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TABLE OF CONTENTS

TITLE AND AUTHOR	Pages
Review on the Role of Agricultural Extension Service on Increasing Farm Productivity in Ethiopia <i>Birhanu Argaw, Kalkidan Yehuala, Alelign Aschalew</i>	77 - 89
Comparison of Autoregressive Distributed Lag Model and Vector Error Correction Model Analysis on The Effect of Some Macroeconomic Variables On GDP In Nigeria <i>Monday Osagie Adenomon, Abbas Usmana</i>	90 - 114
Disclosure of Green Banking, Profitability, and Company Size on Company Value in Banking in Indonesia <i>Asti Pratiwi, Abdul Basyith, Ervita Safitri</i>	115 - 127
Analyzing the Impact of Covid-19 on Indian Airline Stocks: An Empirical Analysis using Event Study Methodology <i>Jabir Yousuf Sheikh Sheikh, Dr. Ranjana Kanungo</i>	156 - 170
Human capital development and economic growth in Nigeria: a structural break perspective <i>Moses Adebayo, Olufunnso O. Oloke, Owolabi A Usman</i>	171 - 179

Review on the Role of Agricultural Extension Service on Increasing Farm Productivity in Ethiopia

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Abstract

Improving farm productivity either through introduction of modern technologies or by increasing agricultural extension services is vital. Agricultural extension is the primary mechanism that increases agricultural production. Therefore, reviewing the role of agricultural extension on increasing farm productivity has been interesting issue. Cognizant of this fact, reviewing the role of agricultural extension in increasing farm productivity is an important issue for policy makers in order to improve productivity. Consequently, this seminar was aimed to provide information on the role of agricultural extension in increasing farm productivity and to review agricultural extension constraints in Ethiopia. The review shows that agricultural extension service had positive and significant role on increasing farm productivity by increasing the farmer's knowhow on agronomic practices such as pest and disease control and adoption of improved seed varieties as well as soil and water conservation technologies. On the other hand, the review reveals that weak interaction; low participation, lack of technical skills, missed use of services, the weak link of research extension, a lack of incentives, and a lack of suitable adaptation to technologies constrain the extension system across the country. Thus, based on the review the following recommendations are forwarded. Extension services should be increase to farmers by the government agents especially by district agriculture development unit, and NGO's to assist farmers to have easy access to extension so as to increase farm productivity. In addition, to increase the current working conditions of extension agents, including transportation, housing, and proper budget allocation, the government should adopt a very responsible and practical approach.

Keywords: Agricultural extension, Agricultural extension constraints, Ethiopia

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1. Introduction

1.1. Background of the Review

Since the end of World War II in 1945, agricultural and rural development has been defined by shifting goals and issues. Following this conflict and the widespread occurrence of severe starvation, the industrialized world made a concerted effort to expand food production (Reimund *et al.*, 2007). Ethiopia, with a total area of 1.1 million Km², has an estimated population size of 61 million (MEDaC, 1999). The backbone of the Ethiopian economy is agriculture. It produces more than 45% of the nation's GDP and 90% of all export revenue. Also, it's believed that 85% of the labor force is employed in agriculture. Ethiopian agriculture, however, is characterized by extremely poor yield. The average grain yield for various crops was 2.14 ton (CSA, 2018). The low productivity of the agricultural sector has made it difficult to attain food self-sufficiency at a national level.

Aware of these issues, the Ethiopian government introduced the Agricultural Development Led Industrialization (ADLI) strategy in 1993, which focuses on agriculture as a key driver of increased output, employment, and income for the people, and as the spring board for the development of the other sectors of the economy (Kassa&Abebaw, 2004; Gebremedhin *et al.*, 2009; cited in Tsegamariam, 2018). The Participatory Demonstration and Training Extension System national extension package program is one of the key elements of ADLI (PADETES). PADETES aims to accomplish sustainable development in rural regions by raising farm productivity (yield), decreasing poverty, raising the level of food security, raising the quantity and variety of industrial raw materials (primary products), and producing for the export market (Kassa, 2003; EEA, 2006).

The PADETES initiative has been concentrating on supply-driven intensification, which entails increased seed and fertilizer supply and promotion, on-farm demonstrations of improved farming practices and technologies, and close monitoring of farmers' plots (Kassa and Abebaw, 2004; EEA, 2006; Kassa, 2008). Hence, the main operations of the extension program have been the greater diffusion of improved farm technologies, management techniques, and know-how to the smallholder farmers (Kassa, 2003; Gebremedhin *et al.*, 2009; Asfaw *et al.*, 2012). Consequently, the adoption status of better agricultural extension is one topic that has generated a sizable body of literature in Ethiopia (Feleke & Zegeye, 2006; Darcon & Christiaensen, 2007; Gebregziabher & Holden, 2011; Beshir, Emanu, Kassa, & Haji, 2012).

Improving farm productivity either through introduction of modern technologies or by increasing agricultural extension services is vital. Agricultural extension is the primary mechanism that enhances agricultural production. Albeit there are many empirical studies regarding to agricultural extension in Ethiopia, reviews regarding to the role of agricultural extension programs on increasing farm productivity are very limited. However, in countries like Ethiopia, it is justifiable to provide information regarding to the role of agricultural extension on increasing farm productivity. Therefore, reviewing the role of agricultural extension in increasing farm productivity as well as identifying agricultural extension constraints has great advantage in Ethiopia. The general objective of this seminar is to review the role of agricultural extension on increasing farm productivity in Ethiopia.

2. Literature Review

2.1. Theoretical Review

There are many definitions, philosophies, and approaches to agricultural extension, and the views of what extension is all about have changed over time. Extension originally was conceived as a service to “extend” research-based knowledge to the rural sector to improve the lives of farmers. It thus included components of technology transfer, broader rural development goals, management skills, and non-formal education. The traditional view of extension in Africa was very much focused on increasing production, improving yields, training farmers, and transferring technology (Christoplos, 2010).

Today’s understanding of extension goes beyond technology transfer to facilitation; beyond training to learning, and includes assisting farmer groups to form, dealing with marketing issues, and partnering with a broad range of service providers and other agencies. Thus many people are now using the phrase, “agricultural advisory services,” instead of extension (which can imply a top-down approach and may ignore multiple sources of knowledge. As a system, extension facilitates the access of farmers, their organizations and other market actors to knowledge, information and technologies; facilitates their interaction with partners in research, education, agribusiness, and other relevant institutions; and assists them to develop their own technical, organizational and managerial skills and practices (Christoplos, 2010).

Agricultural extension can be defined as the entire set of organizations that support and facilitate people engaged in agricultural production to solve problems and to obtain information, skills, and technologies to improve their livelihoods and well-being (Birner *et al.*, 2006). This can include different governmental agencies (formerly the main actors in extension), producer organizations and other farmer organizations, and private sector actors including input suppliers.) Extension is both a political and an organizational instrument implemented to facilitate development and it ranges from transfer of mono-crop technology to participatory problem solving educational approaches, which aims at reducing poverty and enhancing community involvement in the processes of development (Rivera and Qamar, 2003).

2.2. Evolution of Agricultural Extension in Ethiopia

In Ethiopia, agricultural Extension service is said to be operational since 1930’s. However, a formal extension was started only after the establishment of the Haramaya College of Agriculture. Extension is underway in the country for over 70 years. Over this period, several development as well as extension approaches were employed side by side (Belay, 2009). During the first five year plan (1998–2002), the program of community Development (CD) was initiated as a strategy for stimulating population efforts to identify and tackling problems of a given community through self-help projects. This program continued until the third five year plan (2008–2013).

The other program where extension has been exercised was the package program that emerged during the third five-year plan. The typologies of package approaches implemented in Ethiopia since 1960’s were formulated as a project. The first, Comprehensive package project was that of Chilalo Agricultural Development Unit (CADU). This is the long-standing major project in the country was started as CADU in the Chilalo District of Arsi region in 1967. It was established with the assistance of the Swedish International Development Authority (SIDA) and World Bank.

Besides the Chilalo District, the project later on in 1976/77 was expanded to cover the other two District of Ticho and ArbaGugu in the region (Tesfaye, 2006). The extension method employed by CADU was the “Model farmer” approach until 1975. But the model farmer’s approach to extension was criticized both from outside and within CADU itself. Empirical Studies concluded that the approach was only partly successful and that it was not the most efficient way of disseminating knowledge (Waktola, 2005).

The second comprehensive package project was initiated in Wolayita province in 1970 under the Wolayita Agricultural Development Unit (WADU). Understanding the weakness of CADU’S model farmer approach, WADU avoided the “model farmers” approach and instead demonstrated technologies on peasants’ farms that were relatively resource poor. Technology transfer under WADU’S approach has been found to be more effective than that of CADU. As early as the 1970’s, it was apparent that it would not be feasible to implement the comprehensive package projects through the whole country. Hence, the minimum package program (MPP) was initiated in Ethiopia with a claim to address the problems of the lower income bracket farmers and also with greater reliance on people’s participation.

The MPPs were designed to cover large areas so that as many farmers as possible could be reached for extension, input supply, credit provision and marketing services. Thus, under Ministry of Agriculture, the Extension Project Implementation Department (EPID) was created in 1971 to provide peasant farmers production and to carry out the minimum package program started in 1970. Under this program, the basic unit of development was the MPP areas that contained about 10,000 farm families and extended 5km on either side of a 75-km stretch of all-weather roads. MPP- I adopted CADU’s grain technology and also applied its extension methodology. Although the minimum package concept worked well in the limited areas of its operation under MPP- I (1971-74), certain shortcomings like inadequacy of manpower at the Woreda level and little or no in service training for the extension staff became apparent as the program was extended to more farmers (Tesfaye, 2006).

At the termination of MPP- I in 1974, there was a plan to undertake an expansion of MPP. – I under the name of MPP- II which was implemented starting from 1980/81 after efforts were done to adapt it with the new socio- economic and political system of the country. The main objective of the project was institution building and strengthening of infrastructure while of the same time extending the use and availability of inputs to the small holder farmers. After the termination of MPP in 1985, Peasant Agricultural Development Project (PADEP) was initiated to promote agricultural development in the dominant small holder sector. The program was designed on the basis of experiences gained from the past two MPPs.

2.2.1. The current agricultural extension approach in Ethiopia

Drawing on lessons of past experience, the Federal Democratic Republic of Ethiopia (FDRE) has formulated an “Agricultural Development– Led Industrialization (ADLI)” Strategy, taking agriculture as the development base focusing on raising the productivity of the small scale farmers as key actors. Formulated within ADLI is the new system of agricultural extension, termed “participatory Demonstration and Training Extension System (PADETES)”. As the name implies, the system is based on demonstrating and training farmers on proven technologies in participant manner. The system which had been developed after a critical evaluation of the past extension

approaches has also given enough room to accommodate present changes in extension philosophy involving the utilize subsystem i.e. research, education and extension as part of the knowledge system. In contrast to the past extension system where focus was limited either to technology transfer or human resource development, PADETES gives equal emphasis to human resource development (organization, mobilization, empowerment) along with its effort in promoting appropriate technologies to users.

According to the new strategy, the responsibility of the Ministry of Agriculture at the federal level is to formulate agricultural policies, design packages, organize and conduct training activities to upgrade the knowledge and skill of all partners in agricultural development, coordinate interregional activities, render policy advice and technical backstop. The planning, execution, monitoring and evaluation of extension programmers, however, fall within the power and duties of the regional agricultural bureaus.

The new system acknowledges package approach as a means for enhancing the desired change in agricultural development. The intervention strategy in this involves a package approach geared towards three different farming systems, namely: reliable moisture, moisture stress, and nomadic pastoralist areas. Distinction can also be made among areas being exposed for the first time to extension, where extension messages should be simple focusing improved cultural practices (crops, livestock); areas where there is already minimal extension and where improved agricultural practices combined with the use of purchased inputs can be allocated; and finally areas which are already involved in large-scale production, where moderate or high input technology may be appropriate. Supporting services and means of communication may also vary accordingly (MOA, 1998).

The system that has been developed after a critical assessment of past extension system, including the recent effort by the Sasakawa Global 2000 project has become operational since 1995. The assessment carried out enabled identifying the merit and demerit of each approach and as a result, the new extension system is benefiting from the strong extension management principle of the T&V system and is merged with the most practicable technology diffusion experience of the SG 2000 project approach.

According to MOA (1998) the following are known to be the main objectives of PADETES:

- a. Improve the standard of living of the Society through improving productivity
- b. Empower farmers to actively participate in the development process.
- c. Increase the level of food self-sufficiency.
- d. •Increase the supply of industrial and export crops.
- e. •Ensure the rehabilitation and conservation of the natural resource base of agriculture.

Unlike the top – down extension method of the past, demonstration in PADETES is designed to ensure farmers participation. The farmers are involved at all stages of activities, from planning to evaluation. In the implementation of the extension program, the role of the government is to assist in: -

- a. Timely delivery of production inputs.
- b. The provision of credit.
- c. The delivery of extension and training services.

- d. Deploying development agents at the village level.
- e. Facilitating logistics (MOA, 2008).

2.2.2 Conceptual framework of the review

The conceptual framework illustrates how agricultural extension program that is used to enhance farmers' knowledge and skills, as well as promote and expand improved technologies affect farm productivity of Ethiopian smallholders. It is a general fact that, agricultural extension and advisory services play an important role in agricultural development and can contribute to improve the welfare of farmers and other people living in rural areas. In spite of this, there are many factors that condition the relationship between extension inputs and outcomes, and these factors act in complex ways Anderson and Feder (2003).

According to Anderson and Feder (2003) productivity improvements are only possible when there is a gap between actual and potential productivity. They suggest two types of 'gaps' that contribute to the productivity differential, the technology gap and the management gap. Extension can contribute to the reduction of the productivity differential by increasing the speed of technology transfer and by increasing farmers' knowledge and assisting them in improving farm management practices (Feder, Murgai, & Quizon, 2004). To make it understandable and consistent with the objective of this seminar and design of agricultural extension program in Ethiopia the path ways showing how extension program impact on agricultural productivity are illustrated in figure1below.

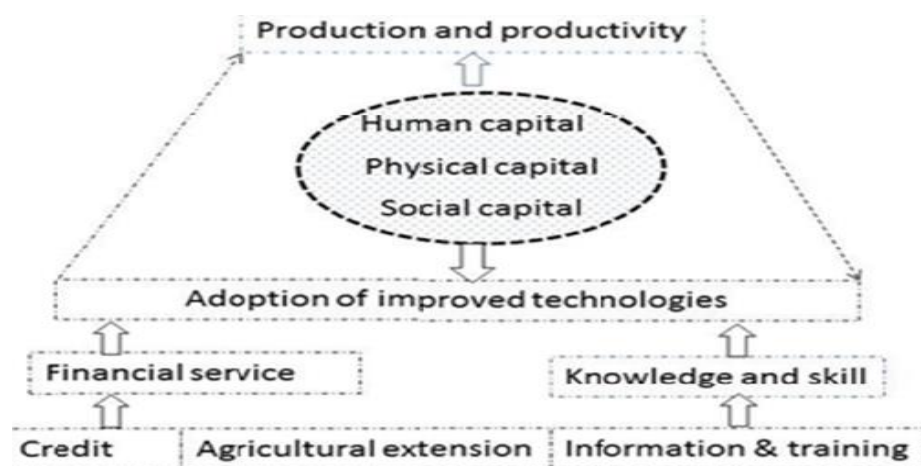


Figure 1. Role of agricultural extension on farm productivity

Source: Tsegamariam (2018)

3. Discussion

The review is involved quantitative and qualitative analysis of the role of agricultural extension service on increasing farm productivity and constraints of agricultural extension in Ethiopia. Accordingly, various empirical study results have been used to review the role of agricultural extension on increasing farm productivity and constraints of agricultural extension in Ethiopia. Thus, quantitative and qualitative results from various researchers on the role of agricultural extension on increasing farm productivity and agricultural extension constraints were used for the review. Accordingly, the reviews are provided as follow.

3.1. Role of Agricultural Extension on Increasing Farm Productivity

Asres *et al.* (2013) conducted research on the effect of agricultural extension program participation on farm productivity taking three case study kebeles (peasant associations) in Ethiopia. The study employed Ordinary Least Square (OLS) method, Heckman Treatment Effect Model (HTEM) and Propensity Score Matching (PSM). The review showed that in the OLS estimation result extension participation increases farm productivity by about 6%. However, both HTEM and PSM clearly showed the presence of selection bias in extension program participation which leads to underestimation of the OLS estimates. Thus, the participation could have increased farm productivity by up to 20% had it not been to the serious selection bias related to non-farming factors such as involvement in kebele administration, and wealth status of the participants observed during program placement. Moreover, the review indicated that the PSM analysis also verifies the positive effect of extension program participation on farm productivity.

Mussema *et al.* (2015) examined Ethiopia's crop diversification factors. Extension services reportedly had a beneficial and considerable impact on crop diversification as well as productivity. According to their justification, having access to extension services promotes the adoption and spread of new technologies through the provision of technical advice, credit availability, input supplies, and even the dissemination of market information and the development of farmer capacity, both of which may be directly related to the productivity and diversification of cereal crops.

Another study conducted by Aregawi (2017) analyzed the role of agricultural extension services on increasing food crop productivity of smallholder farmers in case of Atsbi Womberta Woreda, Ethiopia. This study was mainly concerned with to assess the role of agricultural extension service in improving farmer's productivity in Atsbi Womberta Woreda. The review showed that the agricultural extension services had a great contribution on increasing food crop productivity. Consequently, the review verified that the total average grosses benefit of the respondent from agricultural extension services was 39065 Ethiopian Birr per hectare. In addition, the total net benefit of the respondents was 28717 Birr. As the review indicated the productivity of the respondent has increased twice after they accessed to extension services. On the other hand, the review find that the major constraint that inhibited farmers to access extension service were lack of capital, cost of input, lack of land, and low educational level, lack of adequate information and poor information seeking behavior of the farmers. Finally, the review finds that the extension agents were more focused on the model farmers and gave less attention to poor farmers. This led to limit farmers from participating in extension activity.

A study conducted by Benefit (2020) indicated extension services boost land productivity. The extension offers a range of organic and inorganic fertilizers to boost land output. According to this study, these fertilizers can subsequently be employed to increase agriculture production all around the nation. However, there was little solid data in this study to support the amount of fertilizer that should be applied at the time. The types of fertilizers that should be utilized to increase fertility are not yet well described in this result.

3.2. Constraints of Agricultural Extension Services in Ethiopia

Kassa Belay (2002) assessed obstacles to agricultural extension work in Ethiopia. According to the review, various extension approaches have been biased against the livestock sub-sector, extension programs and policies have been developed without taking farmers' opinions into account, and research and extension activities have been carried out by various organizations without proper coordination. Moreover, the survey results show that extension work in the country has not been participatory in nature, that there has been very little connection between research and extension, and that extension agents have been engaged in a variety of activities outside the scope of their regular responsibilities.

Tigst *et al.* (2017) examined the obstacles and difficulties that came up when adopting agricultural extension methods in the case of north Gondar in Ethiopia's Amhara Region. The aim of this study is to assess the challenges faced by rural youth and women farmers, as well as the limitations of the extension system's ability to educate farmers in the study area about agricultural technologies. According to this study, public agricultural extension services are currently provided in an institutional, technological, and technical manner. They also address issues like gender and the environment in broader contexts, allowing for an examination of current endogenous and exogenous restrictions.

Ethiopia's poor level of agricultural production is partly due to the absence of farmer participation in extension efforts. With such little input, the demands of all extension stakeholders could not be taken into account. According to past studies (Tesfa, 2008; Aregawi, 2017; Asfaw, 2018; Waktole, 2020; Tariku *et al.*, 2021), farmers in Ethiopia rarely participate in agricultural extension activities. On the other hand, it was not known what degree and what kinds of participation led to expansion. Similarly, the extension system employs strict centralization during the design phases (Berhanu & Hoekstra, 2006; Gerba, 2018). The extension services are delivered and created using a top-down methodology. This study was primarily focused on planning while excluding monitoring, execution, and assessment.

4. Summary

In summary, the reviewed literature indicated that there is a limited work in area of the role of agricultural extension with a special emphasis on increasing in farm productivity in Ethiopia. However, the review on the role of agricultural extension indicated that, extension service had positive and significant role on enhancing farm productivity. Moreover, the review asserted that farm productivity can be increased by increasing agricultural extension services. This implies that farmers who getting more frequent extension services could increase their farm productivity. Ultimately, this review asserted that agricultural extension had an important role on increasing the farmer's knowhow on agronomic practices such as pest and disease control and adoption of improved seed varieties as well as soil and water conservation technologies resulting increase in

farm productivity. On the other hand, the review reveals that weak interaction; low participation, lack of technical skills, missed use of services, the weak link of research extension, a lack of incentives, and a lack of suitable adaptation to technologies constrain the extension system across the country.

Based on the review the following recommendations are forwarded. Agricultural extension services should be increase to farmers by the government agents especially District Agriculture Development Unit, and NGO's to assist these farmers to have easy access to extension so as to increase farm productivity. The review shows that extension agents faced many constraints while working. To enhance the current working conditions of extension agents, including transportation, housing, and proper budget allocation, the government should adopt a very responsible and practical approach. Finally, there is a need for further studies on the role of agricultural extension services with a special emphasizes on increasing farm productivity in the country to obtain adequate data.

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Comparison of Autoregressive Distributed Lag Model and Vector Error Correction Model Analysis on The Effect of Some Macroeconomic Variables on GDP in Nigeria

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Abstract

This research work employed Autoregressive distributed lag (ARDL) and Bound Test for co-integration with Vector Error Correction (VEC) Models for estimation of long run and short run effect on Gross Domestic Product (GDP) in Nigeria. In order to achieve this, annual data on GDP, Unemployment, Exchange, and Interest rate from 1980-2017 The Augmented Dickey Fuller (ADF) Test revealed that the variables are stationary at first difference. ARDL and bound test for co-integration revealed that the decision whether to accept or reject either of the hypotheses is inconclusive. Johansen confirmed the existence of long run relationship between the variables. VECM long run estimate indicated that there is positive and significant effect of Exchange rate and Unemployment rate on GDP while Interest rate had negative significance effect on GDP. ARDL long run estimate indicated that only Unemployment rate had significant effect on GDP. ARDL short run estimate among the variables revealed that the coefficient of the ECM(-1) had a correct sign and statistically significant at 5% level which also indicated that the system corrects its previous period at the speed of adjustment by 46% per annum, it was also revealed that interest rate was positive and statistically significant in the short run. While VEC short run estimate revealed that no any variable has significant effect on GDP and that the coefficient of the ECM(-1) had a correct sign and was statistically not significant at 5% level which also indicated that the system had its previous period correct at the speed of adjustment by 12% per annum. The models were stable for forecasting, no serial correlation, multicollinearity, heteroskedasticity and the residuals are normally distributed.

Keywords; ARDL, VECM, GDP, Unemployment rate, Interest rate, Exchange rate .

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1. Introduction

Basically Nigeria economy has been affected by some factors, among of these are unemployment, interest, exchange, and GDP. In this research work we shall identify factors affecting GDP and the relationship between them in Nigeria, where some of which may show negative relationship while other factors may show positive relationship.

Gross Domestic Product (GDP) is one of the basic indicators used to measure the improvement of national economy. According to World Bank definition, Gross Domestic Product (GDP) is the sum of gross value added by all resident producers in economy plus any product taxes and minus any subsidies not included in the value of the products. Gross Domestic Product is used to determine if an economy is growing fast or slow. GDP is calculated without making deduction for depreciation of natural resources. Economic performance has not been impressive in Nigeria due to high Interest rate, high Exchange rate and increase in population but low employment. According to Njoku and Ihugba(2012) stated that unemployment contributed to low GDP and leads to increase in crime and violence, psychological effect, adverse effect on health and political instability. Rodrik(2008) proved that GDP is affected by exchange rate of any country. Udoka and Roland(2012) stated that the interest rate is one of the determinant of economic growth.

1.2 Statement of the problem

Nigeria economic growth has been poor for a numbers of decades because, economic crises in Nigeria is reflected in level of unemployment, high interest rate, exchange rate distortions to mention a few. The main purpose of this study is to identify the effect of interest, unemployment, and exchange rate on gross domestic product (GDP) in Nigeria. It can be seen that from 1980 to 2017 Nigeria economic growth has been growing but not as it is expected. Foo-Zor (2009) stated that slow economic growth which may be due to expansionary monetary policy via a relatively high interest rate regime can lead to a fall in the economic growth. Redrik (2008) found that there is a relationship between exchange rates with economic growth to form positive relationship. Many studies have proved the existent of conflicting relationship between economic growth and unemployment with some showing positive while other showing negative relationship this include the work of Lee (2000) and Fuad (2011) to mention a few.

2. Literature Review

2.1. Concept of GDP

The measures of national income and output for a given country's economy at a given period of time are called GDP. The definition of GDP is based on the total market value of all goods and services produced within the country in a given period of time Alex (2015). Gross Domestic Product (GDP) is one of the most common measures on the state of the economic for any nation. Another issue is that GDP is about outcomes, rather than processes. Most of us do care about how we got the goods and services we consume as well as what we consume. Ruffin (1998) also said that Gross Domestic Product is the broadcast measure of the total output of the economy. Samuelson (2005) explained Gross Domestic Product as the name given to the total

market value of the final goods and services produced cost of pollution, other disamenities modern urbanization and some other adjustment.

2.2. Concept of Unemployment Rate

According to Balami (2006) Unemployment is conceptualized as a situation where by a worker is or workers are involuntarily out of work. This means that people are willing to work but cannot find any work.

Jhingan (2001) posited that unemployment can be conceived as the number of people who are unemployed in an economy often given as a percentage of the labour force.

According to Aminu and Anono(2012) Unemployment can be conceptualized as total number of people who are willing and able to work, and make themselves available for job at the prevailing wage but no work for them. This therefore implies that unemployment is a state of joblessness in the country.

2.3. Concept of Interest Rate

Jhingan (2001) stated that interest rate play the following role in any economy. It measures the opportunity cost of various productive channels and thus helps allocation of saving among them. Interest induces people to save from their incomes and provide capital for productive uses. It has been widely recognized as a powerful weapon to be used by the monetary authorities to control deflation, capital Movement, inflation, etc. It regulates the flow of investible funds and thereby influences the growth and direction of business and industrial actively.

2.4. Concept of Exchange Rate

Mordi(2006) defined exchange rate as the prices of one currency in terms of another. According to Azeez et al(2012) noted that when there is deviation of this rate over a period of time from the benchmark or equilibrium exchange rate is called exchange rate volatility.

Adenomon et al (2019) in the study recommends that savings and savings culture should be encourage in Nigeria since economic theory states that savings and investment are related in any economic development, the study applied ARDL model to examine the contributions of commercial banks to GDP growth in Nigeria, the annual data from 1981-2015 for loans and advance savings, lending rate and GDP of financial institution were collected from CBN bulletin.

Adenomon et al (2018) employed the fully modified ordinary least squares (FMOLS) and the error connection model (ECM) to investigate the unemployment rate in Nigeria. The ADF test shows that the microeconomic variables are stationary at first differences while the co-integration test shows that the variables are co-integrated using unemployment rate as dependent variables. The FMOLS model revealed that exchange rate and population growth are positively significantly related to unemployment, interest and inflation rate were negatively related to unemployment but only interest rate was significant the short run relationship revealed that the co-efficient of the ECM(-1) is negative and statistically significant at 5% level indicating that the system corrects its previous period disequilibrium at the speed of 48.9% yearly. This study concludes that high exchange rate and population growth can lead to increase

in unemployment rate in Nigeria while the government should develop the industrial sector and non-oil section in order to generate employment and boost export in Nigeria.

Rao et al (2010) Investigated the impact of financial development and trade openness on GDP growth in Pakistan, by employing bound testing approach, the analysis demonstrates that in the long – run, trade openness and financial development both increases economic growth, while in the short run, the results indicate directional causality between trade openness (Top) to granger – caused economics growth (GDP) and M2 granger – caused GDP. It is manifest that economic growth is sensitive to changes both trade and financial liberalization policies. Therefore the government should realize effective macroeconomic policies along with momentous improvements in the structure and financial liberazation reforms.

Akutson et al(2018) examined the relationship and effect between unemployment and economic growth in Nigeria, the studies employed ARDL and parsimonies error correction model to analyses the relationship and effect respectively the finding shows that there is no long run relationship among the variable and the short run indicate that 1% increase in unemployment 20.6% of increase in output in the third period performance.

Olawunmi and Adedayo(2017) investigated the impact of unemployment on economic growth in Nigeria using vector autoregressive (VAR) approach it aim was to analyze the variations using difference method such as ADF, johansen co-integration test, VAR model, impulse response test and variance decomposition test when employed to analyze the data. The study recommends increase in government expenditure towards the enhancement of individual skill in order to reduce unemployment and inflation.

Sultan (2010) examined the short run and long run characteristic of gasoline in the transport sector Mauritius. The result indicates that the co-integration and the long run income and price elasticity of gasoline demand are estimated to be 0.77and -0.44 respectively and the short run income elasticity is 0.37 based on ARDL error correction model while the short run price elasticity is found - 0.27 the adjustment parameter is found to be 0.48 which implies that around 95% of the demand adjustment occurring after five period.

Malayaranjan (2018) examined the effect of unemployment on economic growth in india, both long run and short run relationship are analyzed through ARDL bound testing approach. The long run result revealed that unemployment rate increase economic growth by-1.07%. the study satisfied Okuns law. The policy implication is that private entrepreneurship should be encouraged and a micro small and median enterprise also plays an important rule for employment generation in India.

Ismaila (2016) examined the exchange rate depreciation and Nigeria economic growth during the SAP and post SAP period. he employed Johansen co-integration test and error correction model analysis, the result show that exchange rate has direct insignificant effect on Nigeria economic growth in both the long run and the short run, it implies that exchange rate depreciation during the SAP period has no effect on Nigeria economic performance. The study suggested that policy makers should not totally rely on exchange rate depreciation policy instrument to induce economic growth but should use it to complement other macro- economic policies such as monetary and fiscal policies.

Siyasanga and Hlalefang (2017) investigated the dynamic impact of broad money supply (M3) on economic growth (GDP) per capital in South Africa from 1980-2016 the study employed ARDL for co-integration and ECM to investigate the impact of M3 on GDP the findings revealed that there is negative and insignificant relationship between interest rate and economic growth both in short and long run.

Sumera&Amjad (2016) studied the interrelationship of unemployment, interest and inflation rate in Pakistan ARDL model was use to find integration among variable and VECM model utilized for analyzing short run dynamic of the model the result do not provide significant trade – off between unemployment rate and inflation- rate trade off exist in interest rate analysis over short run with inflation rate and unemployment rate. The empirical result show population growth and exchange rate have negative whereas external debt plays a positive role in determining unemployment rate in Pakistan. Money supply is revealed as major cause of inflation while exchange rate and import have contributed negatively in inflation the rate of interest has positive impact on domestic with to private sector where it is negatively related to exchange rate.

Ewubare and Ushie(2018) examined the link between unemployment rate and economic growth in Nigeria during 1990-2016 the data were sourced from world bank, world development indicator they employed descriptive statistic, ADF and ARDL in their analysis. ARDL revealed that the variables are co-integrated it was also revealed that in the short run male unemployment at lag 3 has significant negative impact on GDP growth rate. The long run estimate indicated that female unemployment is negatively related to GDP growth while youth unemployment impacted positively to GDP growth rate. The policy implication for rapid and sustained growth in Nigeria should prioritize employment generation by creating new employment opportunities.

Lee(2012) investigated the nature of the inflation hedging effectiveness of residential properties (four categories), common stock and time deposits for Hong Kong over the period of (1980-2011) he employed ARDL co-integration approach and classical regression approaches. The ARDL result suggest that all size of residential estate and common stock provide a better long term inflation hedge than time deposit but only the small and medium size properties provide a short term inflation hedge based on the regression results. The regression and co-integration results demonstrate that small and medium size real estate assets are the most effective investment vehicle for short and long term inflation hedge. It therefore implies that investors wishing to safeguard the value of purchasing power should reallocate their time deposit asset to the small and medium size residential property during the period of high inflation, during low inflation and deflation period, the results suggest the investor should shifts their investment away from all categories of residential properties to time deposits, the study concludes that the small and medium sizes properties provide a better short term and long term hedge against inflation than large, luxury apartments and financial assets in Hong Kong.

Iheanacho (2017) examined the trade liberalization in Nigeria as a developing economy from (1981-2014), he employed the ARDL / bound test approach. The result shows that the long and short run impacts of trade liberalization to economic growth suggests that the Nigeria economy is yet to harness the benefits of international trade, this is an indication that Nigeria has a lot to do in the exploit and harness a lot its potential. The findings offer some important policy implications, trade liberalization could be another avenue for economic diversification through foreign direct investment and by so doing there will be improved in gross capital formation and indeed economic growth.

Lacheheb & Siraq (2015) found that there was a significant relation between oil price increase and inflation. Where as a significant relation between oil price reduction and the inflation was absent, using ARDL approach. The study examines the relationship between oil price changes and inflation rate in Nigeria from 1970 – 2014.

Ebiringa and Anyaougu (2014) examined the relationship between exchange, inflation and interest rate in Nigeria from (1971-2010) using (ARDL) co-integration analysis, the paper established a significant short run and long run positive relationship between inflation and exchange rate. On the other hand, interest rate exhibited a negative relation though in significant. Concerted effort of all monetary authorities is therefore needed to ensure that periodic variation in inflation is kept at the barest minimum for stability in exchange rate require to be achieved.

Pallis (2006) focused his study on the relationship between inflation and unemployment in new European union member states. He obtained the data used in the analysis the annual data that covered the period from 1994 to 2005, which was taken from European commission 2004 referred to the new ten (10) European union (EU) member's states. The three variables used are the price deflation of GDP at market price, the nominal compensation per employee and then the total employment rate (%). In estimating are variables used in the study, nonlinear least square method of estimation and E – view techniques were used. The findings proved and concluded that the application of common policies across economy may be questionable because of the different effect, of these prices on unemployment and inflation.

Tung (2015) investigated the relationship between the remittance and economic growth in Vietnam during the period of 1996-2012, he applied an autoregressive distributed lag model ARDL bound testing approach to co-integration, error correction, model derived from the ARDL model was used to examine short run dynamic among variables. The finding revealed that remittance has significant positive effect on economic growth in both the short and long run.

Omeke and Ugwuanyi (2010) investigated the relationship between money inflation and output by employing granger causality test and co-integration analysis. The finding shows that co-integrating vector does not exist in the series used; money supply causes both output and inflation. The results indicate that since the price level varies and it causes by money supply, the monetary policy can contribute towards price stability in economics of Nigeria.

Aminu and Anono (2012) studied the impact of inflation on economic growth and development in Nigeria, OLS, ADF and granger causality test was employed and the result shows that there

is a positive correlation between inflation and economic growth in Nigeria and the coefficient of inflation is not statistically significant, but is consistence causation runs from GDP to inflation it money that inflation not granger cause GDP.

Innocent et al (2012) investigated the impact of economic growth and foreign direct investment in Nigeria they employed OLS and granger causality test and found that foreign direction investment (FDI) impacted positively and insignificance on economic growth proxy by GDP between FDI and GDP impacted causality result indicated bidirectional causality.

Maiga(2017) examined the impacted of interest rate of economic growth in Nigeria from 1999 to 2013. The results found that the interest rate has a slight impact on growth the finding shows that growth can be improved by lower the interest rate which will measure the investment. As a result of the study was foundout that Nigerian authorities should set interest rate policies that will boost the economic growth.

Ezirim et al (2012) examined the interdependencies between exchange rates and inflation rates behavior in Nigeria. Using autoregressive distributed lag techniques (ARDL) they found that exchange rates movements and inflation spiral are co-integration and short and long run also exist. This inflation targeting, policy aimed at exchange rates manipulation becomes a proper monetary action or vice versa.

Alex (2013) investigated the effect of factors affecting gross domestic product (GDP) in developing countries, the case of Tanzania from 1970 to 2009, he found that the most common GDP trend is a continuous acceleration and deceleration, he says GDP in same countries is confused and unbalanced with regular and deep unconditional GDP falls and booms. He says Tanzania GDP is influence by (government final expenditure and to selected final expenditure and exports.

Mitraand Pattnaik (2001) indicated that interest rates, inflation rates, and exchange rates are all highly correlated, by manipulating interest rates, central banks exert influence over both inflation and exchange rate and changing interest rates impact inflation and currency values.

Hatane and Stephanie (2015) in their studies, they found that there is a significant negative relationship of interest rates on GDP and a significant positive relationship of the exchange rates on the GDP, while inflation is not a significant influence on GDP. The study employed inflation, interest and exchange rate as independent variable and GDP as dependent variables.

Ifionu, and Ibe, (2015) investigated the impact of inflation, interest and real gross domestic product on stock prices of quoted companies on the Nigerian stock exchange (NSE) post SAP. Data covered a period from 1985-2012. Johansen multivariable co-integration test indicates the existence of the long run relationship among variables in the model; a granger causality test result indicates no causal relationship between the variables etc. the finding suggest that inflation was the most important variable influencing prices in Nigeria.

3. Research Method

Data was analyzed using various econometric techniques such as The ARDL co-integration technique which is used in determining the existence of long run relationship between series with different order of integration (Pesaran et al. 2001). The reparameterized result will gives

the short-run dynamics and long run relationship of the considered variables. Although ARDL co-integration technique does not require pre-testing for unit roots, to avoid ARDL model crash in the presence of integrated stochastic trend of $I(2)$, and VECM is employ for long run relationship between the variables, we are of the view the unit root test should be carried out to know the number of unit roots in the series under consideration. Augmented Dickey-Fuller (ADF) tests will be employed to test the presence of unit root in the series. The statistical package that is used in this work is EViews.

3.1. Test for Unit Root

In running the ARDL for the relationship among the variables in econometric analysis we must test for the existence of stationarity among the variables. We apply the Augmented Dickey - Fuller (ADF) Unit root test to check for the stationary state of the variables. Note that each of the variable must be tested for stationarity in the model before testing for the co-integration.

$$y_{1t} = \rho y_{1t-1} + u_t \quad (3.1)$$

Where ρ is constant, y_{1t-1} , u_t is lag of dependent variable and u_t is a white noise, Subtract

$$y_{1t-1} \quad \text{From both side we have. } y_{1t} - y_{1t-1} = \rho y_{1t-1} - y_{1t-1} + u_t$$

Note that $y_{1t} - y_{1t-1} = \Delta y_{1t}$

$$\Delta y_{1t} = (\rho - 1)y_{1t-1} + u_t \quad (3.2)$$

Equation 3.2 does not consider possible serial correlation of the error process we now replace AR (1) process with ARMA (p,q) which ensures serial correlation in the error term as

$$\Delta y_{1t} = \alpha + \beta t + (\rho - 1)y_{1t-1} + \sum_{j=0}^r \beta_j \Delta y_{1t-j} + u_t \quad (3.3)$$

Where β_t is deterministic trend, α is a constant, Δy_{1t-j} capture serial correlation, $\sum_{j=0}^r \beta_j$ is long run cumulative effect and β_j is lag weight, u_t is the error term.

Hypothesis of unit root is of the form $H_0: \alpha = 0, \beta = 0, \rho = 1$ against alternative $H_1: \alpha \neq 0, \beta \neq 0, \rho < 1$

If the null hypothesis is accepted, we assume that there is unit root and differencing the data before running the regression.

3.2 Tests for Co-integration

When the stochastic process is non- stationary, then the use of OLS can produce invalid estimates (Song and Wong, 2003,). This may results the R-square to be much higher than the Durbin-Watson, t-ratio is also too high and leads to over rejection of the null hypothesis in the slope coefficient estimates and finally yields a result with no economic meaning at all. Granger and Newbold (1974) coined such estimates as “spurious regression”. To overcome such shortcoming requires the specified equation to transform into valid regression by taking the first difference of the variables. This method solves only the statistical problems but not the theoretical economic interpretability of the specification. By doing so, taking the first difference might lose significant information in the long run. Co-integration is a certain stationary linear combination of multiple $I(1)$ variables. The notion for co-integration arose out of concern about

spurious or nonsense regression in time series. The concept of Co-integration was developed by Engle and granger (1987)were the first to formalized the idea of Co-integration which is used to establish relationship among non-stationary series such that the relationship is reasonable, sensible and of statistical important, it also establishes a link between two non-stationary series by obtaining a linear combination which gives integration of order zero $I(0)$, it also specifies the Error Correction Model(ECM) which bring short and long run information

The econometric approach developed by Pesaran et al(2001) called Autoregressive Distributed lag (ARDL) model /bound test for co-integration is used, this technique have various advantage, for Example the ARDL can be apply to different orders of integration for the variables which the dependent variable should be $I(1)$, and other variables can be either $I(0)$ or $I(1)$ or both and robust when there is a single long run relationship between the variable in a small sample. The long-run relationship between the variable can be detected through the F-statistic (Wald test) when the F- statistics exceed the critical value band, this technique will crash in the presence of integrated stochastic trend of $I(2)$. Hence according to Sultan (2010) and Tung (2015) state that when the sample size from 30 to 80 is given the appropriate critical values for bound testing is Narayan (2005).

3.3. Determination of the Existence of the long Run Relationship of the Variables

As was said earlier the existence of the long run relationship that occurred between variables under investigation is tested by computing the bound F-statistics. The ARDL model specification between GDP, exchange, unemployment, and interest rate in equation

$$\Delta lny_t = a_o + \sum_{i=1}^k a_1 \Delta lny_{t-i} + \sum_{i=0}^p a_2 \Delta lnx_{1t-i} + \sum_{i=0}^q a_3 \Delta lnx_{2t-i} + \sum_{i=0}^r a_4 \Delta lnx_{3t-i} + \delta_1 lny_{t-1} + \delta_2 lnx_{1t-1} + \delta_3 lnx_{2t-1} + \delta_4 lnx_{3t-1} + ut \quad (3.4)$$

Where

a_o = intercept

a_s = short run relation

δ_s = long run relation

u_t = white noise

Δ = first difference operator.

k, p, q and r = Are the optimal lag lengths of $y, X1, X2$, and $X3$ respectively.

lny = Natural log of GDP

$lnx1$ = Natural log of Exchange Rate

$lnx2$ = Natural log of Unemployment Rate

$lnx3$ = Natural log of Interest Rate

The Akaike Information Criterion (AIC) was used for the lag length selection. ARDL bound testing for co-integration, F-statistics (Wald test) was used to examine the null hypothesis of no co-integration among the variables, and the estimated F-statistics value is compared with the two sets of critical values of the upper- and lower-bounds. If the estimated F-statistics value is higher than the upper- and lower-bound critical values, then the null hypothesis of no co-integration is rejected. If it lies between the two critical values, the conclusion is indecisive. If the F-statistics value is lower than the critical values, the null hypothesis of no co-integration

is accepted. After the bounds test confirms the co-integration between the variables, the long-run Equations (3.5) and short-run Equations (3.6) coefficients can be investigated.

$$\ln y_t = a_0 + \sum_{i=0}^k a_i \Delta \ln y_{t-i} + \sum_{i=0}^p a_1 \Delta \ln x_{1t-i} + \sum_{i=0}^q a_2 \Delta \ln x_{2t-i} + \sum_{i=0}^r a_3 \Delta \ln x_{3t-i} + u_{1t} \quad (3.5)$$

The next step is to obtain the short-run dynamic parameters by estimating an error correction model associated with the long-run estimates.

3.4. Estimation of short-run dynamics coefficients and Error correction Term

This involves the estimation of short-run dynamics by using the following model

$$\Delta \ln y_t = r + \sum_{i=0}^k a_0 \Delta \ln y_{t-i} + \sum_{i=0}^p a_1 \Delta \ln x_{1t-i} + \sum_{i=0}^q a_2 \Delta \ln x_{2t-i} + \sum_{i=0}^r a_3 \Delta \ln x_{3t-i} + g_0 ECT_{t-1} + u_{1t} \quad (3.6)$$

Where

g_0 is the coefficient of error correction term, which measures the speed of adjustment

ECT is the error correction term that measure short run dynamic.

Where ECT_{t-1} in equation (3.7) is given as

$$ECT_{t-1} = \ln y_{1t} - \hat{a}_0 - \sum_{i=1}^k \hat{a}_i \Delta \ln y_{1t-i} - \sum_{i=0}^p \hat{a}_1 \Delta \ln x_{1t-i} - \sum_{i=0}^q \hat{a}_2 \Delta \ln x_{2t-i} - \sum_{i=0}^r \hat{a}_3 \Delta \ln x_{3t-i} \quad (3.7)$$

The co-integration regressions consider only the long run properties of the model and do not consider short run dynamics but ECM measured the short run dynamic of the model of which the short run dynamics measure any dynamic adjustments between the first differences of the variables. However, to restore equilibrium between the variables, Error correction term is used to capture the speed of adjustment of variables.

The ECM shows how much of the disequilibrium is being corrected i.e any disequilibrium in the previous period is being adjusted. A positive and negative coefficient indicates divergence and convergence respectively, if the estimated $ECT=1$ it means 100% of adjustments takes place within the period and if $ECT=0.5$ it means 50% of adjustment take place in each period, if $ECT=0$ it shows that there is no adjustment and the long run relationship does not exist or make sense any more. Note the ECM as the speed of adjustment parameter is derived as the error term from the co-integration model (3.4) whose coefficients are obtained by normalizing the equation (3.4) respectively. In general the ECT_{t-1} should be negative and between 0 and 1 usually the ECT_{t-1} reports the speed of the adjustment to converge back to its long run equilibrium. (g_0) is the coefficient for measuring speed of adjustment in equation (3.6).

3.5. Johansen's test for co-integration

Johansen approach involves the following steps

1. All the variables have to be tested for order of integration.
2. Choose the appropriate lag length of the model.

3. In the multivariate system choosing the appropriate model regarding the deterministic Components.
4. Estimating the number of co-integrating vectors.

From (4) above and for the sake of this research there are two methods for determining the number of co-integrating vector where both of them involve estimation of matrix π .

In order to understand the procedures, if we have n characteristics roots given by $\pi_1 > \pi_2 > \pi_3 \dots > \pi_n$ if the variables under investigation does not have long run relationship then the rank of π is zero and all the characteristic roots above will be equal to zero and $(1 - \pi_i)$ will be equation 1 and $\ln(1) = 0$.

The T-statistics below test how many of the number of the characteristic roots are significantly different from zero.

The procedures to obtain the number of co-integration vectors are maximum engine value test and the trace test (Johansen & Juselius, 1990) where the maximum engine value statistic test the null hypothesis of r co-integrating relations and the alternative hypothesis of $r+1$ for $r=0,1,2,\dots, n-1$. With the T- statistics

$$\pi_{max}(r, r+1) = p \ln(1 - \hat{\pi}_{r+1}) \quad (3.8)$$

The trace statistic formula is computed as

$$\pi_{trace}(r) = -p \sum_{i=r+1}^n \ln(1 - \hat{\pi}_i) \quad (3.9)$$

Which examines the null hypothesis of r co-integrating relations against the alternative of n where n is the number of variable in the system for $r=0,1,2 \dots n-1$.

Where π is the maximum Eigen value, P = sample size, K = is the number of endogenous variables.

If there is divergence of results between these two test, it is advisable to rely on the evidence based on the π_{max} test because it is more reliable in small samples (Odhiambo, 2005; Mukhtar and Rasheed 2010).

3.6. Vector Error Correction Model (VECM)

VECM is VAR which has been designed for use with non-stationary data having co-integration relationship Mustofa et al (2017). In the other hand if co-integration has been detected between series we know that there exists long run equilibrium relationship between them so we apply VECM in order to evaluate the short run properties of the co-integrated series. In case of no co-integration VECM is no longer required and we directly proceed to granger causality test to establish causal links between variables. Again if a set of variables are found to have one or more co-integrating vectors then a suitable estimation technique is a VECM which adjusts to both short run changes in variables and deviation from equilibrium. According to Granger (1969) in his study on "Investigating causal relations by econometric models and cross-spectral methods" noted that; when time series variables are integrated at order (1), the best model for investigating a causal relationship among the variables is the Vector Error Correction Model (VECM).

This approach extent the single equation error correction model to a multivariate model, let assume that we have three variables x_1, x_2, x_3 which can be endogenous, that is

$$Y_t = [X_1, X_2, X_3] \quad (3.10)$$

$$Y_t = c + A_1 Y_{t-1} + A_2 Y_{t-2} + \dots + A_p Y_{t-p} + \mu_t \quad (3.11)$$

A VAR(p) can be reformulated in a vector error correction model as

$$\Delta Y_t = c + \sigma_1 Y_{t-1} + \sum_{i=1}^{p-1} A_i \Delta Y_{t-i} + \mu_t \quad (3.12)$$

Where:

Δ : Is the first difference operator, $\Delta Y_t = Y_t - Y_{t-1}$.

Y_{t-1} = Vector variables endogenous with first lag

μ_t = Vector residual

c = Vector intercept

δ_1 = Contains the long run information, hence δ_1 can be decompose as LB^t where L includes the speed of adjustment to equilibrium coefficient while B^t will be the long run matrix of coefficient.

A_1 = Matrix with order $k \times k$ of coefficient Endogenous of the i^{th} variables

4. Result and Discussion

4.1 Result

The data are also presented graphically as

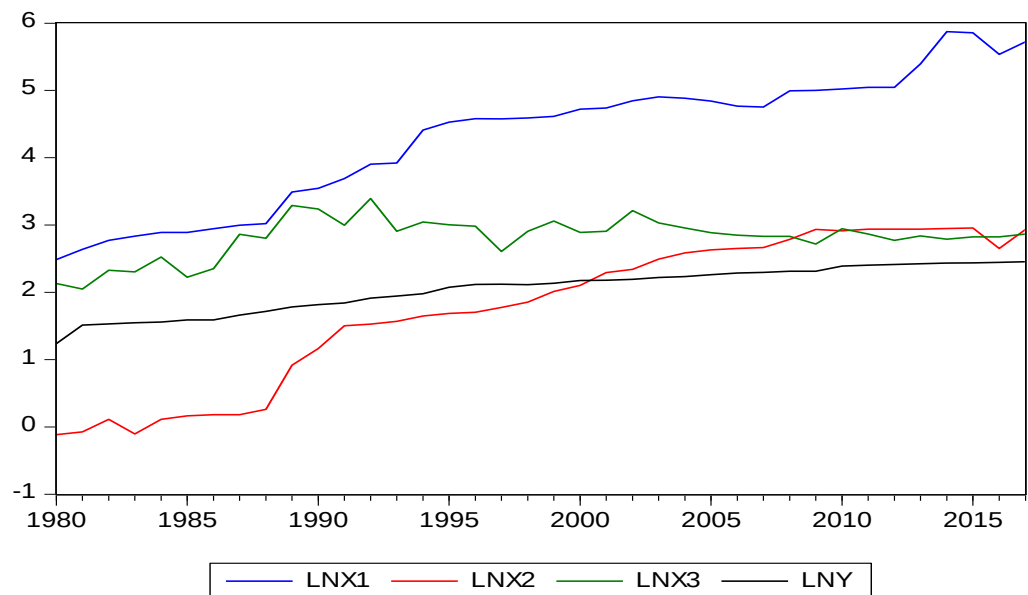


Fig 4.1: A Graph of Macro Economic Variables

The above graph is the graph of natural log transformation of the macro economic variables used in this study. The graph of Exchange and unemployment rate rise rapidly (positive growth), GDP increase slowly and stable while interest rate rise and fall (fluctuate)

Tabel 1. Descriptive Statistics

	LNx1	LNx2	LNx3	LNy
Mean	4.296647	1.757923	2.811595	2.043709
Median	4.603096	1.935601	2.863627	2.127686
Maximum	5.874256	2.954910	3.394508	2.453777
Minimum	2.484907	-0.116534	2.047693	1.238374
Std. Dev.	0.991118	1.092444	0.307299	0.335426
Skewness	-0.387528	-0.539351	-0.776786	-0.589503
Kurtosis	1.956598	1.847738	3.387195	2.210027
Jarque-Bera	2.674883	3.944568	4.058884	3.189013
Probability	0.262516	0.139139	0.131409	0.203009
Sum	163.2726	66.80107	106.8406	77.66095
Sum Sq. Dev.	36.34562	44.15705	3.494017	4.162885
Observations	38	38	38	38

Hypothesis of interest

Ho: Variables are normally distributed

H1: Variables are not normally distributed

Reject Ho if p-value<0.05

The above table 1 shows that the variables under study are normally distributed since their p-values>0.05.

Table 2: Test for Unit root using ADF.

Variables	ADF test statistics	p-value	Order of integration
Lnx1	-1.834518	0.6675	I(0)
D(lnx1)	-5.479964	0.0004	I(1)
Lnx2	-0.831883	0.9532	I(0)
D(lnx2)	-5.747158	0.0002	I(1)
Lnx3	-2.493229	0.3294	I(0)
D(lnx3)	-9.230705	0.0000	I(1)
Lny1	-3.539443	0.0497	I(0)
D(LNY1)	-11.67184	0.0000	I(1)

Table 4.2 above indicate natural log of x_1 , x_2 , and x_3 became stationary at first difference i.e. $I(1)$ except natural log of y_1 that is stationary at level and at first difference i.e. $I(0)$ and $I(1)$ at 5 percent level of significance which show the capability or flexibility of ARDL model which can handle different order of integration $I(0)$ or $I(1)$ or mixed. That is, the models follows an integrating $I(1)$ and $I(0)$ process.

4.2 Co-integration Test

After the ADF test for unit root, if all the variables are $I(1)$ the co-integration test is usually undertaken. The existence of the co-integration relationship implies that the variables share mutual stochastic trend and linked in common long run equilibrium. The test utilizes ARDL Model approach to co-integration Testing/Bound Testing Approach.

Table 3: Standard ARDL (1, 1, 2, 1) Model.

Dependent Variable: D(LNY)				
Method: Least Squares				
Date: 04/06/19 Time: 11:04				
Sample (adjusted): 1984 2017				
Included observations: 34 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.356608	0.267379	1.333719	0.1973
LNY(-1)	-0.326771	0.192450	-1.697952	0.1050
LN X_1 (-1)	0.013639	0.041086	0.331957	0.7434
LN X_2 (-1)	0.071050	0.036424	1.950639	0.0653
LN X_3 (-1)	0.056034	0.037958	1.476198	0.1555
D(LNY(-1))	0.152278	0.247433	0.615432	0.5452
D(LN X_1)	0.010735	0.036534	0.293830	0.7719
D(LN X_1 (-1))	0.004051	0.042861	0.094517	0.9256
D(LN X_2)	-0.001870	0.043537	-0.042951	0.9662
D(LN X_2 (-1))	-0.055553	0.038031	-1.460750	0.1596
D(LN X_2 (-2))	-0.064448	0.034333	-1.877174	0.0752
D(LN X_3)	0.069388	0.022267	3.116156	0.0054
D(LN X_3 (-1))	0.025634	0.025667	0.998722	0.3299
R-squared	0.596605	Mean dependent var		0.027541
Adjusted R-squared	0.354569	S.D. dependent var		0.025145
S.E. of regression	0.020201	Akaike info criterion		-4.679066
Sum squared resid	0.008162	Schwarz criterion		-4.089532
Log likelihood	90.20458	Hannan-Quinn criter.		-4.480706
F-statistic	2.464937	Durbin-Watson stat		2.204838
Prob(F-statistic)	0.035962			

Table 4: Bound Testing

Wald Test:

Equation: Untitled

Test Statistic	Value	Df	Probability
F-statistic	3.518164	(4, 20)	0.0249
Chi-square	14.07266	4	0.0071

Null Hypothesis: $C(2)=C(3)=C(4)=C(5)=0$

Null Hypothesis Summary:

Normalized Restriction (= 0)	Value	Std. Err.
C(2)	-0.326771	0.192450
C(3)	0.013639	0.041086
C(4)	0.071050	0.036424
C(5)	0.056034	0.037958

Restrictions are linear in coefficients.

To test whether the co-integration relations exist among the variables in equation (8), the bound testing for co-integration is carry out in table 4.4 above, the test is base on the hypothesis that H_0 : there is no co-integration if F-statistic(Wald test) is less than Perasan 2001 or Narayan 2005 critical values lower bound and H_1 : there is co-integration if F-statistic is grater than upper bound at 5% level of significance respectively, The result shows that F-calculated fall in between the critical values bound in both Perasan 2001 and Narayan 2005. Since F-calculated (3.518164) is in between the critical values bound, its means that the result isindecisive since we cannot conclude whether either of the hypothesis is rejected or accepted. Marashdeh and Shrestha (2010) posited that another means of establishing co-integration is by applying the ECM version of the ARDL model.

Table 5 below show the critical values for Perasan 2001 and Narayan 2005. Hence table 4.5 is a Standard ARDL (1, 1, 2, 1) model where AIC is used to obtain the optimal lag length.

Table 5:Perasan 2001 and Narayan 2005 critical values for bound testing

Critical values	Perasan (2001)		Narayan(2005)	
	Lower bound	Upper bound	Lower bound	Upper bound
1%	3.74	5.06	4.59	6.37
5%	2.86	4.01	3.28	4.63
10%	2.45	3.52	2.70	3.90

Table.6: Long Run Coefficients of ARDL(1,1,2,1)

Dependent variable (lny1)					
Variables	Coefficients	Std error	t-statistic	p-value	Remarks
Constant	1.0913	0.2905	3.7561	0.0012	Significant
Ln _{x1}	0.0417	0.1065	0.3921	0.6991	Not Significant
Ln _{x2}	0.2174	0.0653	3.3310	0.0033	Significant
Ln _{x3}	0.1715	0.1943	0.8823	0.3881	Not Significant

Table 6 above is the result of long run relationship between GDP, exchange, unemployment, and interest rates, the natural log of the variables indicate that there is long run positive non-significance impact between exchanges, interest rate with GDP, while Unemployment show positive significance impact with GDP

Table 7: Short Run Model of ARDL(1,1,2,1)

Dependent Variable: D(LNY1)

Method: Least Squares

Date: 04/06/19 Time: 11:46

Sample (adjusted): 1984 2017

Included observations: 34 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.019276	0.006916	2.787241	0.0105
D(LNY(-1))	0.414568	0.178337	2.324636	0.0293
D(LNX1)	0.051216	0.029262	1.750259	0.0934
D(LNX1(-1))	-0.047477	0.034003	-1.396266	0.1760
D(LNX2)	0.021202	0.032996	0.642578	0.5269
D(LNX2(-1))	-0.009429	0.030533	-0.308817	0.7602
D(LNX2(-2))	-0.038018	0.032397	-1.173499	0.2526
D(LNX3)	0.062577	0.019584	3.195243	0.0040
D(LNX3(-1))	0.055134	0.019958	2.762462	0.0111
ECM(-1)	-0.460739	0.150624	-3.058874	0.0056
R-squared	0.511494	Mean dependent var	0.027541	
Adjusted R-squared	0.320340	S.D. dependent var	0.025145	
S.E. of regression	0.020730	Akaike info criterion	-4.669448	
Sum squared resid	0.009884	Schwarz criterion	-4.215961	
Log likelihood	87.04590	Hannan-Quinn criter.	-4.516864	
F-statistic	2.675819	Durbin-Watson stat	2.165473	
Prob(F-statistic)	0.027415			

Table 7 above show -0.460739 as the Error Correction Coefficient (ECM), with the correct sign, it means that about 46% speed of adjustment after a shock take place and 46% of

disequilibria is been corrected from previous years in the current year, in the other hand after a shock 46% of disequilibria of previous years converge back to the long run equilibrium in the current year with p-value 0.0056 which is significant. Both previous GDP and interest rate have positive and highly significant impact on current GDP in the short run. However, the coefficients of exchange and unemployment are not significant at 5 percent level though with a negative sign.

Johansen Maximum Likelihood Co-integration Test Results

Table 8 Co-integration Test

Date: 08/17/19 Time: 14:40
Sample (adjusted): 1982 2017
Included observations: 36 after adjustments
Trend assumption: Linear deterministic trend
Series: LNX1 LNX2 LNX3 LNY
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.632630	66.01193	47.85613	0.0004
At most 1 *	0.404027	29.96208	29.79707	0.0479
At most 2	0.162715	11.32992	15.49471	0.1920
At most 3 *	0.128143	4.936673	3.841466	0.0263

Trace test indicates 2 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 Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.632630	36.04985	27.58434	0.0032
At most 1	0.404027	18.63216	21.13162	0.1080
At most 2	0.162715	6.393249	14.26460	0.5633
At most 3 *	0.128143	4.936673	3.841466	0.0263

Max-eigenvalue 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

Table 8 is the co-integration test between the variables which Trace Test indicate 2 co-integrating equation at 5% under at most 1 and 2 since p-value = 0.0479 and 0.0263 < 0.05 it shows that there exist a co-integration between the variables and therefore the Max-Eigen value

test indicates 1 co-integrating eqn(s) at 0.05 level under at most 3 which indicate long run relationship among the dependent and independent variables.

Since co-integration has been detected between series, we know that there exists a long run relationship between them, then, that will enable us to apply VECM in order to evaluate the long run and short run properties of co-integrated series.

Table 9 VAR Lag Order Selection Criteria

VAR Lag Order Selection Criteria
 Endogenous variables: LNX1 LNX2 LNX3 LNY
 Exogenous variables: C
 Date: 08/17/19 Time: 14:50
 Sample: 1980 2017
 Included observations: 35

Lag	LogL	LR	FPE	AIC	SC	HQ
0	16.29982	NA	5.82e-06	-0.702847	-0.525093	-0.641486
1	151.5137	231.7952	6.45e-09	-7.515068	-6.626298*	-7.208265*
2	170.4088	28.07267*	5.69e-09*	-7.680501*	-6.080714	-7.128254
3	183.4465	16.39031	7.46e-09	-7.511229	-5.200426	-6.713540

* 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

Table 9 is the VAR Lag Order Selection Criteria, in table 4.9 the minimum values from each of the information criteria are given with star (*) show the Lag Optimal at Lag 2. But the lag of 1 (2-1) was utilized from the Akaike Information Criteria (AIC). This means the VECM (p) model used should be VECM (1).

Since their exist a long run relationship among the variables, then we now estimate the long run effect between independent variables on dependent variable.

Table 10 Long Run Estimate (VECM)

Dependent variable $\ln(y1)$

Variable	Coefficient	Std	t-calculate	Remark
Lnx1	0.21555	0.04318	4.99256	sig.
Lnx2	0.15940	0.03473	4.58958	sig.
Lnx3	-0.29945	0.05350	-5.59734	sig.
C	1.693462			

In the table 10 above the coefficient of Lnx1(exchange rate), Lnx2 (unemployment rate), are positive and significant related to Lny (GDP), except Lnx3(interest rate) which is negatively and significant related to Lny1 in the long run. This implies that a unit increase in Lnx1 and Lnx2 will result to an increase on Lny1. While unit increase in Lnx3 will lead to decrease on Lny1.

Table 11 Short Run Estimate (VECM)

Dependent Variable: D(LNY1)

Method: Least Squares

Date: 08/17/19 Time: 15:02

Sample (adjusted): 1982 2017

Included observations: 35 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.025763	0.006453	3.992570	0.0004
D(LNX1(-1))	-0.000410	0.035173	-0.011646	0.9908
D(LNX2(-1))	0.021224	0.034719	0.611312	0.5458
D(LNX3(-1))	0.021318	0.020632	1.033284	0.3100
ECM(-1)	-0.118249	0.126351	-0.935875	0.3571
R-squared	0.113519	Mean dependent var		0.027170
Adjusted R-squared	-0.008754	S.D. dependent var		0.024855
S.E. of regression	0.024964	Akaike info criterion		-4.407736
Sum squared resid	0.018072	Schwarz criterion		-4.183272
Log likelihood	79.93152	Hannan-Quinn criter.		-4.331188
F-statistic	0.928404	Durbin-Watson stat		1.651645
Prob(F-statistic)	0.461106			

Table 11 above indicates ECM coefficients. The ECM (-1) is the coefficient of the error correction mechanism which has a correct sign and the p-value is not significance (0.3571). Furthermore, the coefficient of the error correction mechanism revealed that about 11.8% or approximately 12% speed of adjustment take place in the system to come back to the equilibrium point which is very slow. It is also revealed that none of the variable is significantly related to GDP in a short run.

4.2 Discussion of Findings

Descriptive statistics in Table 4.1 shows the average, minimum and maximum values of log exchange rate, log of unemployment rate, log of interest rate and log of GDP). Jarque-Bera statistic of the variables and their p-values indicate that variables are normally distributed at 5% since null hypothesis of normality is accepted. This agrees with the work of Adenomon et al (2018) and Akutson et al (2018). The implication of this is that the ARDL and VECM models are appropriate because these models assume normal distribution.

Unit Root Test in Table 4.2 was done by Augmented Dickey Fuller (ADF) which can also use to capture serial correlation in the error term, and it revealed that all the variables are stationary at first difference i.e integrated at order 1, I(1) this is in lines with the work of Adenomon et al (2019) and Rao et al (2010).

ARDL/Bound test for co-integration in Table 4.4 the test indicates that Narayan (2005) and Paseran et al (2001) critical values shows that F-statistics 3.518164 lies in between the (lower= 3.28, upper 4.63) at 5% level. Hence we cannot conclude if there is long run relationship between the variables.

ARDL long run estimate in Table 4.6 revealed the effect of Unemployment rate, Exchange rate and Interest rate on GDP, the estimation result revealed that unit increase in unemployment, GDP will increase by 0.2% and is statistically significant the result is in line with the finding of Akutson et al (2018), Ezi (2014) but contrary with Malaranjar (2018) who found that an increase in unemployment lead to decrease in GDP. The implication of this result is that increase in unemployment in Nigeria can lead to increase in GDP. The ARDL long run estimate also revealed that unit increase in exchange rate will insignificant increase GDP by 0.042%. The estimation concurred with the finding by Ismaila (2016) but Utile (2018) disagree with this finding. Exchange rate has a tendency to improve the Nigeria economy performance. It was also revealed that unit increase in interest rate would insignificant increase GDP by 0.172%, this is also contrary to Udoka (2012) and Utile (2018).

Short run and ECM coefficient of ARDL (1, 1, 2, 1) model to understand the short run dynamic among the variables in Table 4.7 the ECM model was employed. The fitted ECM model revealed a short run impact from exchange rate, unemployment rate, and interest rate in Nigeria. While the ECM (-1) coefficient is -0.460739 which has the correct sign and significant, this means that the system to converge to equilibrium, it will take a speed of 46% annually. ECM (-1) also indicate that long run relationship exist since we cannot conclude from Standard ARDL(1,1,2,1) that long run relationship exist among the macroeconomic variables. The coefficient of exchange rate, unemployment rate are negative and statistically insignificant hence the unit increase in exchange rate will lead to 0.047% decrease in GDP, and unit increase in unemployment will lead to 0.009% decrease in GDP this result is consistent to the findings by Pierdzioch et al (2009), and Sibusiso (2018) and is contrary to Akusto (2018). The implication is that both exchange rate and unemployment rate does not influence Nigeria GDP.

It was also revealed that interest rate is positively and statistically significantly related to GDP and unit increase in interest rate lead to 0.06% increase in GDP, this result is contrary to Siyasanga and Hlalefang (2017).

Diagnostic Test the test revealed that there was no presence of multicollinearity, serial correlation and Heteroskedasticity the residual is normally distributed and the model is good for forecasting.

The Johansson co-integration test in Table 4.8 confirms the existence of long run relationship among the variables under study. According to economics theory which state that most macro-economic variable exhibits long run relationship Adenomon et al (2018).

VECM long run estimate in Table 4.10 indicated that exchange, unemployment and interest rate are statistically significance at 5%. The result on the effect of interest rate on GDP revealed that there is significant negative effect of interest rate on GDP and it also shows that unit increase in interest rate lead to 0.30% decrease on GDP. This is in line with work of Hatane and Stephanie (2015). The implication of this is that an uncontrolled or higher interest rate decline

GDP in Nigeria. If the interest rates decrease then the investment increase Banerjee and Adhikary (2009) therefore economic growth through increased production will be reflected in GDP. VECM also revealed that there is positive and statistically significant relationship between exchange rate and GDP it also indicates that unit increase in exchange rate will lead to an increase in GDP by 0.216%. This is in line with the work of Hatane and Stephanie (2015), Brigitta (2015), and Olawunmi (2017). The implication is this is that economic growth usually caused by high levels of investment and higher export. VECM also revealed that there is positive and statistically significant relationship between unemployment rate and GDP it also revealed that unit increase in unemployment rate will lead to 0.159% increase in GDP. This is in line with the work of Olawunmi (2017) & Asoluka and Okezie (2011).

Short Run Estimate (VECM) in Table 4.11 the result revealed that exchange rate is insignificant and negative related to GDP with p-values 0.9908, this indicate that unit increase in exchange rate will lead to 0.0040% decrease in GDP this disagree with the work of Ismaila (2016). The test also revealed that unemployment is positive and insignificant related to GDP with p-value (0.5458) the result also revealed that unit increase in unemployment rate lead to 0.021% increase in GDP. This result is contrary with the work of Malayaranjan (2018). It was also revealed that unit increase in interest rate will lead to 0.021 increases on GDP. This result is contrary with the work of Siyasanga and Hlalefang (2017) and is positive and insignificant (0.3100) related to interest rate. Hence ECM (-1) has a correct sign and statistically not significant (p-value=0.3571) with 11.8% speed of adjustment take place in the system to come back to the equilibrium point which is very slow. According to Gujarati (2004) stated that when ECM coefficient has a correct sign and the p-value is insignificant then this implies that the results does not support the existence of a long run between the variables.

VEC Diagnostic Test revealed Variance inflation factor (VIF) < 10 which indicate that multicollinearity does not exist, VEC residual Jarque-Bera test for normality indicate P-value (0.0082) which is less than 0.05 this means that the error term is not normally distributed. VEC residual serial correlation LM test indicate that no serial correlation in the error term since P-value is > 0.05. VEC residual Heteroskedasticity test indicate that Heteroskedasticity with P-value 0.0988 > 0.05 indicates no presence of Heteroskedasticity in the error term. CUSUM at 5% significance indicate that model is stable for forecasting.

5. Conclusion

This study revealed that unemployment Rate was positively and statistically significantly related to Gross Domestic Product (GDP) while Exchange Rate and interest rate were positively and statistically insignificantly related to Gross Domestic Product (GDP) when ARDL model was used. While unemployment Rate and Exchange Rate were positive and significant related to gross domestic product (GDP) and interest rate was negative and significant related to gross domestic product (GDP) when VECM model was used.

This study contributed to the body of the knowledge as the researcher employed two models to test for co-integration between the variables as well as to investigate the long run and short run effect among the variables under study, it was revealed that only unemployment is positive and

significant related to GDP on the two models and only interest rate was negative significance in short run using ARDL.

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Disclosure of Green Banking, Profitability and Company Size on Company Value in Banking in Indonesia

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Abstract

This study aims to determine the effect of green banking disclosures, profitability and firm size on firm value. The sample used was 11 samples with 55 observations using purposive sampling technique. The data used is secondary data, with the data collection method using content analysis. The analysis technique used is multiple linear regression analysis. The results of the analysis prove (1) disclosure of green banking, profitability and firm size has a positive and significant effect on firm value, (2) disclosure of green banking has a negative and significant effect on firm value, (3) profitability has a positive and significant effect on firm value, and (4) company size has a positive and insignificant effect on firm value.

Keywords: Disclosure of Green Banking, Profitability, Firm Size, Firm Value

JEL Codes:

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1. Introduction

Current environmental problems indirectly affect the Indonesian economy. The current economy has created competition between companies which makes it even more intense to improve performance so that company goals are achieved. The main goal of the company, one of which is to increase the value of the company to generate profits. An increase in company value due to high stock prices will make the market believe in the company's performance and

prospects in the future (Rudangga & Sudiarta, 2017). Where the value of the company is a very important aspect because it can reflect the reputation and performance of a company. The value of a type of company can influence or be influenced by economic conditions because economic activity always involves many parties, one of which is banking. Banks are directly involved with many business sectors through their financing activities (Wijaya et al., 2021). The purpose of a company being established is to get large profits and maximize firm value. In other words, maximizing the value of the company means maximizing the main goal of a company. If the stock value is higher, the company's value will be better, and can increase market confidence in the company's performance. Shareholder and corporate wealth is represented by the market price of the stock, which reflects investment, financial and wealth management decisions. The stock price of a company is formed between buyers and sellers when trading occurs, which is known as the company's market value because the stock price reflects the company's value (Muzaki, 2022). Some factors that can affect the value of the company include profitability and company size, where profitability is an important factor in financial management and can be interpreted as an entity by utilizing the assets owned by the company. Profitability is to show the company's success in generating profits. Potential investors will look closely at the smooth running of a company and its ability to make a profit, the better the profitability, the better the company's ability to earn high profits (Anggraeni et al., 2019). The value of a company is said to be affected by its size because larger companies have an easier time finding sources of funding with which to achieve their goals. On the other hand, because corporations have little danger in carrying out their obligations, they will generate large amounts of debt (Indriyani, 2017). According to Tiara & Jayanti, (2022) Total assets represent company size, which can be determined by looking at the number of employees, total assets, stock market value, and other factors. The value of the company can increase if its total assets exceed all of its liabilities. Although environmental issues should be a major concern given the current environmental damage. To overcome these problems, the green economy concept continues to be pursued so that economic activities can reduce their impact on the environment. One form of the green economy concept is known as green banking. According to Budiantoro (2015), Green banking is a banking effort to prioritize the fulfillment of sustainability in financing (credit distribution) or operational activities. Sustainable fulfillment is defined as growth that prevents future declines in production capacity. The availability of resources, including natural, human, technological and other resources, is very important for this production capacity. Meeting the needs of the present without compromising the capacity of future generations to do the same is known as sustainable development. Banks are a source of funding for industry, whose business activities often have an impact on the environment. Thus, now banks are also required to have an environmentally friendly commitment, one of which is by implementing green banking. In principle, green banking is an effort to strengthen banking management capabilities related to environmental and social issues. For example, by increasing the bank's portfolio in financing the renewable energy industry, organic farming, and so on. There are four banks that are widely perceived as having implemented green banking principles. In first place is a private bank, namely Bank Central Asia (BCA) which is considered to have implemented green banking by 25.7%. After that there are three state-owned banks, namely Bank Rakyat Indonesia (BRI) with a percentage of 23.7%, Bank Negara Indonesia (BNI) 12.6%, and Bank Mandiri 12.1%. Meanwhile, other banks are not widely perceived as green banking actors, with a percentage of each below 2%. (Databokskatadata.co.id, 2022). On the other hand, companies that are digital banks, get poor stock performance where there is a decline in digital bank shares. Based on the data, there are three banks listed on the Indonesian Stock Exchange (IDX), namely PT

bank CIMB Niaga Tbk (BNGA), PT bankKB Bukopin Tbk (BBKP), and PT bank OCBC NISP Tbk (NISP).

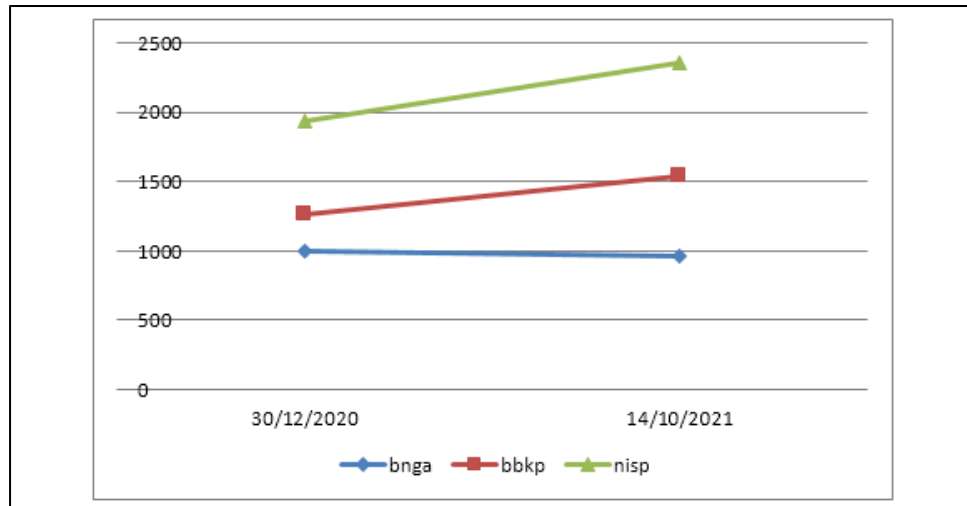


Figure I. Digital Bank Stock Performance 2020-2021

Source: Data Processing

There are 3 banks that have the same pattern of decline, these banks are PT bank CIMB Niaga Tbk (BNGA), PT bankKB bukopin Tbk (BBKP), and PT bank OCBC NISP Tbk (NISP). Chart 1 shows the performance of digital bank shares from 2020 to 2021. The three banks are predicted to experience the deepest decline so far this year. BNGA bank shares in 2020 reached a price of Rp. 995 and will experience a decrease in 2021 at a price of Rp. 965. PT bankKB bukopin Tbk (BBKP) share performance in 2020 is Rp. 575, and decreased to Rp. 270 in 2021. Then PT bank OCBC NISP Tbk (NISP) in 2021 will reach a price of Rp. 820 and in 2021 it will decrease by Rp. 670. The decline in banking shares is due to a lack of public trust in banks in Indonesia at this time because banks have not implemented many environmentally friendly concepts even though bank shares have fallen, financial performance has actually improved.

Even though banks are considered to have to pay attention to environmental aspects in all their business activities, some stakeholders think that banks do not have a significant impact on the environment. disclosure of bank efforts in protecting the environment or the application of green banking provides added value to the bank's reputation, but does not have a positive impact on company profits as does financial performance.

Previous research was conducted by Winarto & Nurhidayah (2021), with research results showing that green banking has a positive effect on firm value. Meanwhile, the research conducted by Muzaki (2022) obtained research results which showed that green banking disclosures had no effect on company value. Besides that, in Mumtazah & Purwanto's research, 2020, it shows that disclosure of green environment has a positive but not significant effect on company value. The results of research from Muharramah & Hakim (2021), show that company size affects company value. While profitability does not affect the value of the company. As well as research conducted by Sutarna & Lisa (2018), shows that profitability has a significant positive effect on company value.

Based on the phenomena and problems above, the purpose of this study was to determine the effect of green banking disclosures, profitability and firm size on firm value in banking in Indonesia. As well as the benefits for all banking companies in Indonesia, especially regarding the disclosure of green banking, profitability and company size on firm value.

2. Literature Review

Research by Tiara & Jayanti (2022), with the title of the influence of green banking, firm age and firm size on firm value. The results show that the green banking variable has no significant effect on firm value, firm age shows a significant negative effect on firm value, firm size has a significant positive effect on firm value and the three variables namely green banking, firm age and firm size simultaneously have a significant effect on firm value. The equation of this study is that the independent variables both use green banking and company size. The difference in this study lies in the firm age variable.

Karyani & Obrien (2020), with the title Green Banking and Performance: The Role of Foreign and Public Ownership. The dependent variable used is bank performance, while the independent variable used is green banking. This research also uses moderating variables, namely foreign ownership and public ownership. The results of this study indicate that green banking practices have a negative effect on profitability, while green banking practices have a positive effect on bank value. The moderating variable of public ownership strengthens the negative effect of the effect of green banking on profitability, while the variable of foreign ownership weakens the positive effect of the positive effect of green banking practices on banking value. The equation in this study lies in the independent variables of green banking and profitability. The difference in this study uses moderating variables, namely foreign ownership and public ownership.

Muharramah & Hakim (2021), with the title influence of firm size, leverage, and profitability on firm value. The results of this study indicate that firm size affects firm value. While leverage and profitability do not affect firm value. The equation of this study lies in the independent variables firm size, profitability and firm value as the dependent variable. The difference in this study lies in the leverage variable.

Research from Winarto, & Nurhidayah, (2021) with the title the effect of green banking disclosure on corporate value at public banks um sharia in Indonesia. The results of the study indicate that there is a significant positive effect of green banking disclosure on firm value in Islamic banking. The equation of this study is that both use the green banking disclosure variable as the independent variable and the firm value variable as the dependent variable. The difference in this study is that the object of research was conducted at Islamic commercial banks while this research was conducted at banking companies in Indonesia that are listed on the IDX.

Research by Simanungkalit & Mayangsari, (2020) with the title of the effect of gender diversification, managerial ownership and green banking on the value of banking companies. The results of this study indicate that board of commissioners gender diversification and managerial ownership have a negative effect on firm value, while green banking has no effect on firm value. Firm size is not proven to moderate the effect of board of commissioners gender diversification, managerial ownership, and green banking on firm value. The equation in this study is the green banking variable as the independent variable and firm value as the dependent variable. The difference in this research is the object used in 2018-2021 while this research is in 2017-2021.

Research by Lugina Kurniawan, (2021) with the title influence of financial performance on green banking disclosure with a control mechanism as a moderating variable. The results of the study show that financial performance has a direct positive effect on green banking disclosure. Of the three elements of the control mechanism, only the variable public ownership moderates the positive effect of performance on green banking disclosure. Meanwhile, the board of commissioners and the audit committee did not moderate the effect of financial performance on green banking disclosures at banking companies listed on the IDX during the study period. The equation in this study lies in the independent variable, namely green banking disclosure. while the difference in this study lies in the board of commissioners and audit committee variables.

Romli & Zaputra's research, (2022) with the title the influence of the implementation of green banking, corporate social responsibility on firm value in banking companies listed on the IDX. Based on the test results, it was found that the green banking implementation variable has a negative influence on company value. While the variable disclosure of corporate social responsibility has no effect on firm value. The equation in the study lies in the independent variable, namely green banking and firm value as the dependent variable. The difference in this research is corporate social responsibility. Research by Mumtazah & Purwanto, (2020) with the title analysis of the effect of financial performance and environmental disclosure on company value. The results of the study show that environmental disclosures made by banks do not have a significant effect on firm value because people think that banks do not have a direct impact on the environment like other industries. The equation in this study lies in the independent variables, namely disclosure of green banking and firm value as the dependent variable. The difference in this study lies in the financial performance variable.

Research conducted by Zhafran Mufid Galyani, (2022) entitled Determination of factors that influence firm value in banking companies. This study aims to analyze the effect of corporate social responsibility (x1), green banking (x2), non-performing loans (x3), and loan to deposit ratio (x4) on the value of banking companies. The results show that corporate social responsibility has a positive influence on the value of the company. Then non-performing loans have a negative influence on company value. Meanwhile, green banking and loan to deposit ratio have no effect on firm value. The equation in this study lies in the independent variables both using green banking variables and firm value as the dependent variable. The difference in this study lies in the variables of corporate social responsibility, non-performing loans and loan to deposit ratio.

Research by Khan, Bose, Sheehy & Quazi, (2021) with the title green banking disclosure, firm values, and the moderating role of a contextual factor a distinctive regulatory setting. The results of the study show that green banking disclosure has a positive effect on the overall firm value. The equation in the study is that both use the green banking disclosure variable as the independent variable. The difference in this study is the non-performing loan variable and this study uses a moderating variable.

Handajani & Mataram Research, n.d. (2021) with the title corporate governance and green banking disclosure: studies on banks in Indonesia. The results of this study indicate a trend of increasing green banking disclosures during the observation period. This study also found that there is a significant effect of the size of the board of commissioners on the disclosure of green banking practices, but the existence of independent commissioners and institutional ownership

has no effect. The equation in this study is that they both use green banking disclosure variables. The difference in this study is using corporate governance.

Research by Utama & Lisa, (2018) the effect of leverage and profitability on company value. Statistical test results show that the variable profitability has a very strong relationship with firm value. Partially, profitability turns out to have a significant positive effect on firm value. This means that the higher the profitability of each, the higher the value of the company. Likewise, the profitability variable simultaneously has a significant positive effect on firm value, meaning that the higher the profitability, the higher the firm value. The equation in this study lies in the independent variables, namely using the variable profitability and firm value as the dependent variable. The difference in this study lies in the leverage variable.

Research by Hossain et al., (2020) entitled The Effects of Green Banking Practices on Financial Performance of Listed Banking Companies in. The results of this study found that there is a positive relationship between green banking practices and financial performance. The findings resulting from this study can serve as appropriate guidelines for bank regulators to take effective decisions regarding environmental issues and thus make social contributions, and after all, play an important role in economic growth. The equation in this study is that the independent variables both use green banking variables. While the difference in this study is the dependent variable using financial performance variables.

Research by Irawan & Kusuma, (2019) with the title influence of capital structure and company size on company value. The results of this study indicate that capital structure has no effect on firm value, while firm size has a negative and significant effect on firm value. The equation in this study lies in the independent variables, namely the independent variables of firm size and firm value as independent variables. The difference in this study lies in the capital structure variable.

Prawirasasra research, (2015) with the title Analysis of the relationship of environmental performance and firm value. In International Conference on Economics and Banking. The results of this study indicate a positive relationship between environmental performance and firm value. The equation in this study is the independent variable, namely the variable environmental performance and company value as the dependent variable. While the difference in this study is the period used in the 2011-2013 study.

3. Research Methods

The type of research used in this research is quantitative, because the data used in the research is in the form of numerical data and the research analysis uses statistical data. The quantitative research method is to obtain a significant relationship between research variables. Where is the disclosure of green banking (X1), profitability (X2), and firm size (X3) to firm value (Y), with the operational research variables as follows:

Table 1. Operational Research Variables

variable	Definition Variable	Indicator	Scale
Firm value	the price that can be sold with a price agreement that has been reached by a company that will be paid by investors or buyers at the price that will be sold.	<i>Tobin's Q</i>	Ratio
Disclosure of	disclosure to the public regarding the company's	GBDI	Ratio

green banking environmentally friendly activities.

Profitability show the company's ability to increase profits through profits generated from sales and investment income to see the company's efficiency. ROA Ratio

ROA Ratio *Ln Size*

Total asset

Firm size

This research was conducted at banking companies listed on the Indonesia Stock Exchange that issue annual reports and/or sustainability reports. The population in this study includes 47 banking sector companies listed on the IDX in 2017-2021. Sampling was carried out using a purposive sampling technique, while 11 banking companies were taken as samples, which met the criteria for issuing sustainability reports consecutively during 2017-2021. The data used in this research is secondary data obtained from financial reports, annual reports, and sustainability reports issued by banking companies listed on the Indonesian stock exchange for the period 2017-2021 on the websites of related companies. The analysis techniques used include financial analysis, descriptive statistical data analysis, multiple regression analysis and hypothesis testing.

4. Results And Discussion

4.1. Descriptive Statistics

Data Analysis Test With a total sample of 11 banking companies x 5 observations (2017-2021), the total sample is 55 observations. The research data shows that the variables of profitability, firm size, and firm value show a smaller standard deviation when compared to the mean (mean), which means that the distribution of research data is quite varied. Except for the green banking disclosure variable which has a standard deviation that is larger than the average (mean).

Tabel 2. Hasil Analisis Deskriptif

	N	Range	Minimum	Maximum	Mean	Std. Deviation
Firm Value	55	706586,791	26032,399	732619,190	193971,30190	141314,428100
Disclosure of Green Banking	55	666,762	0,238	667,000	12,69529	89,860397
Profitability	55	0,158	-0,041	0,118	0,01677	0,022864
Ln Size	55	4,388	16,881	21,269	19,49329	1,116460
Valid N (listwise)	55					

4.2. Multiple Regression Analysis

4.3. Table 3. Multiple Regression Analysis Results

Model	Unstandardized Coefficients		t	Sig.t
	B	Std. Error		
1 (Constant)	-404607,120	291269,673	-1,389	,171
Disclosure of Green Banking	-460,488	228,087	-2,019	,049
Profitability	3831082,874	889209,941	4,308	,000
Ln Size	27711,037	14967,216	1,851	,070
R	,566			
R Square	,321			
Adjusted R Square	,281			
Df	3			
	51			
F	8,032			
Sig.F	,000			

Based on the table above, it can be arranged into an equation, as follows:

$$Y (\text{Company Value}) = -404,607.120 - 460.488X_1 + 3,831,082.874X_2 + 27,711.037X_3$$

Based on the multiple linear regression equation above, it is known that the constant value is -404,607.120, meaning that if the independent variables of Green Banking Disclosure, Profitability and Company Size are considered constant, it can be predicted that the company value is -404,607.120.

The Green Banking Disclosure Coefficient (β_1) is -460.488, this figure indicates that every one percent increase in GDBI will be followed by a decrease in Tobin's Q of -4.60488%.

Profitability Coefficient (β_2) 3,831,082.874, this figure shows that every one percent increase in ROA will be followed by an increase in Tobin's Q of 38310.83%.

Firm Size Coefficient (β_3) 27,711.037, this figure shows that every one percent increase in LN will be followed by an increase in Tobin's Q of 27,711.037.

Hypothesis testing Regression Model Fit Test Results Based on the results of the regression model fit test, it shows that the value of Fcount is 8.032 > Ftable 2.786, with a sig.F level of 0.000 < 0.05 (significant), then H0 is rejected and Ha is accepted, meaning that disclosure of green banking, profitability and company size has a significant effect on value company. Slope Test Results - Multiple Regression Analysis Based on the results of the slope test - multiple regression analysis, it shows that the tcount value of green banking disclosure is -2.019 < ttable 2.007, with a sig.t level of 0.049 < 0.05 (significant), then H0 is accepted and Ha is rejected, meaning that green banking disclosure has no significant effect on the value of the company.

The tcount profitability is 4.308 > ttable 2.007, with a sig.t level of 0.000 < 0.05 (significant), then H0 is rejected and Ha is accepted, meaning that profitability has a significant effect on firm value.

The tcount value of firm size is 1.851 < ttable 2.007, with a sig.t level of 0.070 > 0.05 (not significant), then H0 is accepted and Ha is rejected, meaning that firm size has no significant effect on firm value.

Coefficient of Determination (R2) Based on the calculation of the coefficient of determination, it can be seen that the value of R Square (Coefficient of Determination) is 0.321 or $0.321 \times 100\% = 32.1\%$. The R Square number is 0.321, indicating the effect of green banking disclosure variables, profitability and firm size on firm value of 32.1%. While the rest is influenced by other variables outside of this study.

4.4. Discussion

4.4.1. Effect of Disclosure of Green Banking, Profitability and Company Size on Company Value

Based on the research results, it is known that disclosure of green banking, profitability and firm size has a Fcount of 8.032 > Ftable of 2.786, with a sig. F 0.000 < 0.05 (significant), then H0 is rejected and Ha is accepted, meaning that disclosure of green banking, profitability and firm size has a significant effect on firm value.

These results explain that green banking disclosures, profitability and firm size are related to one another in influencing firm value. Disclosure of Green Banking has an influence on company value, because the goal with the concept of green banking is to increase the perception of bank investors by reporting, while the goal of banking companies is to maximize the value of the company to be achieved by the organization. Profitability has an influence on company value, because the profitability ratio is the ratio to assess the company's ability to achieve profits, the higher the profitability ratio, the added value will be for the company. Also, the size of the company has an influence on the value of the company, because the size of the company can determine the level of ease with which the company obtains funding through the capital market, large companies tend to be considered to have high value and are considered good by investors.

These results are in line with the theory put forward by Anggraeni et al (2019), several factors that can affect company value include profitability and company size, where profitability is an important factor in financial management and can be interpreted as an entity by utilizing its assets company. Profitability is to show the company's success in generating profits. Potential investors will look closely at the smooth running of a company and its ability to make a profit, the better the profitability, the better the company's ability to earn high profits.

These results are supported by research conducted by Tiara & Jayanti (2022), whose research results prove that there is a significant effect of green banking and company size on firm value. The difference lies in previous studies that did not use the profitability variable s but using the variable company age. This research is also supported by Murammah & Hakim (2021), with the results of their research proving that there is a significant effect of company size and profitability on firm value. The difference is in previous studies using green banking disclosure variables but using leverage variables.

4.4.2. Effect of Green Banking Disclosure on Company Value

Based on the results of the study it is known that green banking disclosures have a tcount value of -2.019 < ttable 2.007, with a sig.t level of 0.049 < 0.05 (significant), then H0 is accepted and Ha is rejected, meaning that green banking disclosures have no significant effect on firm value. This result is reinforced by the coefficient value of -460.488 which indicates that every one

percent increase in green banking disclosures will be followed by a decrease in firm value of -4.60488%.

These results prove that green banking disclosures have no effect on firm value. This result is in line with the theory put forward by Budiantoro (2015), Green banking is a banking effort to prioritize the fulfillment of sustainability in financing (credit distribution) or operational activities. Fulfillment of sustainability is defined as development that does not contain future production capabilities, which decreases. This production capability is highly dependent on the availability of natural, human, technological and other resources. Sustainable development is a process of meeting the needs of the current generation without compromising the ability of future generations to meet their own needs.

The results of this study are in line with previous research conducted by Karyani & Obrien (2020) which proved that green banking has a significant effect on bank values. However, there are differences between the results of this study and previous research, which in this study showed a negative effect between green banking disclosures on firm value, while previous research showed a positive effect of green banking on bank values.

4.4.3. Effect of Profitability on Firm Value

Based on the research results it is known that profitability has a tcount of 4.308 > ttable of 2.007, with a sig.t level of 0.000 < 0.05 (significant), then H0 is rejected and Ha is accepted, meaning that profitability has a significant effect on firm value. This result is reinforced by a coefficient value of 3,831,082.874, indicating that every one percent increase in profitability will be followed by an increase in firm value of 38,310.83%.

These results prove that profitability has a positive effect on firm value. This result is in line with the theory put forward by Kasmir (2019) that the profitability ratio is a ratio for assessing a company's ability to achieve profits. This ratio provides a measure of the effectiveness of a company's management. This is shown by the profit generated from sales and investment income to see the efficiency of the company.

The results of this study are in line with previous research conducted by Muharramah & Hakim (2021) which proved that profitability has a significant effect on company value.

4.4.4. Effect of Firm Size on Firm Value

Based on the research results it is known that company size has a tcount value of 1.851 < ttable 2.007, with a sig.t level of 0.070 > 0.05 (not significant), then H0 is rejected and Ha is accepted, meaning that company size has no significant effect on firm value. Meanwhile, the coefficient value of 27,711.037 for firm size is positive, indicating that every one percent increase in firm size will be followed by an increase in firm value of 27,711.037. These results prove that firm size has no significant effect on firm value, but there is a positive correlation between firm size and firm value.

These results are in line with the theory put forward by Setiawan et al (2015), company size can determine the level of ease with which a company obtains funding through the capital market, large companies tend to more easily access funding through the capital market, then are captured as a positive signal by investors so that decided to invest.

The results of this study are in line with previous research conducted by Muharramah & Hakim (2021) which proved company size had a positive effect on firm value. However, there is a difference between the results of this study and previous research, which in this study showed

no significant effect of firm size on firm value, while previous studies showed a significant effect on firm value.

5. Conclusions

Conclusion Based on the results of the analysis and discussion that has been carried out, it can be concluded, as follow: 1. Green banking disclosure variables, profitability and firm size have a significant effect on firm value. 2. The green banking disclosure variable has no significant effect on firm value. 3. The variable profitability has a significant effect on firm value. 4. The variable firm size has no significant effect on firm value. Suggestion Based on the conclusions above, the authors provide suggestions aimed at the good and progress of the banking sector, as follows: 1. Disclosures of Green Banking must be increased from year to year so that they can have a positive impact on company value, because the disclosures of Green Banking that are reported must be consistent according to the number of existing disclosure items. 2. Companies in the banking sector should increasingly strive to increase their profitability from year to year, because profitability not only guarantees the progress and sustainability of the company, but also adds value to the company. Because companies that are able to obtain the maximum possible profitability will be considered increasingly valuable to the public and investors. 3. Companies in the banking sector should further expand the size of the company, because company size is a size scale that is seen from the total assets of a company, the greater the assets owned by the company will add to the value of the company for the public and investors. 4. For future researchers who wish to review similar titles, it is hoped that they will add other independent variables besides green banking disclosures, profitability and firm size on firm value. Because the results of this study have proven that 32.1% of the influence caused by disclosure of green banking, profitability and firm size has on firm value, to find out the remaining effect it is necessary to add other independent variables to examine further what variables can increase firm value.

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Analyzing the Impact of Covid-19 on Indian Airline Stocks: An Empirical Analysis using Event Study Methodology

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Abstract

The outburst of Covid-19 pandemic has slowed down the economic progress both in developed and developing nations. Since its outburst, the stock markets have declined all around the globe. However, some industries become profoundly weak while others proceed to perform well even in the crisis period. Given this new phenomena we try to study the short-term effects of the outburst of new contagious disease COVID-19, on four BSE listed aviation companies in India by employing event study methodology. The outcomes reveal that Indian aviation stock returns drop more significantly than the BSE stock market returns in response to the four main COVID-19 press statements that were made during first half of year 2020. Generally, stockholders respond contrarily in the four selected events. The strong over response shown by the investors is noted during the on-event period of the announcements made by World Health Organization and the Indian government. Besides, the results endorses that investors of Indigo and Spicejet were more reactive to the announcements made related to Covid-19 outbreak. The findings demand for instant policy framework in order to lighten the bad effects of the pandemic in the airline sector in India.

Keywords: Abnormal Returns, Aviation Industry, Airline stock Returns, Covid-19

How to Cite:

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1. Introduction

Covid-19, a contagious disease caused by the new type of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), which first emerged in Wuhan, a Chinese city, in December 2019. Since its confirmation the widely spread disease has caused havoc all around the globe. In January 2020 the World Health Organization first declared it a Public Health Emergency of International concern and later a pandemic in March 2020, (WHO). As of 4 December 2020, total number of confirmed Covid-19 cases has crossed over 21.5Cr with around more than 44.8L deaths all across the globe, (WHO). Countries such as United States, India, Brazil, Russia, France, Spain, United Kingdom, Italy and Argentina were mostly affected by it so far in terms of confirmed cases.

The pandemic has shaken the interconnected global economic activity and it left the immediate adverse impacts on global growth, global production, international trade and foreign direct investment, employment and ultimately individual livelihoods. The COVID-19 pandemic has gravely wounded the world economy with serious consequences impacting all communities and individuals (Mukhisa Kituyi, 2020). The COVID-19 contagion has produced far-reaching costs on the global economy with Kristalina Georgieva International Monetary Fund (IMF) Managing Director, stating the crisis **“the worst economic fallout since the Great Depression.”** The international economy is likely to decrease by 4.9 percent, a sharper drop than the 3 percent predicted in April (IMF, 2020).

The economic crisis set in the motion by the outbreak of COVID-19 is disturbing economies, both developed and developing economies. The covid-19 economic crisis is affecting unevenly developing and unindustrialized economies. They will take the painful hit, as they have “less resources to protect themselves against this dual...health and economic crisis.” World Bank President David Malpass also cautioned that the global economic downturn could set back years of progress in developing countries. As a result, developing countries could see income losses in excess of \$220 billion,(UNDP). Developing economies haven’t felt this type of crisis since the Great Depression. India’s economy contracted by nearly a quarter, 23.9%, throughout the April to June period compared with the previous year, its worst growth performance since quarterly data started in 1996.

The outburst of pandemic has affected the world’s 2nd largest developing nation India in a gigantic way, specifically the countrywide lockdowns which brought societal and commercial life to a halt. There is a multi-industrial impact of the pandemic in India as the economic activities have slowed down almost in every industry. Sectors such as healthcare, aviation, travel and tourism, realty, education, retail, recreation and media were mostly damaged by it. The airline industry is possibly the worst hit during the Covid-19 pandemic, which led to the cancellation of flight operations-both international and domestic – by the end of the march in India, to curb cross-country passenger movement and to stop more spread of the disease. Indian aviation passengers’ facilities remain on hold for 60 days (25 March 2020 to 24 May 2020), carried huge loss to the industry. DGCA reported 33% drop in passenger traffic flow (from 11.5 million reported in March 2019 to 7.8 million in March 2020) during six days discontinued flight operations in March 2020. Airports Authority of India stated a 92% drop in revenue,(Rs 239 crore during April-June 2020 from Rs 2,973 cr in 2019), resulting in the shrunk of market value of the aviation business. Therefore, the

situation necessitates examining the short-run impact of Covid-19 on the stock performance of Indian airline industry.

To understand the impact of Covid-19 on the Indian aviation sector, this study analyses the influence of different official statements made about the pandemic, by particularly focusing on the stock returns of four aviation companies listed on S&P BSE. This study will contribute to earlier works on calamities in the airline sector. Also its results are expected to support stockholders, Capital market regulatory organizations, corporate managers, and government to better apprehend the short-term variations and return performance of four Indian aviation companies and assist them make better decisions about the forthcoming impacts and repairing market sentiment in the face of the COVID-19 outbreak.

The researcher applies event study methodology in order to explore the influence of COVID-19 official media announcements on four S&P BSE listed airline stock returns. While the first COVID-19 infected patient was announced by the World Health Organization (WHO), in China on December 31, 2019 (WHO, 2020), the researcher consider four key dates linked to COVID-19: (1) January 13, 2020- the first Covid-19 case reported in Thailand, outside china ; (2) February 21, 2020-the outburst in Italy, (3) March 11, 2020- WHO announced Covid-19 outbreak as global pandemic and the U.S. declared ban on travel passengers from 26 European nations and (4) March 24, 2020- the Government of India ordered countrywide lockdown .The researcher select these four dates as they exhibit essential phases about the uncontrolled COVID-19 outbreak.

The purpose of this study is to evaluate the stock performance in terms of stock returns of four Indian airline companies before and after the four important official press announcements were made related to Covid-19 outbreak. Additionally this study attempts to test the quickness with which Covid-19 announcements are absorbed by the stocks of companies belonging to Indian aviation industry.

2. Review of Literature

2.1. Stock market behavior and outbreak of disease

A number of past studies have analyzed the connection between the outburst of pandemic and share Market response. Pendell and Cho (2013), while analyzing stock market performance and spreadable animal virus outbreaks found that daily earnings with the smaller scale businesses are observing the major fluctuations. Wang et al. (2013), in the perspective of Taiwan, examined the influence of infections, for example, Enterovirus 71, SARS and H1N1, dengue, fever on similar biotechnology enterprises' stocks' performance. They acknowledged that stockholders realistically appraise the performance of biotechnology stocks throughout the disease outbreak. Morales and Callaghan (2012) stated that because of globalization, markets all around the world are mutually dependent, and calamity in one nation is expected to disturb other nations as well. Lee and McKibbin (2004), while conducting their study reported high degree of influence of the SARS epidemic on financial integration besides its severe impact on human society. Zouaoui et al. (2011) documented that the impact of a disease outbreak on an investor's sentiment is more prominent in culturally interdependent countries.

In recent times, Liu et al. (2020) examined the influence of the COVID-19 pandemic on the highly disturbed stock markets applying the event study method. They found that the stock markets reacted unfavorably to the COVID-19 outburst, resulting in negative stock return performance. Zhang et al. (2020) reported that world financial markets have turned into highly volatile and financial systematic risk has surged in reaction to the uncertainty created by ongoing outbreak of Covid-19. In the context of the US, they anticipated that unconventional policy interventions (quantitative easing) may possibly increase new difficulties for the economy. Albulescu (2020) in his study concerning the influence of the Covid-19 pandemic on stock market fluctuations found that new confirmed Corona cases and death positively impact market volatility index (VIX) both inside and outside of China. Furthermore, he proposed that there is a positive correlation between the spread of the Covid-19 virus and the financial volatility in the financial market of a country.

2.2. International events and aviation industry

The aviation sector has been disturbed by different global crises throughout history. From the SARS, oil blockade, terrorist attacks, airline deregulation the Sector has faced many storms resulting in the decrease of overall performance (Davies, 2016). Franke and John (2011) stated that the 9/11 attack triggered a substantial decrease in flight operations and aviation sector struggled to continue its smooth operations. Kim and Gu (2004) found that the average weekly stock return of aviation companies does not fluctuate intensely after 9/11, while investigating the impact of the 9/11 terrorist attacks on the stock returns and uncertainties of airline stocks on the stock market. Also there has been a significant increase in the market risk and total value of airline stocks. Loh (2006) reported that aviation companies listed in China, Canada, Singapore, Hong Kong, and Thailand were highly responsive to SARS official announcements than non-aviation stocks, and that the adverse effects of SARS on stocks surge volatility instead of decrease in average returns. Also it was found that after the outbreak of SARS the stocks of aviation companies tend to be more aggressive.

Harbison (2003) find out that during the strong wave of the SARS outbreak, the passenger travel traffic decreased by 5.6%, pushing certain airlines functioning in the Asia-Pacific countries to defer orders and to downscale the number of employees in order to minimize the total cost of service. Wang (2013) examined the connection between global events and stock returns of international airlines from 1996 to 2010, resulting that major global events may have a risk impact on earnings of airline stock prices. Borenstein and Zimmerman (1988) use CAPM market model to analyze the impact of 74 plane crashes on the airline sector in the US from the 1960s to 1985. They reported that airline crashes have an adverse impact on the revenue growth. Sato (2013) Comparing the performance of European airline and North American stock portfolios, points out the 2008 global financial crisis has a main effect on the North American market compared to the European one. Sakkakom and Suntichai (2020) examined the short-range impact of the new COVID-19 pandemic on 52 listed aviation companies across the globe by using event study methodology. They found that that stock returns of aviation companies decline more substantially than the market returns after three main COVID-19 official press releases were made.

3. Research Methodology

3.1 Sample and data

As the purpose of the present study is to investigate the impact of unexpected Covid-19 pandemic on the Indian aviation sector which is highly vulnerable and had shown high stock price fluctuations during the initial phase of Covid-19 outburst. So the study uses four aviation companies- Interglobe aviation, Spice jet, Jet Airways, and Global Vectra listed in Bombay Stock Exchange as its sample to conduct this study.

S&P BSE SENSEX, an index reflecting the overall stock market performance in India, is preferred as the standard index to estimate the abnormal returns of combined stocks of sample companies. The daily closing prices data of S&P BSE SENSEX and the four sample companies have been collected from websites, bseindia.com and in.finance.yahoo.com (a website which provides free real time stock quotes, financial news, historical stock data etc.). The time interval used for collection of data is from 1st January 2019 to 3rd May 2020, including both the time period before and during Covid-19 outbreak.

3.2. Research model

The researcher utilized event study approach as proposed by Fama et al. (1969) to carry out empirical work on how the stocks of Indian aviation sector, perform after the explosion of Covid-19 news. This approach is recognized as one of the most popular and important methodology applied in the economic and finance writings, to examine the impact of arrival of fresh information from a specific event on stock returns. This method is applied to test semi-strong form market efficiency (Fama, 1970, Fama, 1991), which assumes that the announcement of new relevant public information gets reflected quickly and immediately through current stock prices. It holds that stock prices have already absorbed all relevant information available in the market. It summarizes that extra returns cannot be obtained by means of technical and fundamental analysis.

3.3. Events of Concern and Event dates

In the present study four significant events depicting the development of the COVID-19 outbreak have been considered, which are, Event 1 (January 13, 2020), the first Covid-19 positive patient registered outside China in Thailand; Event 2 (February 21, 2020), the Covid-19 outburst in Italy; Event 3 (March 11, 2020), U.S. declared ban on travel passengers from 26 European nations and WHO declaration on Covid-19 as global pandemic outbreak; Event 4 (March 24, 2020), the Government of India ordered countrywide lockdown

3.4. Event window

To investigate the impact of Covid-19 outbreak over stock returns of Indian aviation companies, the author use an window event of 4 days prior to every single event date to 4 days subsequent to every single event date [-4,+4]. The [-4, +4] event window is applied to calculate the abnormal returns of four Indian aviation companies. To reduce the influence of unrelated information on share prices, a short event window is normally preferred.

4.5. Estimation window

Estimation window is the time duration covering the historical trading days, on which the investigator wants to estimate the expected returns. The estimation window selected for this study is one year before the event window.

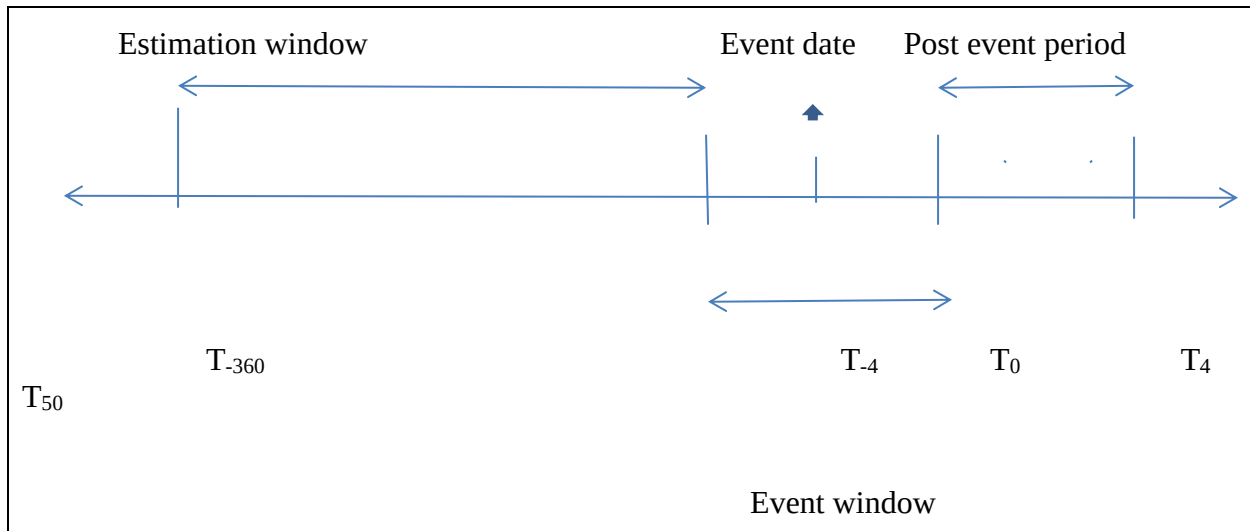


Figure 1. Event Study Timeline

3.6. Method of Analysis

There are three basic methods to calculate abnormal returns using event study methodology.

Mean adjusted returns model (MAR): which is simply used to find the difference between the return on a stock on a particular day and the average return on the stock.

$$AR_t = R_t - \bar{R}_j \quad (1)$$

Where, R_t and $\bar{R}_j$ are the daily stock returns on a given day and average return on the stock and AR_t is the resulting figure abnormal return on a given day.

Market- adjusted return Model (MKAR): This looks for the difference between the return of a stock on particular day and the corresponding stock market index return.

$$AR_t = R_t - R_{Mt} \quad (2)$$

Where, R_{Mt} represents the market return on a given day.

The above mentioned two event study models are not commonly used to estimate the abnormal returns in order to investigate the impact of new relevant information on stock returns. Therefore in present study the author applies the third method, described below, for conducting the empirical analysis on how the stock prices of Indian aviation companies behaved during the initial phase of Covid-19 outbreak.

Risk-adjusted returns Model: this is the most superior method among the three because it considers the risk adjustments. While applying this method we have to run regression of the stock returns against the market returns and then find intercept and slope to estimate, expected stock returns (fair values). The estimated stock returns are then subtracted from the actual stock returns to find out abnormal returns. So to calculate expected returns, the author starts with the market model based on regression as seen below.

$$R_{i,t} = \alpha_i + \beta_i R_{m,t} + \mu_{i,t} \quad (3)$$

Where $R_{i,t}$ is returns on daily basis of a particular stock at time t and $R_{m,t}$ is market index returns on daily basis of a particular market at time t . $\mu_{i,t}$ is the residual of a particular stock at time t , which is independent and identically distributed. α_i and β_i are intercept and slope of the market model. After estimating the intercept and slope the following formulae are used to compute the estimated return and abnormal return.

$$E(R_{i,t}) = \hat{\alpha}_i + \hat{\beta}_i R_{m,t} \quad (4)$$

$$AR_{i,t} = R_{i,t} - E(R_{i,t}) \quad (5)$$

Where $E(R_{i,t})$, $R_{i,t}$, and $AR_{i,t}$ are estimated return, actual return and abnormal return of a particular stock at time t . $AR_{i,t}$ reflects the impact of the announcement of information related to three Covid-19 events discussed above, on aviation stocks. If $AR_{i,t}$ is equal to zero, it means that market value is equal to estimated value (fair value), if not then market value deviates from estimated value. Also we can compute the mean value of abnormal returns using equation 6.

$$AAR_t = \sum_{i=1}^N AR_{i,t} / N \quad (6)$$

To explore the aggregate impact of the different events mentioned above during pre-defined time period, cumulative abnormal returns (CAR) of particular stock i throughout the period t_0 and t_1 are obtained using equation 7.

$$CAR_i(t_0, t_1) = \sum_{t=t_0}^{t_1} AR_{i,t} \quad (7)$$

The present study examines whether the market value shows much deviations from estimated values by testing, if $CAR_i(t_0, t_1)$ is substantially different from zero. During the investigation period when the market responds to the new relevant information, deviation from the estimated values can be in terms of either positive or negative $CAR_i(t_0, t_1)$.

4. Results and Discussion

4.1. Abnormal Returns

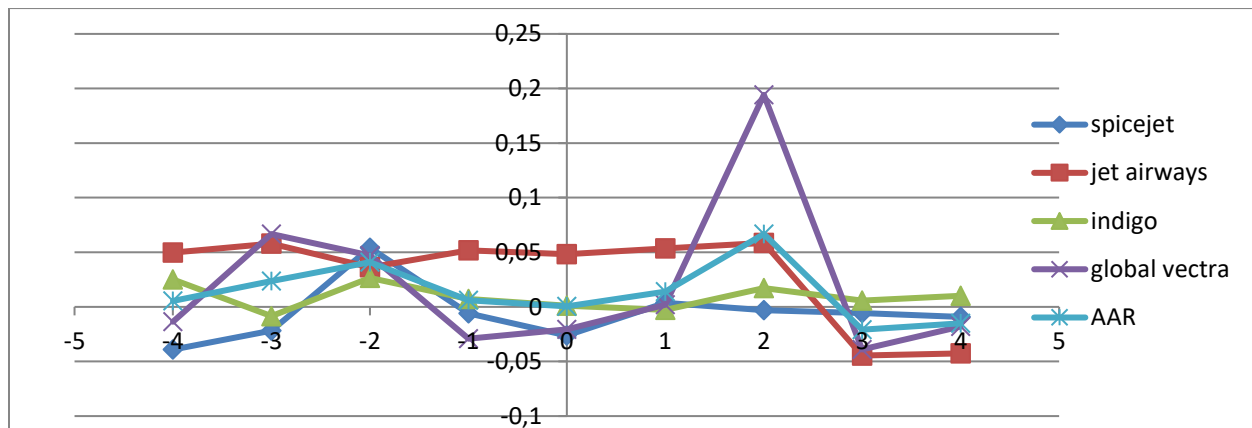


Figure 2. Daily abnormal returns of the entire sample in response to the first Covid-19 press announcement made on 13 January 2020

Figure 2 depicts the abnormal returns of four Indian aviation companies in response to the first Covid-19 press announcement made on 13 January, 2020. On the event day, the stocks of Spice jet and Global Vectra show insignificant negative abnormal returns at 5% level. The abnormal returns of Spice jet and Global Vectra were negative for most of the days during the event window. As shown in figure, the abnormal returns of the entire sample do not show deep fluctuations between days-4 to day -2. After day +2 a little deep fluctuation from positive AR to negative AR occurs in the stocks of Global Vectra and Jet Airways. The insignificant impact is observed before and after the event date after analyzing the values of abnormal returns in **table 1**, with the help of T stat at 5% level of significance.

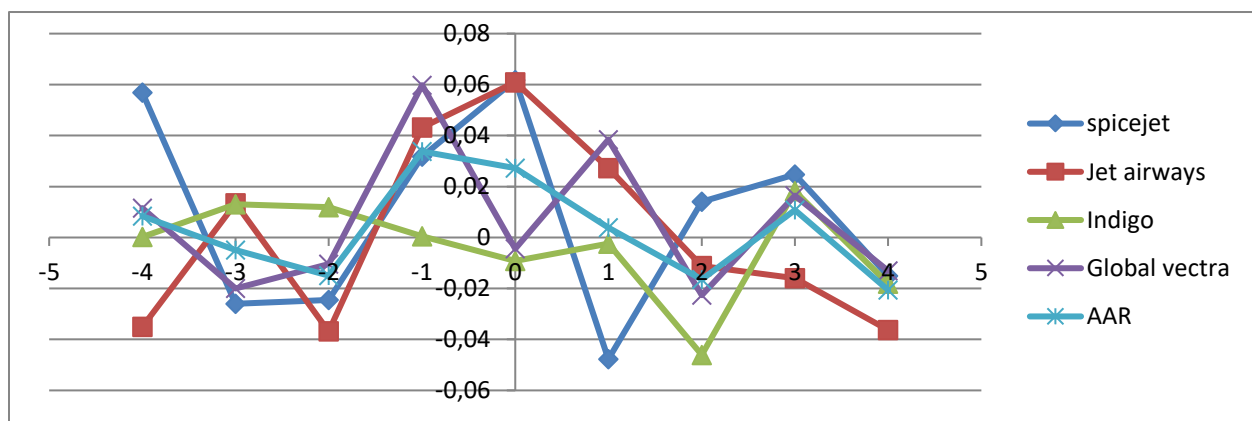


Figure 3. Daily abnormal returns of the entire sample in response to the second Covid-19 press announcement made on 20 February 2020

Figure 3, exhibits the abnormal returns for the entire sample during the second event window period. On the event day, the stocks of Indigo and Global Vectra show negative abnormal returns. All the stocks of aviation companies show high fluctuations throughout the whole event window period (-4, +4). The above figure shows that on next day after the event happened, stocks of spice jet and Indigo has shown high negative fluctuation as compared to other stocks. The abnormal returns observed between day -4 to day +4, were not found significant after applying the T statistics at 5% level of significance.

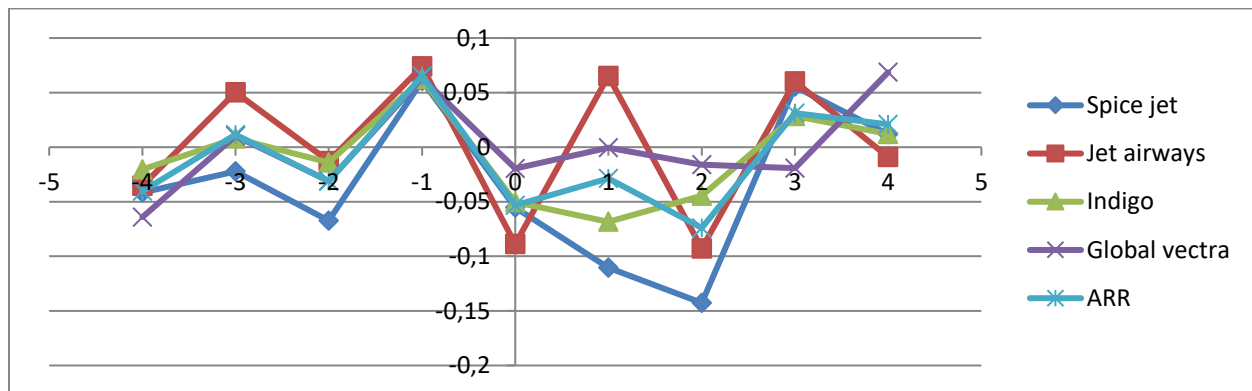


Figure 4. Daily abnormal returns of the entire sample in response to the third Covid-19 press announcement made on 11 March 2020.

Figure 4 depicts the abnormal returns in response to the breaking news about Covid-19 (U.S. declared ban on travel passengers from 26 European nations and WHO declaration on Covid-19 as global pandemic outbreak). On the event day stocks of entire sample reported negative abnormal returns indicating the event did attract the attention of stock traders. The abnormal returns of all stocks on event day were found insignificant except Indigo at 5% level. It is also observed that the abnormal returns of stocks of Spice Jet and Indigo on the next day after the event day, were significantly negative at 5% level.

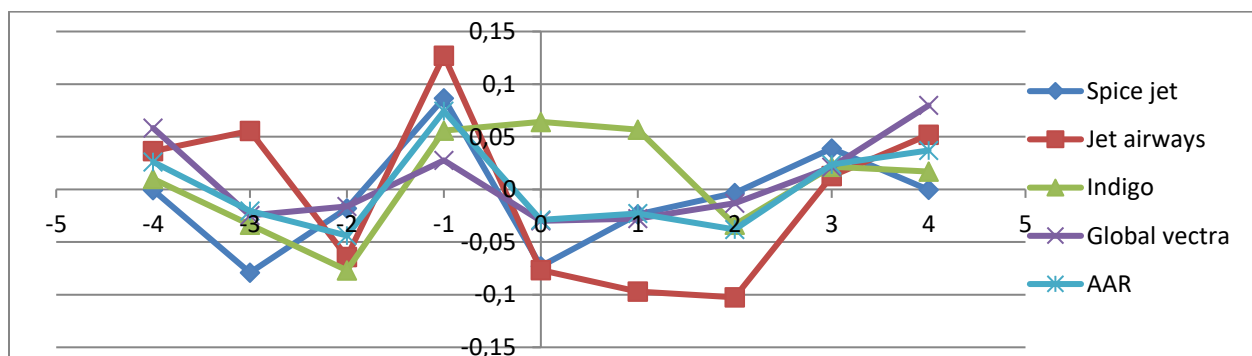


Figure V. Daily abnormal returns of the entire sample in response to the fourth Covid-19 press announcement made on 24 March 2020.

Figure 5, illustrates the response of Indian aviation stocks after the Indian govt. declared countrywide lockdown. On the event day (day 0) stocks of Indian aviation companies experienced negative abnormal returns except Indigo indicates that the stock traders reacted immediately after the countrywide lockdown announcement were made. Spice jet among the entire sample showed negative abnormal returns in most of the days during event window, but the significant abnormal returns were found only on day 0, day -1, and day-3 at 5% significance level (**Table 1**). Indigo airline is found to have significant and positive abnormal returns on day 0, day 1, day -1, day -2 at 5% level of significance.

Table 1 Abnormal returns and T test during four different event windows

	Spicejet AR	T test	Jet Airways AR	T test	Indigo AR	T test	Global Vectra AR	T test
Event window 1								
-4	-0.03907	-1.23706	0.049675	0.57912 3	0.02515 4	1.03515 4	-0.01348	-0.3133
-3	-0.02166	-0.6858	0.057831	0.58375 9	-0.00845	-0.34769	0.06682 2	1.55355
-2	0.05406 1	1.71172 5	0.036323	0.58649 6	0.02651 7	1.09122 3	0.04715	1.09619 5
-1	-0.00592	-0.18729	0.051919	0.58756 5	0.00723 1	0.29758 1	-0.02914	-0.67747
0	-0.02615	-0.82786	0.048403	0.58718 7	0.00097 9	0.04030 2	-0.02073	-0.48193
1	0.00360 5	0.11414 3	0.053475	0.58555 6	-0.00259	-0.10665	0.00185 4	0.04309 4
2	-0.00312	-0.09878	0.058581	0.58285 3	0.01732 4	0.71294 6	0.19416 9	4.51425 5
3	-0.00565	-0.17876	-0.04454	-0.59106	0.00575 6	0.23688 7	-0.03897	-0.90605
4	-0.00929	-0.2943	-0.04255	-0.58468	0.01007 4	0.41456 9	-0.0181	-0.42081
Event window 2								
-4	0.05679 7	1.79835 7	-0.035	-0.41581	0.00025	0.01058 1	0.01151 1	0.26761 2
-3	-0.026	-0.82332	0.01339	0.15907 5	0.01297	0.53377 8	-0.01993	-0.46346
-2	-0.02448	-0.77525	-0.03686	-0.43795	0.01195	0.49191 1	-0.01044	-0.24271
-1	0.03172 2	1.00440 5	0.043125	0.51233 4	0.00047	0.01942 2	0.05976 5	1.38948 6
0	0.06176 1	1.95553 6	0.060932	0.72389 4	-0.00916	-0.37683	-0.00448	-0.10408

1	-0.04774	-1.51174	0.027199	0.32313 4	-0.00246	-0.10121	0.03835 9	0.89182 1
2	0.01400 7	0.44350 3	-0.01122	-0.1333	-0.04606	-1.89539	-0.02263	-0.52619
3	0.02470 9	0.78235 9	-0.01594	-0.18936	0.01812	0.74593 7	0.01644 5	0.38232 8
4	-0.01504	-0.47622	-0.03627	-0.43087	-0.01816	-0.74717	-0.01307	-0.30386
Event window 3								
-4	-0.04144	-1.31223	-0.03523	-0.41858	-0.0203	-0.83548	-0.06409	-1.49007
-3	-0.02221	-0.70319	0.050249	0.59697	0.00787 1	0.3239	0.01037 4	0.24119
-2	-0.0673	-2.13078	-0.01268	-0.15064	-0.01404	-0.57777	-0.03104	-0.72158
-1	0.06082 4	1.92586	0.073868	0.87757	0.06246 2	2.57044	0.06354 3	1.47731 5
0	-0.05522	-1.74842	-0.0886	-1.05262	-0.05018	-2.06507	-0.0196	-0.45566
1	-0.11049	-3.49829	0.065054	0.77286	-0.06834	-2.81249	-0.00055	-0.01274
2	-0.14264	-4.51633	-0.09271	-1.10147	-0.04433	-1.82434	-0.01607	-0.37355
3	0.05562 4	1.76122	0.060069	0.71363	0.02864 8	1.17891	-0.01934	-0.44972
4	0.01196 7	0.37892	-0.0091	-0.10812	0.01198	0.49299	0.06864	1.59581
Event window 4								
-4	-0.00081	-1.35152	0.036398	0.43241 9	0.01001	0.41194 8	0.05826 8	1.35468 3
-3	-0.07908	-2.50394	0.055527	0.65967 8	-0.03361	-1.38303	-0.02459	-0.37591
-2	-0.01805	-0.57136	-0.0642	-0.76277	-0.07684	-3.16211	-0.01617	0.64016 3
-1	0.08663 6	2.74313 6	0.127114	1.51015 4	0.05596 1	2.30293 5	0.02753 5	-0.69324
0	-0.07297	-2.31057	-0.07676	-0.91194	0.06418 8	2.64148 6	-0.02982	-0.64154
1	-0.02376	-0.75227	-0.09703	-1.1527	0.05664 4	2.33104 5	-0.02759	-0.30407
2	-0.00347	-0.10986	-0.10249	-1.21758	-0.03359	-1.38221	-0.01308	0.49602 4
3	0.03895 7	1.23350 2	0.012722	0.15113 8	0.02153	0.88599 5	0.02133 5	1.85452 2
4	-0.00047	-0.01496	0.051991	0.61766 3	0.01709 4	0.70344 6	0.07976 8	-2.74387

****Significant @5% level of significance**

Source: Authors calculation

4.2. Cumulative Abnormal Returns

Table 2 shows the cumulative abnormal returns of four major Indian aviation company stocks during four different event windows, for the four important Covid-19 events happened during the initial phase of disease outburst. We have excluded all other stocks of airline companies operating in India, not listed on any stock exchange. The above table presents the outcomes on pre event (-4, 0), on event (0, 0), and post event (4, 0) windows as below.

During the before-event (-4, 0), window the CAR of Indigo, Jet Airways and Global Vectra shown in table 2 are mostly positive but not statistically significant. The stock of Spice jet has shown negative CAR in every event except event 2. The t-test employed on the CAR of the four days before, all the events do not show any significant difference from zero. So the results shown in table 2 on pre event window (-4, 0) are not statistically significant in any of the events.

Table 2. Cumulative Abnormal returns and T test in individual aviation companies during different event periods

Companies	Window	Event 1, 13 Jan., 2020		Event 2, 20 Feb., 2020		Event 3, 11 March, 2020		Event 4, 24 March, 2020	
Before Event		CAR	t-test	CAR	t-test	CAR	t-test	CAR	t-test
Spice Jet	(-4, 0)	-0.01258	-0.26223	0.038032	0.792555	-0.07012	-1.46134	-0.0113	-0.23545
Jet Airways	(-4, 0)	0.195748	1.623434	-0.01535	-0.1273	0.076204	0.631998	0.154835	1.284121
Indigo	(-4, 0)	0.050453	1.355102	0.025653	0.68901	0.03599	0.966655	-0.04447	-1.19454
Global Vectra	(-4, 0)	0.071357	1.120373	0.040902	0.642201	-0.02121	-0.33304	0.045047	0.707289
On event									
Spice Jet	(0,0)	-0.02615	-0.82786	0.061761	1.955536	-0.05522	-1.74842	-0.07297	-2.31057
Jet Airways	(0,0)	0.048403	0.587187	0.049091	0.060932	-0.0886	-1.05262	-0.07676	-0.91194
Indigo	(0,0)	0.000979	0.040302	-0.00916	-0.37683	-0.05018	-2.06507	0.064188	2.641486
Global Vectra	(0,0)	-0.02073	-0.48193	-0.00448	-0.10408	-0.0196	-0.45566	-0.02982	-0.64154
After event									
Spice Jet	(4,0)	-0.01446	-0.30124	-0.02407	-0.50158	-0.18553	-3.86636	0.011256	0.234575
Jet Airways	(4,0)	0.024964	0.207041	-0.03623	-0.30045	0.023308	0.193306	-0.1348	-1.11797
Indigo	(4,0)	0.030563	0	-0.04855	-1.30391	-0.07205	-1.93509	0.06168	1.656634
Global Vectra	(4,0)	0.138951	2.181682	0.019101	0.299913	0.03268	0.513118	0.06043	0.948807

****Significant @5% level of significance**

Source: Authors calculation

This shows the under reaction of the investors of Indian aviation companies. The likely reason of this finding is that the investors of Indian aviation stocks expect that the spread of the Covid-19 disease would be restricted to specific areas, which is also reported by study on SARS conducted by Ru et al., (2020). Another possible reason of this finding is that the investors expected that the Governments of different countries may discover a vaccine within a short period of time. Also investors do not expect that the cross-broader operations of airline companies would drop because of the lockdown policy in most of the countries. Hence, they misjudge the possible consequences of COVID-19 on world trade and industry.

During the on-event days (0, 0), the abnormal returns of stocks of aviation companies did not show much fluctuation in the first event, but ups and downs were reported during the subsequent events. Most of the negative abnormal returns were reported during on-event days specifically in the third and fourth events, indicating that these events were taken seriously by the investors of airline companies. As shown in the table 2 above, CAR of all the stocks during on-event days in the first two events is not significant at 5% level of significance. The Indigo stock in the third and fourth event shows significant CAR, demonstrating that the investors of Indigo overreacted during the third and fourth event. Also during the fourth event the Spicejet shows significant CAR at 5% level of significance. Therefore the events of third and fourth Covid-19 announcement have significantly impacted the stocks of Indigo and Spicejet aviation companies.

During after event window days (4, 0), little fluctuations were reported in almost all the stocks specifically in the stocks of Jet Airways and Spicejet. The stocks of sample companies had shown insignificant, both positive and negative abnormal returns throughout the after event windows days. After analyzing the above table 2, CAR of all the sample stocks during after event window days in the first two events do not show any significant result except Global Vectra in the first event. Also in the subsequent events the stocks do not exhibit any significant CAR except Spicejet in the third event. Hence, this finding suggests that the investors of Indian aviation companies did not overreact during after event window days.

5. Conclusion

The COVID-19 pandemic has influenced the worldwide economy of which India is a major member. India is the country with the second biggest populace on the planet, so the pandemic has been particularly risky for India. The COVID-19 influenced practically all securities exchanges all around the world. We endeavored to evaluate the stock performance in terms of stock returns of four Indian airline companies before and after the four important official press announcements were made related to Covid-19 outbreak. Four significant events depicting the development of the COVID-19 outbreak have been considered, which are, Event 1 (January 13, 2020): the first Covid-19 positive patient registered outside China in Thailand; Event 2 (February 21, 2020): the Covid-19 outburst in Italy; Event 3 (March 11, 2020): U.S. declared ban on travel passengers from 26 European nations and WHO declaration on Covid-19 as global pandemic outbreak; and Event 4 (March 24, 2020): the Government of India ordered countrywide lockdown.

The stocks of Indian airline companies have shown fluctuations in terms of abnormal returns in every event, but the significant fluctuations were reported only in the third and fourth event. We find under reaction by the investors during before-event days, on-event days, and after-event days

in almost all of the Indian airline stocks to the first two covid-19 announcements. The investors over reacted to the third and fourth Covid-19 announcements mostly during on-event days. The stocks of Indigo and Spicejet airlines were the worst performers during event third and fourth.

The aviation industry battles with Covid-19 pandemic and it's potential after effects, which appears to be challenging and may be long drawn-out. The sustainability and existence of Indian aviation sector warrants for changes of improvement in their methodologies and business plan of action to reinforce their financial endurance. Overcapacity, strong rivalry and increasing operational cost are the key elements upsetting aviation companies' performance. To beat the negative challenges of Covid-19 catastrophe, ideal use of capital assets, collaboration as opposed to rivalry ,mergers and acquisitions, cost adequacy, tax policy and government subsidies appears to be the conceivable way-outs for supporting with financially feasible take-off on harsh terrain.

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Human Capital Development and Economic Growth In Nigeria: A Structural Break Perspective.

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Abstract

The study examined human capital development and economic growth in Nigeria using secondary data obtained from CBN statistical bulletin for the period of forty years between 1981-2020. Agriculture (AGR), Civil-Service (CIVSER), Education (EDU), Health (HLTH), Manufacturing (MANU) and Transportation (TRANSP) sectors of Nigerian economy were used from 1981 to 2020 as proxies for expenditure on human capital development and independent variables for the studies while Gross Domestic Product (GDP) was used as proxy for economic growth and the dependent variable. Structural break analysis was used which shows no structural break occurrence in Nigeria within the period of study. It could also be seen that expenditure on human capital development on civil servants, education, manufacturing and health were found significant with exception of agriculture and transportation that were not significant in the least square results generated with the structural break analysis. Generally, with the R-squared and Adjusted R-squared of 96% and 95% respectively, it could be submitted that for forty years under consideration, there is smooth correlation between human capital development and economic growth in Nigeria. The Structural Adjustment Program (SAP) that was introduced in July 1986 and lasted till June 1998 was not strong enough to influence human capital development and economic growth. This was supported by the structural break graph and cusum graph.

Key words: Structural break, Structural adjustment program, human capital development, economic growth.

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1. Introduction

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Structural break is particularly relevant in economic time series and has been defined variously such as an unexpected change over time in the parameters of regression models or a sudden jump or fall in the economic times series which occurs due to change in regime, policy direction and external shocks. Structural break could come about through an internal or external cause. Also, Structural break is an unexpected disruption that occurs in a system. It is an incidence of any form of change with attendant influence on the existing structure, as applicable. It is usually indicated on the graph by a sudden or sharp bend upward or downward, indicating positive or negative change

Different from structural break is a similar but completely different concept, structural change. Structural change ‘refers to changes in the structure of the economy. Structural change can be caused by factors which include technological progress, foreign trade, and demographic transition while with education, the adjustment costs brought about by structural change can be mitigated and individuals can be further empowered to be more adaptive, versatile, and productive Ogbonnaya (2018). He also stated that ‘Structural changes occur in times series data for a number of reasons, including economic crises, changes in institutional arrangements, policy changes. Apart from a sudden event or major change in government policy, another factor identified to bring about structural change is war (robbyhyndman.com, Accessed Dec. 2022).

Possibly easily identifiable as a cause of structural break in Nigeria is the Structural Adjustment Programme (SAP) which was launched by President Ibrahim Badamosi Babangida of Nigeria in 1986 (with support from the International Monetary Fund (IMF) and the World Bank - WB). SAP was to last till 1998 and be terminated after achieving its objectives. However, in attempting to correct all noticeable mistakes in the drive to achieve the objectives, it was prolonged till 1993 and then terminated due to the need to put certain things right or correct certain mistakes. Some of the objectives of SAP included to restructure and diversify the economy’s productive base in order to reduce dependence on oil and imports, achieve medium term fiscal viability and the balance of payment, promote economic growth without inflation, achieve a GDP growth rate of 3-4% in 2 years and reduce inflation to 9% yearly. The policy mechanisms designed to meet the objectives included to expand the supply base of the economy, encourage domestic production and put in place the mechanism for realistic exchange rates (legit.com, Accessed Jan. 2023). Unfortunately, because oil production and export were (and still constitute) the main stay of the Nigerian economy in the 80s, there was access to easy money and when there was a fall in agricultural and mineral exports, the intended effect of the SAP was not felt as there were no changes made. SAP was intended to improve the economic situation in the long-run through short-term solutions that would reduce fiscal in-balance in the society and it was successful for some years as the agricultural sector was booming and farmers and their rural communities benefitted more while Civil-Servants and the middle class lost out with increasing difficult standards of living (legit.com, Accessed Jan 2023). Other negative indices such as the depreciation of the naira against the dollar for as high as 80%, fluctuating rate of inflation to as high as 50% in 1992, insurmountable debt growth to the IMF and WB and government partiality towards its supporters set in (legit.com, Accessed Jan. 2023) and according to Adrianna, S. (2017), ‘oil prices plummeted to less than \$10 for a barrel. This caused an overall stagnation of the economy. The government had a problem with finding money for the budget’.

To examine how structural break affects human capital development and economic growth in Nigeria in Nigeria. **Null Hypothesis:** Structural break does not affect human capital development and economic growth in Nigeria.

2. Empirical Review

Brita and Taran (2021) investigated the role of human capital in structural change and growth in an open economy: Innovative and absorptive capacity effects. They believed that the poor growth that has plagued Europe since the financial crisis of 2008 has been exacerbated by the COVID-19 pandemic. One of the most pressing issues for the next few decades will be fostering economic expansion and making the transition to a knowledge-based industrial structure. Using a dynamic endogenous growth model using Norway as a numerical example, we examine the effect of increased and improved human capital on knowledge accumulation and structural transformation. There are two primary functions of human capital in fostering productivity growth: increasing inventive ability through involvement in R&D, and increasing absorptive capacity in sectors that engage in international commerce and may learn from their counterparts overseas. The sectors of a small, open economy where human capital, R&D, and commerce all interact and permit absorption expand the most quickly, we discover.

Michele, Edinaldo and Marina (2021) studied to determine whether or not human capital is a critical factor in structural change across economic sectors and whether or not it may hasten the pace of such change. This paper makes a contribution to the body of knowledge by conducting an empirical test of the model proposed by Li *et al.* (2019) by employing the generalized method of moments (GMM), which accounts for the endogeneity present in human capital variables, and by employing two proxies for human capital and structural change to ascertain whether or not they have an effect on the variable of interest and to provide robust results. As human capital affects the relative involvement of the sectors on total added value or total employment, it plays an important role in the structural transformation process of the economy. Human capital was also shown to be a possible catalyst for this structural change.

Prodi (2019), using panel data from 38 districts/cities from 2010-2015, this article explores the impact of human capital and structural changes on economic growth in East Java. Health and education as indicators of human capital have a positive and substantial influence on economic growth, as shown by estimate findings using the Generalized Method of Moments (GMM) Arellano-Bond. There is a positive and considerable effect on economic growth from structural changes, as assessed by the percentage of workers in the industrial, construction, and service sectors. Intriguingly, the research showed that structural shifts had a bigger impact than human capital.

Jochen (2010) in response to Baumol's concept of "unbalanced growth," a growing body of research has proposed frameworks for integrating structural shifts with Kaldor's "stylized reality" of steady per-person GDP increase. Another school of thought goes further, saying that the human capital-accumulating character of major 'stagnant' services actually promotes rather than hinders long-term economic growth as a result of budget changes toward Baumol's 'stagnant' sector (like health care and education). Using a Granger-causality analysis on a panel of 18 OECD countries,

this research provides empirical evidence for a connection between structural change and economic development.

Jagannath Mallick (2017) submitted that many factors have been redistributed due to the profound changes in the mix and structure of developing economies brought about by globalization. This research looks at what drives structural shifts in the labor market and how much of an impact they have on LPG overall, while also taking into account the effects of globalization and different forms of human capital. Human and material resources are both examined and ranked in terms of their importance to LPG. According to the research, shifting consumer demand has the biggest role in redistributing workers in India. Allocating workers in the PRC takes these and technological developments into account. The investigation of the correlation between LPG and structural change, globalization, and human capital verified these findings. India has the potential to become a world leader in economic growth if the right steps are made to improve the country's infrastructure and foster the growth of its human capital and exports.

Wei-Bin (2017) examined structural change in economic development models with mixed-income families. The value of property and savings are set by internal factors. Walrasian general equilibrium theory, Ricardian theory of distribution, and neoclassical growth theory form the basis of our model. The study analyzes how shifts in economic dynamics might affect the distribution of income and wealth as well as the rate of economic expansion. We construct an analytical framework for a broad theory of economic growth based on microfoundations and endogenous accumulation of wealth. The model is being simulated. We identify a single stable equilibrium state. We employ three different types of families to chart economic growth and change. To better understand the nuanced dynamics of economic development and the distribution of wealth and income, we also engage in comparative dynamic studies. We demonstrate, for example, that when the group with the most human capital increases its propensity to save, the wealth levels of the group and the other two groups are temporarily enlarged, leading to negative growth in national output; however, when this trend is maintained over the long term, the wealth levels of the group and the other two groups continue to increase, leading to positive growth in national output. We also show that a rise in the population of the group with the lowest (highest) human capital causes a decline in pay rates, wealth, and consumer product consumption across the board (enhanced).

Fashanu and George (2020) in their studies submitted that both technical progress and structural change have been demonstrated to have an impact on economic growth. The empirical data from Nigeria, however, has shown contradictory findings on the presence and pattern of structural change in her growth process. So, the purpose of this research was to look at the connection between structural shifts and GDP expansion in Nigeria. The study used a retrospective research approach, gathering data in the form of time series and analyzing them with the help of the Growth Decomposition model. The results showed that structural change in Nigeria is really growth promoting, which runs counter to the findings of some earlier research that suggested the opposite. The research recommended raising government expenditure and instituting new policies to boost aggregate demand, particularly for manufactured goods, both of which rely heavily on the productivity of human labor.

3. Methodology

The study area was Nigeria with focus on the Agriculture (AGR), Civil-Service (CIVSER), Education (EDU), Health (HLTH), Manufacturing (MANU) and Transportation (TRANSP) sectors from 1981 to 2020. Sector by sector government recurrent expenditure was used as proxy for human capital development, the independent variable while Gross Domestic Product (GDP) was used as proxy for economic growth, the dependent variable. The ex-post facto research design was used because the study being of a times series in nature needed already available data.

3.1. Sources of data

The main source of data collection was the Central Bank Nigeria (CBN) Statistical bulletin. Reports and Records from the Federal Bureau of Statistics and the World Bank were also used. In order to collect relevant data on the *GDP* and government recurrent expenditure on *AGR*, *CIVSER*, *EDU*, *HLTH*, *MANU* and *TRANSP*, a purposeful selection was made from the CBN bulletin from 1981 to 2020.

The Model for Structural break analysis:

$$GDP = f (AGR, CIVSER, EDU, HLTH, MANU, TRANSP + u)$$

Where

GDP = Gross Domestic Product= Economic Growth (EG)

AGR=Agriculture

CIVSER=Civil Service

EDU=Education

HLTH=Health

MANU=Manufacturing

TRANSP=Transportation

$$GDP_t = \alpha_0 + \sum_{t=1}^n \beta_{1i} AGR_{t-1} + \sum_{t=1}^n \beta_{2i} CIVSER_{t-1} + \sum_{t=1}^n \beta_{3i} EDU_{t-1} + \sum_{t=1}^n \beta_{4i} HLTH_{t-1} + \sum_{t=1}^n \beta_{5i} MANU_{t-1} + \sum_{t=1}^n \beta_{6i} TRANSP_{t-1} + V_t$$

4. Results and discussions

Structural break is the occurrence of any change having a sudden or sharp influence on any existing system or structure. A structural break is more general than specific as it exposes the whole of a nation's population to whatever the challenge(s) or opportunity (ies) is (are).

When illustrated graphically, the sharp change in structural break may be upward or downward, that is positive or negative.

4.1. Structural Break Analysis

The Least Square test shows the p-value of almost all the variables to be $< \text{or} = 0.05$. The R-Square = 0.960027 (96%) and the Adj. R-Square = 0.952759 (95%). The variables therefore interacted very well and the results are desirable, indicating that structural change does not affect relationship existing between human capital development and economic growth in Nigeria.

Table 1: Least Square

Variable	Coefficient	Standard error	t-statistic	Probability
C	17960.44	1006.890	17.83775	0.000
AGR	97.65830	72.30752	1.350597	0.1860
CIVSER	29.63984	10.11242	2.911032	0.0061
EDU	-45.20948	8.499311	-5.319194	0.0000
HLTH	192.8531	32.24452	5.980958	0.0000
MANU	-122.9497	50.17196	-2.450567	0.0197
TRANSP	106.3649	53.97085	1.970785	0.0572

Dependent Variable: GDP

R. Squared	0.960027	Mean dependent var	35573.76
Adjusted R. Squared	0.952759	S.D. dependent var	20742.71
S.E of regression	4508.436	Akaike info criterion	19.82292
Sum squared resid	8.71E + 08	Schwarz criterion	20.11847
Log likelihood	-389.4583	Hannan-Quinn criter	19.92978
F-Statistic	132.0918	Durbin-Watson Stat	1.247503
Prob (F-Statistic)	0.000000		

The line in Figure 1 is straight. It has no sudden or sharp bend, hence, no sudden policy change which could alter existing association between human capital development and economic growth in Nigeria.

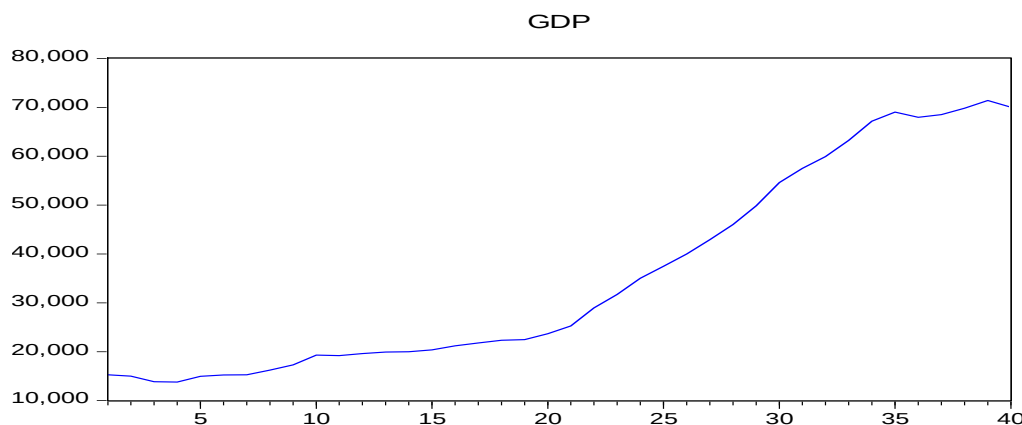


Figure 1:Structural Break Analysis graph a.

Source: E-views 9, 2022

In figure 2, the blue line, representing structural policy or change, did not cross any of the red lines, representing the normal or existing structure or state of the economy, hence, no structural break. In this work, there is no major change or break that affected human capital development and economic growth in Nigeria within the period of study. This explains why the blue line is within the red lines. The flow of the economy maintains itself within the two dotted lines which show the range. The CUSUM test therefore corroborates the structural break graph (a).

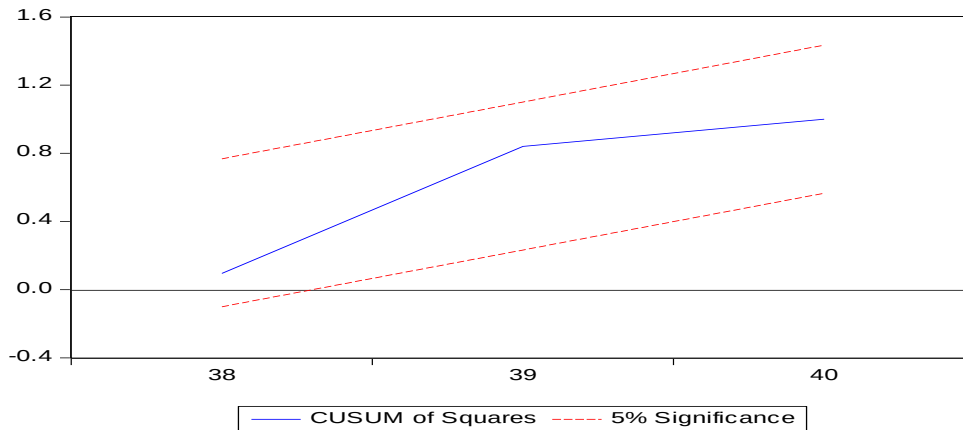


Figure 2: Structural Break Analysis graph b

How Structural Break affects Human Capital Development and Economic Growth in Nigeria

From this study, it was found that there was no structural break in Nigeria within the period of study. Figure 2 showed no structural break as shown by the blue line not crossing any of the red lines above or below it. The blue line is within the red lines. Since no structural break occurred, there was no effect on human capital development and economic growth during the period of study.

The occurrence of structural break in Nigeria was not identified during the period of this study. The Structural Adjustment Program (SAP) introduced to the system in 1986 and which lasted till 1993 was not strong enough to influence human capital development and economic growth in Nigeria. There was no enduring impact. Anyawu, Adam, Obi and Yelwa (2015) in their study on the impact of human capital development on economic growth found that equilibrium was fully restored for any distortion in the short-run. Anyanwu *et al* (2015) stated further that with the SAP, the country's attempt to bring down fiscal deficits, by reducing public spending across the board, as part of the stabilization and adjustment program, 'resulted in unprecedented economic and social costs as human resources development was neglected with adverse long term development consequences. The goal of economic development which underscored the need to improve the well-being of people was overlooked. The program failed and the system returned to equilibrium.' The structural adjustment program (SAP) was not, therefore, successful in Nigeria because it did not suit nor was appropriate for the Nigerian situation (legit.com, Accessed Jan. 2023). According to Adrianna (2017) the Naira was overvalued, and it was concluded that the 'Structural adjustment program in Nigeria has gone down in history as one of the worst things that happened to Nigeria's economy.'

Null Hypothesis : Structural break does not affect human capital development and economic growth in Nigeria.

The structural break analysis shows no structural break occurrence in Nigeria within the period of study. The Structural Adjustment Program (SAP) that was introduced in July 1986 and lasted till June 1998 was not strong enough to influence human capital development and economic growth. There was no enduring impact. The null hypothesis is therefore accepted.

5. Conclusion

SAP did not work when examining relationship existing between human capital development and economic growth in Nigeria as normal flow was not affected by the policies formulated in the Nigerian SAP, Therefore, it was not suitable and appropriate in this economic situation. (legit.com, Accessed Jan. 2023). Aside the above, many economic policies were formulated within the period of forty years under examination and it appears through the study that relationship between human capital development and economic growth was so smooth with insignificant obstruction, by this, it could be said that if the policies formulated within those years are as vital, they would have had negative effects on both dependent and independent variables. The Naira was overvalued and Adrianna, (2017) concluded that the ‘Structural adjustment program in Nigeria has gone down in history as one of the worst things that happened to Nigeria’s economy.

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