EFFECT OF THE NEW ECONOMY IN BANKING SECTOR: EXPERIENCE OF GHANA

YENİ EKONOMİNİN BANKACILIK SEKTÖRÜNE OLAN ETKİSİ: GANA DENEYİMİ

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ABSTRACT

Ghana's banking sector is a critical component of its economy. However, there are growing trend of banking sector blues which caught the attention of the public recently. It is largely due to the woefully performance of the economy over the last years. In view of this, the research paper analyzed the relationship between the banking sector's performance and new economy and the contribution of the new economy to the success of Ghana's banking industry using time series data spanning from 1990 to 2016. The key time series model adopted to achieve the set objectives were the Augmented Dickey-Fuller (ADF) Test, Johansen Cointegration Test, Granger Causality and Descriptive Statistics. The results shows presence of positive correlation between the banking sector's performance and the new economy in the long run. The results also indicated that, a good performance in banking industry bolsters economic growth and GDP at large. However, causality test for the anticipated causal relationship between the banking sector and new economy proved to be correlated, thus, a causal relationship. The research recommends that, government policies aim at improving the banking industry should target reducing hyperinflation, stabilizing the monetary policy rate and increasing private sector credits to banks and non-banks financial institutions and finally encourage foreign direct investment. In conclusion, the new economy has leapfrogged the activities of banking industries in Ghana. Banks have gradually equipped themselves with high tech tools and state –of-art technologies except the rural banks.

Keywords: New Economy, Banking Industry, Causality Test, Augmented Dickey-Fuller Test, Ghana

ÖZET

Bankacılık sektörü Gana ekonomisinin önemli bir bileşenidir. Bu Araştırma Raporu, 1990-2016 yılları arasındaki verileri kullanarak bankacılık sektörünün performans ve yeni ekonomi arasındaki ilişkiyi ve yeni ekonominin Gana bankacılık sektörünün başarısına katkısını analiz etmektedir. Çalışma ayrıca, Gana'da bankacılık sektörü ve yeni ekonomi ile ilgili kamuoyunun görüşünü almak için kullanılan bir araştırma çalışması anketini kullanmıştır. Anahtar zaman serileri ve ekonometrik model, Artırılmış Dickey-Fuller (ADF) testi, Johansen Cointegration testi, Granger nedensellik ve tanımlayıcı istatistikler idi. Elde edilen sonuçlar, uzun vadede bankacılık sektörü performansı ile yeni ekonomi arasındaki pozitif korelasyonun varlığını göstermekte ve ayrıca, bankacılık sektöründe iyi bir performans, ekonomik büyüme ve GSMH arttığını göstermektedir. Ancak, bankacılık sektörü ve yeni ekonomi arasında beklenen nedensel ilişki için nedensellik testi korelasyonu bir nedensel ilişki gösterdi. Araştırma, hükümet politikalarının Gana ve benzeri ülkelerin ekonomik büyümesini geliştirmeyi hedeflediğini, hiperenflasyon ya da yıl enflasyon oranını azaltmayı, para politikası oranını, özel sektör kredilerini bankalar ve bankalar dışı finans kuruluşlarına artırmayı hedeflediğini ve nihayet yabancı doğrudan yatırımı teşvik etmeyi önermektedir. Sonuç olarak, yeni ekonomi Gana'da mevcut bankacılık sektöründe neler olduğunu göstermiş ve önde gelen avantajlar sağlamıştır. Bankalar giderek en son teknoloji-Cure bankacılığı ile kendilerini donatmışlardır.

Anahtar Kelimeler: Yeni ekonomi, Bankacılık sektörü, Nedensellik testi, Artırılmış Dickey-Fuller testi, Gana

1. INTRODUCTION

The essence of new economy on banking industry can hardly be underestimated. Ghana's banking industry is the life blood of its economy contributing 56.5 percent to GDP in 2016 (Bank of Ghana Report, 2017:1). Banking sector development comprises of formal and informal institutions in an

economy offering all forms of banking services to businesses, consumers and other financial institutions. These includes banks, insurers, microfinance institutions, mobile service providers, stock exchange, money lenders and credit unions as well as wholesale and retail service providers. It is worth noting that the Ghanaian banking industry currently constitute 31 banks due to the fall out of UT Bank and Capital Bank (Bank of Ghana Report, 2018).The dynamics of Ghana's banking sector is being influenced by unstable macroeconomic environment such as exchange rate fluctuations and global forces namely, information technology and communication, technological advancement; deregulation of financial services at the national level and opening-up to international competition; corporate behavior, such as growing disintermediation and increased emphasis on shareholder value are changing ceaselessly. (Boris, Vladan and Milos, 2014:193-194). The new economy is constructively regarded as a host of new economic phenomena resulting from two concurrent processes: On one hand, globalization; i.e. ongoing deregulation, integration of global markets for capital goods and labour, as well as increased competition, on the other hand, a technological revolution based mostly on general-purpose information and communication technologies (ICT) which having an impact on all sectors of the economy, accelerate productivity and economic growth. (Piatkowski, 2003: 2).

Ghana's banking sector appears vibrant compared to those in other countries of the sub-region. Despite the relatively well-developed and structured banking system, the sector was widely used by previous governments in their massive, state intervention programmes, particularly between the 1960s and 1970s (Quartey and Afful-Mensah, 2014:115). This led to significant losses for the banks in terms of the ratio of bad loans to their total portfolio. As part of measures to restructure the banking sector, reforms were instituted (including a market for securities) to ensure effective monetary policy. As a result, a weekly auction in Treasury bills was introduced in 1986. Gradual attempts were subsequently made by the central bank to move away from the direct control regime3 to the indirect system of policy measures which was more market-oriented. Given the negative consequences from the repressive measures, the Financial Sector Adjustment Programmes (FINSAP 1) was introduced between 1988 and 1990 to, inter alia, restructure distressed banks, increase the mobilization of savings and efficiency in credit allocation, and develop money and capital/securities markets (Owusu-Antwi, 2009:85). Subsequently, the government amended the existing banking law in August 1989 in order to strengthen the banking system. Most of these policies had been unsuccessful. The need therefore arises to have an in-depth study into banking sector and new economy and identify proper measures to deal with the obstacles of banking industry for future purposes.

2. ECONOMICS OF BANKING and NEW ECONOMY

Summarizing from the banking industry, contemporary financial intermediation theory sees banks as information agents and, as such, intermediations among providers and users of financial capital. Banks alleviate information problems through two main functions (Greenbaum, Thakor, and Boot, 2015:490). Previous studies on banking sector and new economy, the effects of internet banking and impact of ICT on banking broaden the scope of this study to close the gap in the thematic area of new economy. For instance, earlier empirical studies simply used a case study approach of relating cross-country new economy or IT with the level of banking sector development. Others consist of just the examination of the direction of causation between new economy and the level of growth of banking sector as in the case of studies reported by (Jung ,1986:321-334) and (Odedokun,1998:203-224)), among others. Some others like (Fritz, 1984:91-112); (Jao, 1976:83-109 and Lanyi, 1939:61) and (Saracoglu, 1983:1); adopted the approach of testing for the effects of financial intermediation variables (e.g. financial depth and the growth of real money balances) in the economic growth equations. Other recent empirical studies that were based on a similar approach include (Gross,1991:1-29. Most of these studies have reported effects of financial intermediation on economic growth. Recent studies on the relationship between economic growth and banking sector development using Granger causality reveals that at some point in the economic growth cycle, the driving force turns in to a "demand-following" relationships, as increased economic growth leads to higher income and educational levels which in turn generates greater demands for more sophisticated

financial and risk management services (Liang and Reichert, 2006:19). To Liang and Reichert, economic growth hinders banking sector development as people become abreast with knowledge and vital information regarding the industry. In their view, the new economy poses a deleterious threat to the financial sector development. In view of this, further research will be conducted to see how crypto currency negatively affects the banking sector development.

2.1 Conceptual Understanding of New Economy

The study perceived the new economy as a jargon which describes the high growth industries with state-of-art-technologies that are deriving the forces of macroeconomics variables like exchange rate, GDP, inflation etc. in the Ghanaian economy. The new economy is broadly defined as a fancy economic enterprise which constitute the information economy, network economy, digital economy-age, knowledge economy, risk society and computer age that contribute immensely to the development of banking industry in a positive way. It is an integral part the research and the operations of planning, manufacturing and production of services of the economic enterprises and, also an essential means to support the control and decisions taken inside the enterprises themselves. The modern banking industry depends heavily on the new economy for excellent performance. The new economy and its effects on the banking sector have received impressive consideration in the fields of development, finance and international economics. Varying views have emerged from the theme: (Dangolania, 2011:13) examined the impact of Information Technology (IT) in banking system. A case study in Bank Keshavarzi Iran. The findings proved that IT contributes to the banking system in three different ways: IT saves time of customers and employees conspicuously; IT cuts down budget expenditure by 10 percent in 1991 and facilitates network transactions. For instance, Dangolania hinted in his article dated 2011 page 13 to 16 that, the advent of IT to every aspect of human life and business has been so obvious that it does not need to be accentuated more. Technology is influencing competition and the degree of contestability in banking, and technology influence economies of scale as well as the economics of delivery.

2.2 Information Technology

According to Princhard and Cole (1997), IT is a term, which generally covers the harnessing of electronic technology for the information needs of business at all levels. It is a computer based system as well as telecommunication technology for storage, processing and dissemination of information. However, the role of information technology in the banking industry is accentuated too but not sufficient in Iran. In the light of this, Lichtenberg (1995) finds evidence of excess contemporary returns to capital and labour deployed in information systems. He uses data of the US economy from two different sources with between 190 and 450 firms in the cross-section dimension. His results are based on Cobb-Douglas production functions with the input factors computer capital stock and non-computer capital stock, ICT labour and non-ICT labour. Lichtenberg does not measure the lagged productivity effects and takes noaccount of unobserved heterogeneity and endogeneity of ICT investment and ICT labour decisions (Zwick, 2003:1) Lichtenberg concludes that there is significant benefit from investment in IT especially in the banking industry. Furthermore, Castelino (2006) suggests that Indian banking industry has provided the leading edge to what is happening to the Indian economy. Banks have equipped themselves with the latest of technology—core banking. Business Process Reengineering has been introduced to enhance spleen and efficiency of delivery. The aforementioned literature suggests that banking industry cannot survive without the technology. Information technology becomes a strategic asset when it makes the entire business adaptive and ready for change by connecting people, process, and information to drive results. An effective information technology investment reflects the organization's complex values, social structure, process, and practice. IT also helps companies understand the complexities of data, because that data may reveal customer and market insights in the firm's area of expertise (Bothra, Shukla, Murari and Tater, 2011:218-219).

Information Technology enables sophisticated product development, better market infrastructure, implementation of reliable techniques for control of risks and helps the financial intermediaries to

reach geographically distant and diversified markets. Focusing on both threats and opportunities of information technology, (Blili and Raymond, 1993:439) concluded that the strategic use of information technology can both threaten and benefit Small and Medium-sized Enterprises (SMEs). There are also statistical reports regarding the banking industry affected by IT as announced by organizations throughout the world. The banking sector saw budgets drop by 10% on average in 1991, and expects only average growth in 1992. With average site budgets in excess of US$4 million, the highest in the survey group, the downturn for banking has affected the entire IT market. Banking had the highest negative rating in its attitude towards investment savings spending; almost half checked choices indicating stable spending with no major growth in any area, or a contraction of spending. Controlling costs is a critical imperative for nearly two-thirds of the banking community, by far the highest ratio for any of the sectors surveyed. This will presumably be largely personal computers, since banking had the lowest percentage (18%) agreeing that UNIX workstations are becoming a viable alternative to traditional personal computers. A survey-low 29% of PCs in banking were connected to a host computer, compared to an average of two-thirds. Overwhelmingly the major activity of software staff at banking sites is systems or network maintenance, which accounted for 60% of staff time compared to an average of 33%. Only 16% of staff time went to developing new applications. (Computer Industry Report, 1992:1)

2.3 Resilient Banking Industry

The literature critically examined some empirical work on the essence of new economy on banking industry and the effects of technological advancement in the banking sectors of the economy. It clearly shows that, the findings of the various research are not the same but it all geared towards achieving a resilient banking industry. The positive impact of banking sector on the new economy seem to be significant and cannot be underestimated.

Literature on the areas related to this Study seems to work much more effectively in the advanced countries than the developing and middle income countries because of the difficulty connected with access to data. There are data gaps in Africa and in particular Ghana where the research is conducted. In this paper therefore, the strategic importance of information technology is analyzed in light of the specificity of banking institutions. Planning approaches are then outlined, focusing on how SMEs can attain a mastery of information technology for competitive advantage. However, the fast growing new economy like crypto currency can be pernicious to the banking industry more especially rural and other traditional banks. In view of this, our future research will be to find out how widespread of crypto currency like bitcoin affects banking industry in a pestilent manner and how central bank of Ghana can regulate its activities.

3. DATA and METHODOLOGY

The primary research method for this study is literature review and Conceptual modeling. The methodology specifically describes the research model, research instruments, data collection process and the procedure for the data analysis. A survey research was conducted, which is one of the most common types of quantitative in social science research. Survey research is a method used to obtain information needed by giving out questionnaires to the related population. Survey research can be used for explorative intention, explanatory or confirmatory, evaluation, prediction, operational research and development of social indicator. It allows the collection of data about subjects that are exclusively internal to the participant, such as attitudes, opinions, expectations and intentions, and data on these areas are important for the study.

3.1 Description and Selection

In order to motivate and influence the variables selection, it is imperative to comprehend what constitutes banking sector development and growth and the definitions of banking sector variables. The rest of this section looks into this matter.

3.1.1 What is Banking Sector Development?

The Banking Sector Development comprises of formal and informal institutions in an economy offering all forms of banking services to businesses, consumers and other financial institutions. These includes banks, insurers, microfinance institutions, mobile money service providers, stock exchanges, money lenders and credit unions, wholesale and retail services.

The determinants of banking sector development from the perspectives of real income, real interest rates, openness and financial liberalization.

The three models of banking sector development indicators employed in the banking industry, namely liquid liability, private sector credit and domestic credit. For example: (1) higher Gross Domestic Product (GDP) will strengthen the banking sector development, however, financial liberalization appears to destabilize the banking sector development, and (3) the financial reforms in Ghana require financial liberalization to come in a later stage, when adequate institutions and sound macroeconomic policies are already in place. The indicators of banking sector development should have a complete characteristic of risk management, credit intermediation and liquidity management. The present study measures financial sector development by the amount of fund banking service immediate, increase in size of the financial sector and increase in financial service access.

3.1.2 Empirical Measure of Banking Sector Development

One of the key issues in studying the banking sector development- new economy's relationship is how to select a suitable empirical measure of financial development. Several indicators have been used as proxy for banking sector development; this study uses four of the commonly used proxies grouped into two: Stock market development-(the ratio of stock market capitalization to GDP and Total Value of Shares Traded Ratio) and financial intermediaries (Banking sector and non-financial institutions)

3.2 Data Exploration Techniques

The study evaluates the banking sector development and new economy in Ghana using time series data of financial (bank level data) and macroeconomic variables for the period 1990 to 2016. This study employ two broad category of time series variables: economic and financial variables in establishing the long run effect of banking sector performance on new economy in Ghana. The economic variables that influence the level of new economic growth were M1 (Wide Money Supply), M2 (Broad Money Supply), M2+ (Total Liquidity), GM2+ (Growth rate of total liquidity), Commercial Bank Interest Rate (CBR), Monetary Policy Rate (MPR), Consumer Price Index (CPI), and Gross Domestic Product (GDP) or new economic growth rate whereas the financial variable consist of Private Sector Credits (PSC).

In order to determine the effect of the above mentioned economic and financial variables of the banking sector performance on new economy in Ghana, the study employ the mathematical model below:

$$NE_t = f(M1_t, M2_t, M2+_t, GM2+_t, MPR_t, CBR_t, CPI_t, PSC_t) \dots \dots \dots \dots \dots \dots . (3)$$

Where: NE = New Economic Growth rate in Ghana

M1= Wide Money Supply

M2= Broad Money Supply

M2+ = Total Liquidity

GM2+ = Growth of Total Liquidity

CBR = Commercial Bank Interest Rate

MPR = Monetary Policy Rate

CPI = Consumer Price Index

PSC = Private Sector Credit and t denotes time.

The dependent variable is the new economy (including Information Communication Technology (ICT), GDP (Gross Domestic Product), total productivity, development of capital goods and services in Ghana) and the independent variables are M1, M2, M2+, GM2+, MPR, CBR, CPI, and PSC. The table below shows the variables of the model, and expected effect of the various variables on new economic growth in Ghana.

Table 3.2.1. Variables, their denotations, units and expected signs

Variables	Denotations	Units	Expected Signs
New Economy	NE		
Commercial Bank Interest Rate	CBR	Percentage	+
Monetary Policy Rate	MPR	Percentage	+
Growth on Total Liquidity	GM2+	Percentage	-
Wide Money Supply	M1	Numeral	+
Broad Money	M2	Numeral	+
Total Liquidity	M2+	Numeral	+
Inflation	CPI	Percentage	-
Private Sector Credit	PSC	Numeral	+

3.3. Statement of Hypotheses

The following specific hypotheses will be tested to establish the correlation between the banking sector development and new economy in Ghana:

(1a)   the null hypothesis that there is no positive relationship between banking sector development and new economy,

(1b)   the alternative hypothesis that there is a positive relationship between banking sector development and new economy and

(2a)   the null that there is no long-run relationship between banking sector development and new economy,

(2b)   the alternate that there is a long-run relationship between banking sector development and new economy

3.4 Empirical Model and Estimation Techniques

The relationship of the various variables under consideration against time are used in examining the trend of new economy (NE), inflation rate (CPI), wide money (M1), broad money (M2), total liquidity (M2+), growth on total liquidity (GM2+), monetary policy rate (MPR), commercial bank interest rate (CBR), private sector credits (PSC). With the objective to examine the banking sector performance on new economy in Ghana, the model to be estimated is as follows:

$$NE_t = \beta_0 + \beta_1 LCPI_t + \beta_2 MPR_t + \beta_3 GM2 +_t + \beta_4 M1_t + \beta_5 M2_t + \beta_6 M2 +_t + \beta_7 CBR_t + \beta_8 PSC_t + \varepsilon_t \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \ (4)$$

Where NE, CPI, PSC, M1, M2, M2+, GM2+, MPR, are defined above and L denote the log $\beta_i = 0, 1, 2 \dots$ Is the parameter estimates of the regressors, and ε_t is the error term.

Annual data is employed to undertake the analysis in establishing the long run relationship between the banking sector performance and the new economy in Ghana. There is the need to ensure that the data coverage is sufficient for meaningful analysis hence the period under consideration is 1990 to 2016.

3.5. Empirical Model and Instruments

3.5.1. Test for Stationary

This research employed Augmented Dickey–Fuller (ADF) and Philip Peron (PP) tests to aid verify the null hypothesis which always says the series are not stationary and not the usual t-test which is identified to have weakness. The t-test is only give a valid results if the time series under study is

stationary. In addition, Augmented Dickey-Fuller (ADF) model will be appropriate as the variables under consideration in this research are not stable at given time and the error term usual correlates with the subsequent error term. According to Dickey and Fuller (ADF) test is conducted by "augmenting" the random walk without drift, random walk with drift and random walk with drift which is surrounded by a deterministic pattern or trend methods through an

3.5.2 Unit Root Test for Stationary

It is important to know the properties when working with time series data in order to guide you select valid methodology for the analysis. Order of integration is one of such data features when using econometric methods. In regression or co-integration techniques, incorrect application of order of integration always produces spurious regressions or wrong test statistics which can render the analysis useless. The unit root tests have always been used to verify the order of integration of econometric time series. There are many different unit root test used in the literature, however we use seven most commonly used test which are briefly discussed below:

3.5.2.1 Lag Length Selection

One of important decisions in Vector Auto Regression (VAR) modelling is the selection of appropriate lag length. Eventually, the appropriate lag length selection remains one of the weaknesses in VAR modelling due to different lag length provided by different test criteria. Two out of the lot; Akaike information criterions (AIC) and Schwarz Bayesian information criterions (SBIC) are widely used; they are considered to be good and quite reliable. The idea of the two information criteria is to choose parameter that minimizes it. The SBIC chooses fewer lag, while any additional regressor increases the penalty for the loss of degrees of freedom whereas AIC delivers too large model. It is always better to choose model with too many lags than too few. This is to make sure that autocorrelation in the remaining VAR model is eliminated; AIC is thus selected as the leading indicator.

3.5.2.2 **Co-integration and Error Correction Modeling**

If time series data reveal non-stationarity, cointegration can be used to remedy the situation. Cointegration is a situation in which two non-stationary series integrated of the same order have long run relationship (Engle and Granger, 1987:251). The fact that two series are of the same order of integration, say I (1), does not necessarily mean that the series are cointegrated. For the variables to be cointegrated, they must be of the same order as well as having common stochastic trends. The necessary condition for cointegration is that the residual obtained from the regression of the two series should be stationary. Cointegration can also be interpreted as follows: if two or more series are linked to form an equilibrium relationship spanning the long run and then even though the series themselves may contain stochastic trends they will nevertheless move closely together overtime and the difference between them will be stable.

The error correction model (ECM) formulation starts from the recognition that the variables are non-stationary (perhaps integrated of order one) but move together in the long-run, such that there exists a stationary linear combination of these variables (integrated of order zero). If such linear combination exists, then the variables are said to be cointegrated and that stationary linear combination is the ECM. ECM captures the long-run relationship. It reflects attempt to correct deviations from the long-run equilibrium path and its coefficient can be interpreted as the speed of adjustment or the amount of disequilibrium transmitted each period to economic growth. Thus cointegraion is the statistical equivalence of the existence of a long-run equilibrium relationship. When there are two or more I (1) variables under consideration, the residual-based cointegration tests may be inefficient and may lead to contradictory results (Perseroan and Perseroan, 1997:239). A more satisfactory approach would then be used, and this involves methods like Johansen Maximum Likelihood procedure.

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3.5.2.3 Impulse Response and Variance Decomposition Analysis

Impulse response functions (IRFs) shows the effect of shocks on the adjustment path of the variables. Forecast error variance decompositions measure the contribution of each type of shock to the forecast error variance (FEV). Both computations are useful in assessing how shocks to economic variables reverberate through system.

Impulse Response Functions (IRFs) and Forecast Error Variance Decompositions (FEVDs) can be produced after using the vector error correction modelling (VECM) or the variance auto regression (VAR) commands. The results can be presented in a table or a graph. After the VAR command we will use impulse-response-variance-decomposition option to generate IRFs and FEVDs.

3.5.2.4 Granger –Causality Test

Granger- causality is way to investigate causality between two variables in a time series. The method is probabilistic account of causality; it uses empirical data to find patterns of correlation. However, causality is closely related to the idea of cause-and-effect, although it is not exactly the same. A variable X is causal to variable Y if X is the cause of Y or Y is the cause of X.

When econometricians say "cause", what they mean is "Granger-Cause", although a more appropriate word might be "precedence" (Leamer, 1985:308). The (Granger, 1969:540) approach to the question of whether x causes y is to see how much of the current y can be explained by past values of y and then to see whether adding lagged values of x can improve the explanation, y is said to be Granger-Cause by x if x helps in the prediction of y or equivalently if the co-efficient on the lagged x's are statistically significant.

Granger-causality is a "bottom up" procedure, where the assumption is that the data-generating processes in any time series independent variables; then the data sets are analyzed to see if they are correlated. The opposite is a "top down" method which assumes the processes are not independent; the data sets are analyzed to see if they are generated independently from each other. It's important to note that there are other approaches that can be taken to make sure that your causality testing is done properly when the time-series you're using are non-stationary (possibly cointegrated). For instance, see (Lütkepohl, 2005:515).

3.5.2.5 Augmented Dickey – Fuller (ADF) and Philip Peron (PP) Test for Stationary

The research will employ Augmented Dickey- Fuller (ADF) and Philip Peron (PP) test to aid verify the null hypothesis which always says the series are non-stationary and not the usual t-test which is identified to have weakness. The t-test only give a valid result if the time series under study is stationary. In addition, the Augmented Dickey- Fuller (ADF) model will be appropriate as the variables under consideration in this research are not stable at given time and the error term usually correlates with the subsequent error term. According to Dickey and Fuller, ADF test is conducted by "augmenting" the random walk with drift, random walk without drift and random walk with drift which is surrounded by a deterministic pattern or a trend method through an addition of the lagged values of the dependent variable as indicated below:

$$\Delta Y_t = \beta_1 + \beta_2 t + \beta_3 Y_{t-1} + \sum_{i=1}^{m} \alpha_i \, \Delta Y_{t-1} + \varepsilon_t \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots (10)$$

Where ε_t a pure white noise error term, m is the maximum length of the lagged dependents variable and ΔY_{t-1} is the change in price of time t less i term. To ensure that the error term in equation (1) is serially uncorrelated, adequate lagged difference are added which is arrived through an empirical method. In ADF, the test is on whether $\beta_3 = 0$.

The Philip Peron test (1988) test of unit root test will also be employed. The regression equation for the Philip Peron (PP) test is given by:

$$\Delta Y_t = \propto + \emptyset Y_{t-1} + \varepsilon_t \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots (11)$$

The null hypothesis of non-stationarity or there is unit root against the alternative of stationarity or there is no unit root will be tested for both the ADF and PP tests. However, an opposed test which

also measures the stationarity of time series data is the Kwiatkowski – Philips – Schmidt – Shin (KPSS) test. The KPSS test the null hypothesis of stationarity against the alternative of not stationarity.

To confirm the ADF and PP test results, Kwiatkowski – Philips – Schmidt- Shin (KPSS) test for unit root were adopted. In econometrics and time series analysis, Kwiatkowski – Philips – Schmidt –Shin (KPSS) tests are used for testing a null hypothesis that an observable time series is unit root around a deterministic trend.

3.5.2.6 **Scope and Limitations of the study**

The period of coverage for this study spans 1990-2016. Published data on all of the variables selected in this study were not all available in one whole but where gathered bit by bit from various sources. However, adequate information on primary data from various banks in Ghana could not be obtained because most of the banks were not willing to give vital information since it could affect the profitability of the banks by its competitors, budgetary support for the research were also a hindrance because of travel and transport (T &T) expenses. The university did not allocate research allowance for this project.

3.5.2.7 **Data Used and Sources**

As indicated before the study uses time series (annual) data spanning from 1990 to 2016. The secondary data used in the study were sourced from the World Development Report, Ghana Statistical Service Department , Bank of Ghana Annual Report and Bulletins, and from the main website of Central Bank of Ghana; www.bog.gov.gh/indexphp/statistics/timeseriesdata . The primary data were also collected from the survey using questionnaire; the information were gathered from bank employers, bank employees, customers of the banks and experts in the field of banking in Ghana.

4. EMPIRICAL RESULTS and DISCUSSIONS

4.1 Descriptive Statistics

Statistics by summary are used to describe the basic features of the time series data in this research. The descriptive statistics are presented in a raw data form and help us to simplify large amounts of data into a reasonable way as well as provide a resilient summary that may enable comparisons across units of measurement. The eight related variables summary statistics are tabulated below. The table 4.1.1 indicate the number of mean, median, standard deviation, minimum, maximum, sum, sum of square deviations, kurtosis, skewness, Jarque – Bera and the number of observation of the series (GDP or new economic growth rate, CPI, Year-on-year inflation, M1, M2, MPR, RM) in Ghana spanning from the period of 1990 to 2016.

Table 4.1.1: Descriptive Statistics of Series

	CPI/O	INF_YOY	M1	M2_	MPR	REAL/GDP/GROWTH_	RESID	RM
Mean	138.3770	20.83704	4572.291	9724.842	24.87037	5.425926	-2.14E-12	3112.641
Median	116.6000	16.40000	1137.280	2117.400	24.50000	4.600000	5.299261	769.3000
Maximum	404.0000	70.80000	26076.38	56692.09	45.00000	14.00000	374.7617	17487.92
Minimum	6.880000	8.580000	21.70000	29.50000	12.50000	3.300000	-324.4855	13.00000
Std. Dev.	119.7568	13.38843	7112.251	15411.35	10.05331	2.348910	168.5513	4865.798
Skewness	0.749802	2.139472	1.761455	1.810482	0.680487	2.157062	0.318361	1.738204
Kurtosis	2.506624	8.210115	5.073461	5.279317	2.513529	7.793265	3.247149	4.908918
Jarque-Bera	2.803760	51.13650	18.79890	20.59499	2.350020	46.78544	0.388748	17.69555
Probability	0.246134	0.000000	0.000083	0.000034	0.308816	0.000000	0.823350	0.000144
Sum	3736.180	562.6000	123451.9	262570.7	671.5000	146.5000	-4.28E-11	84041.31
Sum Sq. Dev.	372883.8	4660.501	1.32E+09	6.18E+09	2627.796	143.4519	539781.5	6.16E+08
Observations	27	27	27	27	27	27	20	27

Source: Arthurs Computation, 2017

The table 4.1.1 above illustrates the statistical analysis of 27 observation of the variables CPI, INF YOY, M1, M2, MPR, Real GDP Growth, and RM. It is observed that, the minimum and maximum

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annual consumer price index (CPI) of Ghana within the time range under consideration are 6.880000 and 404.0000, that of inflation year –on-year are 8.580000 and 70.80000 with narrow money and broad money supply have 21.70000 and 26076.38 and 29.50000 and 56692.09 respectively. However, the minimum and maximum for monetary policy rate and the reserve money are12.50000 and 45.00000, and 13.00000 and 17487.92 respectively. Whereas, the minimum and the maximum for the real Gross Domestic Product growth rate is indicated by 3.300000 and 14.00000 Also, the average of CPI, INF YOY, M1, M2, MPR, Real GDP Growth and RM are shown to be 138.3770, 20.83704, 4572.291, 9724.842, 24.87037, 5.425926 and 3112.641 respectively which is the sum of all the values in the data of a respective variable divided by the total number of observation and the respective standard deviation of CPI,INF YOY,M1, M2, MPR, Real GDP Growth, and RM are shown to be 119.7568, 13.38843, 7112.251, 15411.35, 10.05331, 2.348910, and 4865.798 which is computed by taking square root of the variance.

The table again shows the degree of asymmetry of distribution for each series (Skewness). The skewness could be left-handed (negative) or right-handed skewed (positive). In this research, all the variables are positively skewed. Kurtosis which measures the degree to which the frequency distribution is focused about its mean is also presented and kurtosis could be positive, zero or negative in terms of its coefficient. From the observations, all the variables exhibit leptokurtic kurtosis, thus, their values are greater than zero.

4.2 Stationarity Test

In order to assess the stationarity of the variable used in the models, all the variables were transformed into natural logarithm and Augmented Dickey-Fuller test was performed on the variables. The test was performed under the assumption that the times series variables follow a trend that is Augmented Dickey-Fuller test with trend. The importance of this is to determine whether trend variable must be included in the final model for estimation or not. The results are indicated in table 4.2.1 below.

4.2.1 Augmented Dickey-Fuller Test at Levels

With Trend and Intercept		
Variables	Test Statistics	P-Value
Real GDP Growth	-2.851	0.1934
CPI	-0.720	0.9606
INF YOY	-3.388	0.0749
M1	-0.929	0.7623
M2	-0.966	0.9318
RM	-1.973	0.5882
MPR	-1.211	0.8869

Source: Author's Computation, Nov. 2017

Mackinnon (1996) approximate one-sided p-value: with Trend: -4.356 (1%), -3.595 (5%), and -3.233 (10%). As shown in Table 4.2, the test statics and the one-sided p-values indicates that all the variables were not stationary at level- that is they were not integrated at order zero [I (0)]. This means that there exist unit root among all the variables. In order to use such variable to generate regression coefficient that are unbiased and efficient they must be made stationary. Consequently, the first difference of the real GDP growth, consumer price index (CPI), Year-on-year inflation (INF YOY), wide money supply (M1), broad money supply (M2), reserve money (RM), and monetary policy rate (MPR) were employed and Augmented Dicky-Fuller test was performed on the variables. The results are shown in the table 4.2.2 below

4.2.2 Augmented Dickey-Fuller Test at Levels as First Difference

With Trend and Intercept		
Variables	Test Statistics	P-Value
Real GDP Growth	-7.051	0.0000
CPI	-5.113	0.0019
INF YOY	-5.802	0.0006
M1	-6.386	0.0001
M2	-4.332	0.0048

RM	-10.386	0.0000
MPR	-2.794	0.2156

Source: Author's Computation, Nov. 2017

Mackinon (1996) approximate one-sided p-value with trend:-4.3743 (1%), -3.6032 (5%) and -3.2380 (10%). As shown in table 4.2.2 the ADF test at level at first different with trend and intercept of real GDP growth, CPI, INF YOY, M1, M2, RM, and MPR are all stationary. That is they are all integrated in order one [I (1)]. The theory posit that when two or more variables are integrated of other one then there might be a long run relationship between the variable which can be captured using error correction model (Engle and Granger, 1987:251). Granger causality test was performed to detect a causal relationship among between the banking and the new economy (Granger, 1969:540). The unit root test for both Philip Peron (PP) and KPSS test was performed to ascertain the possibility of stationarity between/amongst the variables. This is indicated in table 4.2.3 and 4.2.4 below

4.2.3 Results of Unit Root Test of Variables (Philips Peron (PP) Test)

	At Levels		Levels At First Difference	
Variables	**Test Statistics**	**P-Value**	**Test Statistics**	**P-Value**
Real GDP Growth	-2.864	0.1894	-6.928	0.0000
CPI	-2.142	0.2311	-4.360	0.0023
INF YOY	-3.504	0.0599	-6.198	0.0002
M1	-1.856	0.6479	-8.271	0.0000
M2	-0.946	0.9347	-5.239	0.0015
RM	-1.779	0.6857	-10.386	0.0000
MPR	-1.407	0.8346	-4.499	0.0076

Source: Author's Computation, 2017

4.2.4 Results of Unit Root Test of Variables (Kwiatkowski-Phillips-Schmidt-Shin (KPSS) Test)

	KPSS at Level	KPSS at Level at First Difference		
Variables	**Test Statistics**	**Test Statistics**		
Real GDP Growth			0.3726	0.1438
CPI			0.6722	0.4204
INF YOY			0.4877	0.2041
M1			0.7815	0.1543
M2			0.7824	0.4432
RM			0.7798	0.2136
MPR			0.4514	0.1675

Source: Author's Computation, 2017

The time series data was also tested for stationarity through the Phillip Perron and KPSS tests. At level, none of the series were stationery for PP test. However, taking the first difference of all the series, the result showed that the time series is stationary, with the PP statistic being significant at the 1% level at the first difference which is confirmed by the KPSS test of showing significant at 99% confident level. With the evidence that, the five variables are integrated of order one i.e I (1) – they are stationary for KPSS at level and first difference for PP tests, there is the need to continue to test for multivariate cointegration using (Johansen, 1988:231) cointegration test for the non-stationary series variables.

NB: ****1%, ****5% and ****10% asymptotic critical values for both ADF and PP test at levels at first difference are -4.3743, -3.6032 and -3.2380 while the KPSS test has ****1%, ****5%, and ****10% asymptotic critical values for both level and level at first difference of 0.7390, 0.4630 and 0.3479 respectively.

4.3. Co-integration Test

This study determines the long run relationship between the variables by combining the Trace and Max-Eigen value test though, some research shows that, the power of the two tests are very similar. A Monte Carlo comparison shows that there may be slight differences in small sample size. It is very critical to combine the two method in that, trace tests tend to have more distorted sizes where as their

power are in some situations superior to that of the maximum eigenvalue tests. The results of Johansen cointegration using Eviews 8.0 are presented in Table 4.3.1 below.

Table 4.3.1: Results of Johansen test of Cointegration (Trace and Eigenvalue test statistic)

Eigen Variables (Hypothesized No. of CE(s))	Trace Statistic	5% (0.05) Asymptotic Critical Value	Eigen Value	P-Value	Max- Eigen Value Statistic	5% (0.05) Asymptotic Critical Value	P-Value
None	191.9802****	125.6154	0.9094	0.0000	60.04927****	46.23142	0.0010
At most 1	131.9309****	95.75366	0.8358	0.0000	45.17505****	40.07757	0.0123
At most 2	86.75584****	69.81889	0.7036	0.0012	30.40331	33.87687	0.1229
At most 3	56.35253****	47.85613	0.6523	0.0065	26.41723	27.58434	0.0699
At most 4	29.93530****	29.79707	0.4926	0.0482	16.96424	21.13162	0.1737
At most 5	12.97106	15.49471	0.2635	0.1159	7.646643	14.26460	0.4158
At most 6	5.324416****	3.841466	0.1918	0.0210	5.324416	3.841466	0.0210

Source: Author's computation, 2017

NB: The asterisks **** indicate rejection of the null hypothesis of no cointegration meaning the acceptance of the alternate hypothesis of the presence of cointegration at 5% level of significance.

From Table 4.3.1, the trace statistic with a statistic values of 191.9802, 131.9309, 86.7584, 56.35253, 29.93530 and 5.324416 is greater than 5% asymptotic critical values of 125.6154, 95.75366, 69.81889, 47.85613, and 29.79707 and 3.841466 respectively. Therefore, the research accept the alternate hypothesis of the presence of cointegrating equation and confirmed the research or reject the null hypothesis of no cointegrating equations. However, the research could not reject the null hypothesis of "at most 5" as the statistic value is less that 95% confident critic value. Hence, it is concluded that the model consists of one cointegrated equation using the Trace test.

A way to confirm the Trace results is to check for the presence of cointegration using Unrestricted Cointegration Rank Test – maximum Eigen value test. In this test, the Max-Eigen statistic has a values of 60.04927 and 45.17545 is greater than the 5% asymptotic critical values of 46.23142 and 40.07757 respectively. This implies, the null hypothesis of no cointegrating equations is obviously not true and hence rejected and the alternate hypothesis of the presence of cointegration again could not be rejected. Both the restricted and unrestricted test simple illustrate that, there is a long run association or relationship among Real GDP Growth, CPI, INFYOY, M1, M2, RM, and MPR in Ghana`s economy considering the data for the period of the analysis.

4.4. Results for Pairwise Granger Causality Test

The causality result in Table 4.4.1 show that, the null hypothesis of no Granger causality of wide money supply (M1) to year-on-year inflation (INF YOY) could not be rejected. In that, when the F-statistic of 0.58139 to the probability value of 0.5683 is compared to the asymptotic critical value at 5% level of significance, the probability value for the F-statistic is greater. Also, the null hypothesis causal decision for year-on-year inflation to wide money supply is accepted on the bases that, the Probability value is less than 0.7411 showing that the test value is greater than the respective critical value not shown in the table 4.4.1 below.

Table 4.4.1: Results of Pairwise Granger Causality Test

Variables	Granger Causality			
	Obs	F-Statistic	P-Value	Decision
M1→INF YOY	25	0.58139	0.5683	No Causality
INF YOY→M1		0.30414	0.7411	No Causality

Source: Author's computation, 2017

5. SUMMARY, CONCLUSION and RECOMMENDATIONS

This chapter deals with the summary of the research, conclusion and recommendations. The conclusion would be drawn from the analysis and empirical literature review.

5.1 Summary of Findings

This study analyzes the impact of the new economy on banking industry in Ghana spanning from 1990 to 2016. The research was conducted by using eight macroeconomic variables including the broad money supply (M2), wide money supply (M1), and the reserve money (RM), inflation rate, interest rate, nominal exchange rate, commercial banks rate, monetary policy rate (MPR) and the total liquidity. The results from cointegration reveals that both the restricted and unrestricted test simply illustrates that, there is a long run association or relationship among Real GDP Growth, CPI, INFYOY, M1, M2, RM, and MPR in Ghana`s economy considering the data for the period of the analysis. Hence, the results showed presence of positive correlation between the banking sector's performance and the new economy in the long run. The results also indicated that, a good performance in banking industry bolsters economic growth and GDP at large. However, causality test for the anticipated causal relationship between the banking sector and new economy proved to be correlated, thus, a causal relationship. However, taking the first difference of all the series, the result showed that the time series is stationary, with the PP statistic being significant at the 1% level at the first difference which is confirmed by the KPSS test of showing significant at 99% confident level.

5.2 Conclusion

Despite the numerous challenges facing the adoption of new economy, the findings of the research proved that, the new economy contributes immensely towards the growth and development of banking activities in Ghana in many different ways as follows: It keeps clients of the banks to abreast with requisite knowledge, and information regarding every single transaction being carried out in their accounts in the best possible way, it saves the time of the customers and bank employees conspicuously. The computer-age economy cuts down the expenses and facilitates the network transaction. In effect, the digital economy-age helps to minimize high risks on the part of bankers and their clients if proper care are being taking.

In conclusion, the new economy has leapfrogged the activities of current banking industries in Ghana. Banks have gradually equipped themselves with the latest technology-cure banking. However, this is still insufficient to satisfying the general need on the part of banks clients. The network economy enhances the sophisticated product development, better market infrastructure, E-banking activities, and proper implementation of reliable techniques for control risks and helps banks and non-banks financial institutions to reach geographically distant and diversified markets. Notwithstanding, by focusing on both the strength, weaknesses, opportunities and threats of the computer-age economy, one can confidently say that, information technology can both threaten and benefit financial and non-financial institutions in Ghana especially small and medium-sized enterprises (SMEs).

5.3 Policy Recommendations

The following recommendations are necessary to making the path of new economy a reality in the Ghanaian industry if employed strategically by government, stakeholders, key players and captains of the various banking industry in Ghana. 1. Cost of Adopting the New Economy: As part of the challenges facing the successful implementation of the new economy is high cost. Per the analysis of the results from the research survey, it is worth noting that, the cost of adopting new economy; electronic banking by banks are very high and thus making it difficult for both the traditional banks and orthodox banks to adopt the new economy. To mitigate this problem, the central bank should offer support services to the commercial banks in the form of reduction in the monetary policy rate (MPR). Clearly, a reduction in the monetary policy rate will increase the profitability and liquidity of the banks since the banks will have penchant to lend more loans to its potential creditors at a reasonable rate and consequently enable the banks to pursue the new economy programs. In view of this, the monetary policy committee (MPC) is solely responsible for formulating and regulating monetary policy which should bring transaction to the central bank's operation and its communication with the public. 2. Legislative Instruments: on the quest to dealing with the challenges of new economy, there should be proper legislative instruments or law to mitigate the risk of fraud on the part of bank clients and actors in the banking industry. Fraud is a key issue affecting the desire for

customers to get acquainted with e-banking services in Ghana especially among traders and petty business owners. There is the need because many customers have greater fears in using electronic banking services amid the high risk associated with the network economy. 3. Security and Transparency: Security is one of the discouraging factor in using electronic banking because bank clients feels a greater insecure as they do not know how electronic transaction pass or flow and whom they meet. To deal with this problem, it is highly recommended that, they should be transparency and free flow of information between the bankers and their clients. This would be a very remarkable remedy since it will ensure transparency and proper education of their customers and also clear all doubts. 4. Charges: High charges on using electronic banking services discourage most clients to adopt IT banking related services. There is the need for bankers reduce the charges significantly if not completely eliminate it. This would enable customers to become abreast with the e-banking services. 5. Government policies aim at improving economic growth, development, and banking activities in Ghana should target of reducing hyperinflation or year on year inflation. 5. Issuance of Private Sector Credit: The research finally recommends that government should aim at increasing private sector credits to banks and non-banks financial institutions so as to encourage foreign direct investment (FDI).

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