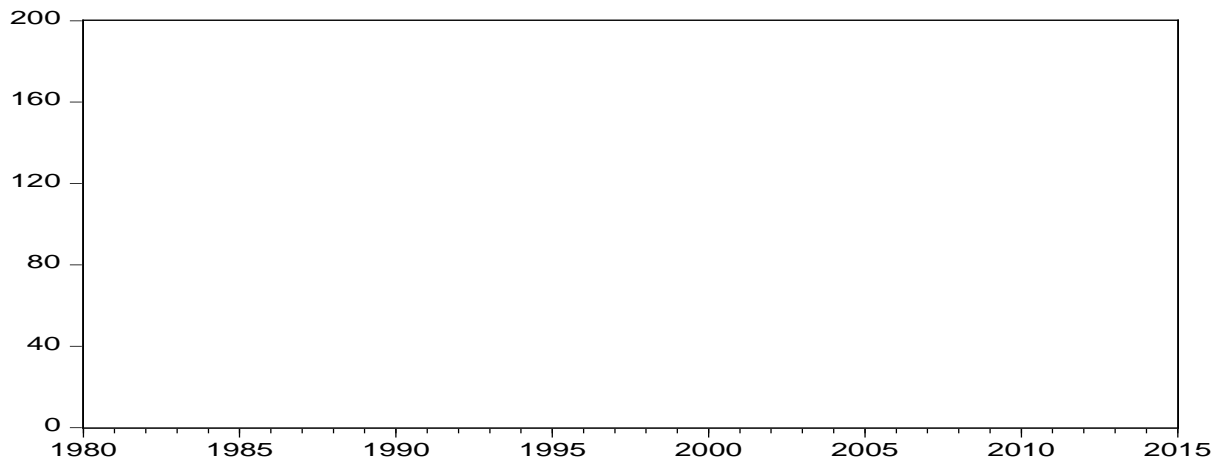


Source: Author's compilation using E views9.0 2018

Figure 4.3: Trend analysis of DOMD

Figure 4.1.3 shows that there is no increase in same for this period started to increase from 1990- domestic debt from 1981- 1989, domestic debt was the 2015.

EXCR



Source: Author's compilation using E views9.0 2018

Figure 4.4: Trend analysis of EXCR

Figure 4.1.4 shows the trend analysis of exchange rate (EXCR) from the year 1980-2015 that reflect a lot of fluctuations. From 1980- 1985, it was very low then rose again from 1986. The Sierra Leone Naira slowly lost value with respect to the American Dollar. In 1987 it got to 4.01 Naira to a dollar. From this point the value of Naira to a dollar reduced drastically and reached its highest point in 2014 which was Le\$22.0654 to a dollar. The exchange rate stabilized at Le\$21 to a dollar from the year 1994-1998 with the only fluctuations being in kobo. In 2015, the exchange rate rose again to Le\$92.3381 to a dollar which passed the Le\$100 mark in 2017 and continued to rise and by 2014, exchange rate rose again to Le\$132.888. Nevertheless, it began to reduce from the year 2015-2018, as it went from Le \$131.2743 to Le \$118.546. Recently, it began to increase again from Le \$150.298 in 2010 to 192.4405 in 2015.

a) Stationarity Test Results

This section explains the application of the unit root test which was carried out on the variables to determine their stationary levels. Augmented Dickey Fuller (ADF) test was implemented. The test is based on two statement of hypothesis which are the null and alternative hypothesis.

Table 4.2: Augmented Dickey Fuller Unit Root Test

Series	5% Critical Value	ADF at first difference (Prob.)	ADF Test at first difference	Equation Specification	Order of integration.
LRGDP	-2.951125	0.0218	-3.318382	Intercept	I(1)
LEXTD	-2.951125	0.0434	-3.015530	Intercept	I(0)
LDOMD	-2.951125	0.0015	-4.366387	Intercept	I(1)
EXCR	-2.951125	0.0000	-5.275833	Intercept	I(1)

Source: Authors computation using E-views 9.0 (2018)

The a priori expectation when using Augmented Dickey Fuller test is that a variable is stationary when the absolute test statistic is greater than the critical value at 5%. From table 4.2 the variables, real gross domestic product, domestic debt and exchange rate are all stationary at first difference because their respective absolute test statistic is greater than 5% critical values at

constant and intercept. External debt was stationary at levels. However, real gross domestic product and domestic debt were not stationary at levels and as such were differenced to become stationary. Since the variables were stationary at first difference, Ordinary Least Square (OLS) method would be inappropriate to use.

Table 4.3: Phillip Perron Unit Root Test

Variables	5% Critical Value	Phillip Perron Test (Prob)	Phillip Perron Test at First Difference	Equation Specification	Order of Integration
LRGDP	-2.951125	0.0234	-3.288595	Intercept	I(1)
LEXTD	-2.951125	0.0019	-4.272283	Intercept	I(1)
LDOMD	-2.951125	0.0015	-4.366387	Intercept	I(1)
EXCR	-2.951125	0.0001	-5.275833	Intercept	I(1)

Source: Authors computation using E-view 9.0 (2018)

In table 4.3, the results shows that the variables, real gross domestic product, external debt, domestic debt and exchange rate are all stationary at first difference because the absolute test statistic was greater than 5% critical values at constant and intercept. To test for the reliability of the results, the probability was also tested and the probabilities of each variable is less than 5% level of significance. The result of the variables

being stationary at first difference makes it inappropriate to use the Ordinary Least Square (OLS) method, therefore Johansen co-integration test will be used.

b) Optimal Lag Length Selection

The selection of optimal lag length was very essential before carrying out a Johansen co-integration test.

Table 4.4: Lag Length Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-238.2556	NA	27.95851	14.68216	14.86355	14.74319
1	-53.55105	313.4380*	0.001024*	4.457640*	5.364614*	4.762809*
2	-42.97202	15.38768	0.001490	4.786183	6.418737	5.335488
3	-32.42405	12.78543	0.002347	5.116609	7.47472	5.910049

Source: Author's computation using E-views 9.0 (2018)

*indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: -Hannan- Quinn information criterion

c) Johansen Co-integration test result

This test was carried out because it fulfilled the assumption that the variables must be stationary at first difference (I) and the lag interval must be determined which was lag 1 with the selection of Schwartz Information Criterion. There are two types of tests which were considered the Eigen value and Trace statistic test. The decision criteria based on this test is if the trace

statistic is greater than the critical value then reject the null hypothesis and accept the alternative hypothesis. The details of table 4.5 is presented in Appendix 11

Table 4.5: Johansen Co-integration test based on Trace Statistic.

Lag	Eigenvalue	Trace Statistic	0.05 Critical value	Prob**
0	0.551163	46.90258	47.85613	0.0613
1	0.327710	19.66537	29.79707	0.4458
2	0.165269	6.165135	15.49471	0.6760
3	0.000681	0.023162	3.841466	0.8790

Source: Author's computation using E-views 9.0 (2018)

NB: The test indicates no co-integration at 0.05 level

Table 4.5 explains the result of the Johansen co-integration test based on the trace statistic. At none it was seen that the null hypothesis is accepted and the alternative hypothesis is rejected because the trace statistic value (46.90258) is less than the critical value

(47.85613). The result therefore leads to the acceptance of the null hypothesis leading to a short run relationship among the variables. From the test carried out, there was no co-integrating equation, therefore an Ordinary least square method will be implemented.

d) Ordinary Least Square Method

Table 4.6: Ordinary test result

Variables	Coefficient	Standard Error	T- Statistic	Prob.
CONSTANT	9.191962	0.084278	109.0676	0.0000
LEXTD	-0.094426	0.015988	-5.906230	0.0000
LDOMD	0.222171	0.028350	7.836716	0.0000
EXCR	0.003040	0.000684	4.441983	0.0001
Adjusted (R ²)		0.961262	F 290.5012	D- W Stat 0.488356

Source: E-views 8.0 2018

The estimated model of the functional relationship between RGDP and Public debt is:

$$RGDP = 9.191962 - 0.094426LEXTD + 0.222171LDOMD + 0.003040EXCR$$

$$\begin{aligned} \text{PROB} &= (0.0000) & (0.0000) & (0.0000) & (0.0001) \\ \text{SE} &= (0.084278) & (0.015988) & (0.028350) & (0.000684) \\ \text{t-Statistic} &= (109.0676) & (-5.906230) & (7.836716) & (4.441983) \\ \text{F-Statistic} &= 290.5012 & \text{Adjusted } R^2 = 0.961262 & & \\ \text{Durbin-Watson} &= 0.488356 & & & \end{aligned}$$

T-Statistic

LEXTD: From table 4.6, the t-stat result for LEXTD shows that it is not statistically significant at 5% significance level because the calculated t statistic which is -5.906 is less than the tabulated t-statistic 1.694.

LDOMD: From table 4.6, the t-stat result for LDOMD shows that it is statistically significant at 5% significance level because the calculated t-statistic which is 7.836 is greater than the tabulated t-statistic 1.694.

EXCR: From table 4.6, the t-stat result for EXCR shows that it is statistically significant at 5% significance level because the calculated t- statistic which is 4.441 is greater than the tabulated t-statistic 1.694.

R-squared

From table 4.6, R-squared is given as 0.964582 that is 96% of the variations in the dependent variables are explained in the independent variables.

Adjusted R-squared

The estimated adjusted coefficient of determination is 0.961262 that is 96% of the variations in

the dependent variables have been adjusted for variations in the independent variables.

F-Statistic

From table 4.6, the value of the computed F-statistics i.e F_{cal} is 290.5012 and from the F distribution table with the use of 5% level of significance, k-1 and n-k degrees of freedom, the value of F_{tab} is 2.90 ($290.5012 > 2.90$), therefore reject H_0 and accept H_1 .

Standard Error

The standard error test of the least square estimate is necessary to measure the size of the error and determine the degree of confidence in the validity of the estimates. If the null hypothesis states that the variable is not statistically significant while the alternative hypothesis is statistically significant. The decision criteria is to accept the alternative hypothesis and reject the null hypothesis if and only if the standard error is less than the co-efficient divided by 2.

Table 4.7: Standard Error Test Results.

Variables	Standard Error	Co-Efficient	Co-Efficient/2	Decision Criteria
LEXTD	0.015988	-0.094426	-0.047213	Null
LDOMD	0.028350	0.222171	0.1110855	Alternative
EXCR	0.000684	0.003040	1.52	Alternative

Source: Author's computation using E-views 9.0 2018

Table 4.7 showed that the variables, Domestic debt (LDOMD) and Exchange rate (EXCR) are statistically significant while External debt (LEXTD) is not statistically significant based on the acceptance of the null hypothesis and rejection of the alternative hypothesis.

From the estimated model, the constant coefficient in the multiple regression model is given as: 9.191962 which means that when the independent variables (External debt, domestic debt and exchange rate) are fixed at zero or held constant, Real gross domestic product (RGDP) remains 9.191962. This growth will be caused by other inducing factors which are not included in the model. The parameter a_1 has a negative sign that is external debt has an inverse relationship with real gross domestic product. The estimated parameter of the model is -0.094426 which implies that an increase in external debt by 1% will reduce real gross domestic product by 94% while other variables are held constant. The parameter a_2 has a positive sign that is domestic debt has a positive relationship with real gross domestic product. The value

of domestic debt is 0.222171. This means that a 1% increase in domestic debt will lead to a 2.22% increase in real gross domestic product when other variables are held constant. The result is therefore consistent with the apriori expectation that $a_2 > 0$. The parameter, a_3 has a positive sign that is a positive relationship between real gross domestic product. The coefficient of EXCR is 0.003040. This means that a 1% increase in exchange rate will lead to a 30.4% increase in real gross domestic product when other variables are held constant. This result is not consistent with the apriori expectation that $a_3 < 0$.

e) Post- Estimation Test

i. Breusch- Godfrey Serial Correlation Lm Test

This serial correlation test was used to check for the serial relationship between the variables. The null hypothesis states that there is absence of serial correlation while the alternative hypothesis states that there is presence of serial correlation. If the prob.chi square is less than 5% level of significance, then accept the null hypothesis and reject the alternative hypothesis.

Table 4.8: Breusch- Godfrey Serial Correlation LM Test Result

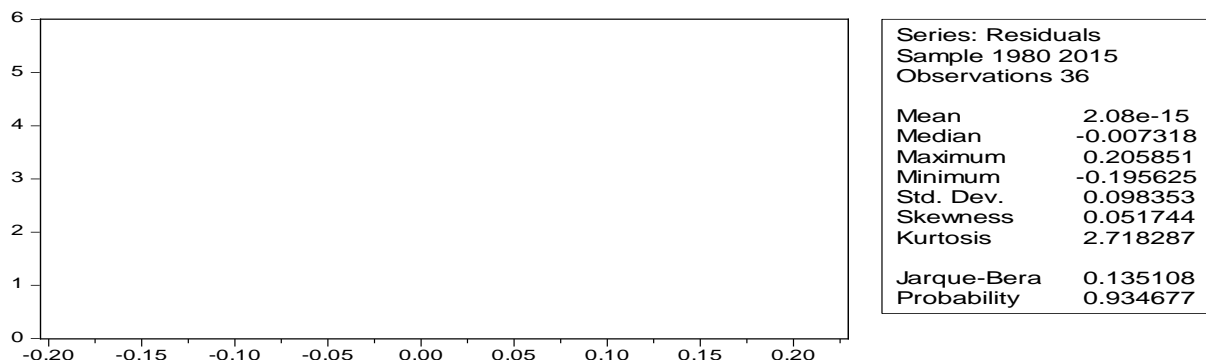
F-statistic	3.114035	Prob. F(3,32)	0.0398
Obs*R-squared	8.134946	Prob. Chi-square(3)	0.04333

Source: Authors computation using E-views 9.0 (2018)

The results above showed the prob. (chi-square) having a value of 0.04333 which is lesser than 5% level of significance. Therefore, we accepted the alternative hypothesis which stated that there is serial correlation.

This test was carried out to check whether the error term follows a normal distribution. The normality test adopted is the Jarque-Bera (JB) Test of Normality. This test computes the skewness and kurtosis measures of the OLS residuals and its probability is statistically significant.

ii. Normality Test



Source: Author's computation using E-Views 9.0 2018

Figure 4.4: Normality test

V. CONCLUSION

The main objective of this study is to specifically examine the effect of public debt which consists of both external and domestic debt on economic growth in Sierra Leone from 1980-2015. Real gross domestic product was used as a proxy for economic growth which is the dependent variable while external debt, domestic debt and exchange rate were the independent variables. The Ordinary least square method was implemented in this study. The results revealed that external debt had a negative effect on the economic growth in Sierra Leone while domestic debt had a positive effect on economic growth in Sierra Leone through encouraging domestic productivity and level of output. External debt is therefore seen as a barrier to the economic advancement and performance of a country. Government should therefore avoid taking external loans. The result revealed that if domestic debt is properly managed, it could lead to high growth rate in Sierra Leone. Based on dual gap theory, the higher the rate of savings and investment the higher an economy tends to grow. Therefore, public debt will lead to economic growth if it is invested properly.

Based on the findings highlighted above, the following recommendations are made:

1. Growth is directly related to savings that is for an economy to grow, they must save and invest a certain proportion of their GDP. The higher the level of savings and investment, the higher the economy tends to grow.
2. To experience economic growth, government should invest borrowed money into capital-based projects at no additional costs. This will help to increase productivity and output level in the country thereby increasing economic growth.
3. External debt should be used strictly for economic reasons and not for social or political reasons in order to avoid accumulation of external debt shock overtime.
4. The government should also increase exportation of domestic goods in order to make our domestic industries known. Note that a high exchange rate would make our goods more attractive to the foreign market.

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- Findings
- Writings
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Acknowledgments

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The following is the official style and template developed for publication of a research paper. Authors are not required to follow this style during the submission of the paper. It is just for reference purposes.



Manuscript Style Instruction (Optional)

- Microsoft Word Document Setting Instructions.
- Font type of all text should be Swis721 Lt BT.
- Page size: 8.27" x 11", left margin: 0.65, right margin: 0.65, bottom margin: 0.75.
- Paper title should be in one column of font size 24.
- Author name in font size of 11 in one column.
- Abstract: font size 9 with the word "Abstract" in bold italics.
- Main text: font size 10 with two justified columns.
- Two columns with equal column width of 3.38 and spacing of 0.2.
- First character must be three lines drop-capped.
- The paragraph before spacing of 1 pt and after of 0 pt.
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- Large images must be in one column.
- The names of first main headings (Heading 1) must be in Roman font, capital letters, and font size of 10.
- The names of second main headings (Heading 2) must not include numbers and must be in italics with a font size of 10.

Structure and Format of Manuscript

The recommended size of an original research paper is under 15,000 words and review papers under 7,000 words. Research articles should be less than 10,000 words. Research papers are usually longer than review papers. Review papers are reports of significant research (typically less than 7,000 words, including tables, figures, and references)

A research paper must include:

- a) A title which should be relevant to the theme of the paper.
- b) A summary, known as an abstract (less than 150 words), containing the major results and conclusions.
- c) Up to 10 keywords that precisely identify the paper's subject, purpose, and focus.
- d) An introduction, giving fundamental background objectives.
- e) Resources and techniques with sufficient complete experimental details (wherever possible by reference) to permit repetition, sources of information must be given, and numerical methods must be specified by reference.
- f) Results which should be presented concisely by well-designed tables and figures.
- g) Suitable statistical data should also be given.
- h) All data must have been gathered with attention to numerical detail in the planning stage.

Design has been recognized to be essential to experiments for a considerable time, and the editor has decided that any paper that appears not to have adequate numerical treatments of the data will be returned unrefereed.

- i) Discussion should cover implications and consequences and not just recapitulate the results; conclusions should also be summarized.
- j) There should be brief acknowledgments.
- k) There ought to be references in the conventional format. Global Journals recommends APA format.

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Author details

The full postal address of any related author(s) must be specified.

Abstract

The abstract is the foundation of the research paper. It should be clear and concise and must contain the objective of the paper and inferences drawn. It is advised to not include big mathematical equations or complicated jargon.

Many researchers searching for information online will use search engines such as Google, Yahoo or others. By optimizing your paper for search engines, you will amplify the chance of someone finding it. In turn, this will make it more likely to be viewed and cited in further works. Global Journals has compiled these guidelines to facilitate you to maximize the web-friendliness of the most public part of your paper.

Keywords

A major lynchpin of research work for the writing of research papers is the keyword search, which one will employ to find both library and internet resources. Up to eleven keywords or very brief phrases have to be given to help data retrieval, mining, and indexing.

One must be persistent and creative in using keywords. An effective keyword search requires a strategy: planning of a list of possible keywords and phrases to try.

Choice of the main keywords is the first tool of writing a research paper. Research paper writing is an art. Keyword search should be as strategic as possible.

One should start brainstorming lists of potential keywords before even beginning searching. Think about the most important concepts related to research work. Ask, "What words would a source have to include to be truly valuable in a research paper?" Then consider synonyms for the important words.

It may take the discovery of only one important paper to steer in the right keyword direction because, in most databases, the keywords under which a research paper is abstracted are listed with the paper.

Numerical Methods

Numerical methods used should be transparent and, where appropriate, supported by references.

Abbreviations

Authors must list all the abbreviations used in the paper at the end of the paper or in a separate table before using them.

Formulas and equations

Authors are advised to submit any mathematical equation using either MathJax, KaTeX, or LaTeX, or in a very high-quality image.

Tables, Figures, and Figure Legends

Tables: Tables should be cautiously designed, uncrowned, and include only essential data. Each must have an Arabic number, e.g., Table 4, a self-explanatory caption, and be on a separate sheet. Authors must submit tables in an editable format and not as images. References to these tables (if any) must be mentioned accurately.



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

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TIPS FOR WRITING A GOOD QUALITY MANAGEMENT RESEARCH PAPER

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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



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

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

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

INFORMAL GUIDELINES OF RESEARCH PAPER WRITING

Key points to remember:

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

Final points:

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

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

The discussion section:

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

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

General style:

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

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

Mistakes to avoid:

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



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

Title page:

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

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

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

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

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

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

Approach:

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

Introduction:

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

The following approach can create a valuable beginning:

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



Approach:

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

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

Procedures (methods and materials):

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

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

Materials:

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

Methods:

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

Approach:

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

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

What to keep away from:

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

Results:

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

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

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



Content:

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

What to stay away from:

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

Approach:

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

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

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

Figures and tables:

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

Discussion:

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

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

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

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

- You may propose future guidelines, such as how an experiment might be personalized to accomplish a new idea.
- Give details of all of your remarks as much as possible, focusing on mechanisms.
- Make a decision as to whether the tentative design sufficiently addressed the theory and whether or not it was correctly restricted. Try to present substitute explanations if they are sensible alternatives.
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- Recommendations for detailed papers will offer supplementary suggestions.



Approach:

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

Describe generally acknowledged facts and main beliefs in present tense.

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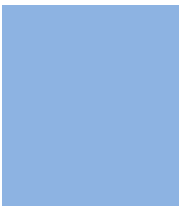


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