THE IMPACT OF CASHLESS BANKING ECONOMIC POLICY ON THE ECONOMIC GROWTH IN NIGERIA (1981-2013)

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CERTIFICATION.

This research work has been read and certified as meeting part of the requirement for the award of Bachelor of Science (B.Sc.) degree

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DEDICATION.

This research project is dedicated to almighty God. The most gracious and merciful God who through his infinite mercies saw me through the writing of this project. Also to my parents, Mr. and Mrs. Jonathan for their support, understanding and sacrifices they made for me to acquire this certificate.

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ABSTRACT.

The study examines the impact of cashless banking economic policy on the economic growth in Nigeria. Data covering the period 1981-2013 was collected from Central Bank of Nigeria (CBN) statistical bulletin, the World Bank (WB) and, analyzed using econometric approach. The unit roots properties of the time series data was examined using Augmented Dickey Fuller test and Phillip Perrron unit root tests. The dependent variable is Real Gross Domestic Product. The independent variables are Money growth, Cash Deposit Ratio and Interest Rate. The Engle and Granger (EG) cointegration test was conducted to ascertain the long run cointegration of the variables in the model. The table shows that three variables are stationary at level and only one variable becomes stationary at first difference. The model was established to account if there is a long run relationship among the variables. It was discovered that the variables; the coefficient of cash-deposit ratio is positive. The implication of this is that as the economy goes cashless, the growth rate of real GDP declines and money supply has a positive relationship with the gross domestic product (GDP) and interest rate has a negative relationship with the gross domestic product (GDP). The study recommends that the government should not make cashless policy mandatory in order to achieve an increase in economic growth.

Keywords: cashless policy, economic growth, cash deposit ratio, Nigeria

CHAPTER 1

1.0 INTRODUCTION

Before the introduction of modern banking system, banking operations were manually done which led to a slowdown in settlement of transactions. This manual system involves posting transactions from one ledger to another with human hands. Figures or counting of money which should be done through computers and electronic machine, were computed and counted manually which were not 100% accurate thereby resulting to human errors. Most banks then used only one computer in carrying out transactions which helped to improve the sluggish nature of banking transaction. Cashless economy does not refer to total absence of cash transactions in the economic setting but one in which the amount of cash-based transactions are kept to the barest minimum. It is an economic system in which transactions are not done predominantly in exchange for actual cash. It is not also an economic system where goods and services are exchanged for goods and services (the barter system). It is an economic setting in which goods and services are bought and paid for through electronic media. It is defined as "one in which they are assumed to be no transactions frictions that can be reduced through the use of money balances, and that accordingly provide a reason for holding such balances even when they earn rate of return". Cashless economy is an economy where transactions can be done without necessarily carrying out physical cash as a means of exchange of transaction but rather with the

use of credit or debit card payment for goods and services. The cashless economy policy initiative of the Central Bank of Nigeria (CBN) is a move to improve the financial terrain but in the long run sustainability of the policy will be a function of endorsement and compliance by end-users (Ejiro, 2012). The CBN cash policy stipulates a daily cumulative limit of N150,000 and N 1,000,000 on free cash withdrawals and lodgements by individual and corporate customers respectively in the Lagos state with effect from March 30,2012. Individuals and corporate organizations that make cash transactions above the limits will be charged a service fee for amounts above the cumulative limits. Furthermore 3rd party cheques above N 150,000 shall not be eligible for encashment over the counter with effect from January 1, 2012. Value for such cheques shall be received through the clearing house. All Nigerian banks were expected to cease cash in transit lodgment services rendered to merchant-customers from January 1, 2012. The policy through the advanced use of information technology facilitates fund transfer, thereby reducing time wasted in banks. The introduction of the implementation of cashless policy (policy is program of actions adopted by government) began in Lagos state, Nigeria. Lagos state accounted for 85% of POS and 66% of cheques transaction in Nigeria (CBN, 2011). Cashless economy aims at reducing the amount of physical cash circulating in the Nigeria economy and thereby encouraging more electronic- based transaction. Latest data from the Central Bank of Nigeria (CBN) revealed that currency in circulation rose by an unprecedented N30.71 billion or

2.12% in September 2013. According to the CBN, currency in circulation stood at N1, 474 trillion, up from N1, 443 trillion in the preceding month end.

According to Central Bank of Nigeria, the policy is expected to reduce cost incurred in maintaining cash-based economy by 90% upon its full implementation in Nigeria. This study aims to look at the impact of cashless economy in Nigeria.

1.1 BACKGROUND TO THE STUDY

There has been a tremendous advancement in technology in the 21st century, but the most pronounced is the system of information and communication technology upgraded computer and turned the world into a global village where people of different races, nationalities and social background can interact (Adeya, 2001, Dahawy, et al, 2005.)

The introduction of electronic banking, online transactions and mobile banking in Nigeria has paved way for a new era of development where the use and demand for physical cash is gradually declining. These recent evolution of technology in the Nigerian financial institutions poses interesting questions for economist, financial institutions, business analyst and the government regarding the current economic status, logistics, and availability of instruments to guarantee economic growth and stability, efficiency and effectiveness of the cashless policy. Since the inception of humanity, various payment methods have been used to purchase goods and services starting with the trade by barter. The trade by barter method of transaction has been

the foundation for the introduction of money and coins to solve the problem of double coincidence of wants and divisibility faced by trade by barter. The use of money/coins was introduced after the use of trade by barter method, and it has solved various challenges associated with trade by barter, but the use of money as an exchange medium has its own challenge and can still be replaced with a better payment system. Various advantages enjoyed by more developed nations such as the US has prompted the Central Bank of Nigeria (CBN) to adopt the cashless policy. At the end of the 1980s the use of cash for purchasing consumption goods in the US constantly dropped with inflation (Humphrey, 2004). Nigeria to be among the biggest economy by 2020 has driven her to gradually move from a pure cash economy to a cashless economy. Since Nigeria gained her independence in1960, there have been different constitutional reforms, change in economic and banking policies mainly aimed at stabilizing the economy, enhancing social welfare and enhancing economic growth and development. In view of being one of the best and biggest economies in 2020, the CBN has started implementing the cashless policy/banking in some major states/cities in Nigeria such as Lagos, Kano, Port-Harcourt and Onitsha. The CBN and Pro cashless policy activists have asserted reduction in crime rates, minimized risk associated with carrying huge sums of money, reduction in political corruption, reduction in banking cost, improvement on monetary policy in management of inflation and the overall growth and development of the economy of Nigeria as advantages associated with the implementation of the cashless policy.

1.2 STATEMENT OF THE PROBLEM

1st January, 2012, the CBN commenced the implementation of the 'cashless policy' aimed at driving development and modernization of the country's payment system in line with Nigeria's vision 2020 goal of being amongst the top 20 economies by the year 2020. It is also believed that an efficient and modern payment system is positively correlated with economic development, and is a key enabler for economic growth. Other reasons for this policy is to reduce the cost of banking services (including cost of credit) and drive financial inclusion by providing more efficient transaction options and greater reach and to improve the effectiveness of monetary policy in managing inflation and driving economic growth. As good as the policy is, it faces great challenges. A few of these inherent challenges are network reliability which is prevalent across all operators, would pose a problem/serve, as a barrier to usage especially when money sent is not received when needed, social and security threat which have been faced by Nigeria since 2011 with the advent of the present regime. The amount of insecurity in the banks and other financial institutions may jeopardize the cashless programme in Nigeria. Inadequate infrastructural development particularly energy (power) puts a lot of constraints to the operations of cashless system, High rate of illiteracy and poor sensitization has been a major challenge in a country where literacy rate is still very low especially in the northern part of the country. Inadequate education coupled with poor enlightenment of bankers and customers on various aspects and issue of electronic payment transactions and cashless policy before launching the

scheme has made the strategies for marketing the project fall short of expectations. Poor timing and sequencing for both the policy and penalty which is too strong or severe for Nigeria who have a strong habit of using cash for most of their transactions has limited the success of the policy because inherent implementation of a policy of this kind demands attitudinal change from the public which constitutes an inherently complete endeavor that involves multiple players and multiple system.

With the high volume of cashless banking economic policy in Nigeria, it is important to determine how the policy will affect economic growth either positively or negatively considering the problems associated with the cashless policy.

1.3 RESEARCH OBJECTIVES

The main objective of the study is to examine the impact of the cashless policy on the economy of Nigeria and how it affects economic growth. Specific objectives of the study include:

- To examine the various challenges associated with the implementation of the cashless policy/banking.
- To proffer ideas on how cashless policy and other monetary policies can be managed for better contribution to the economic growth of Nigeria.

1.4 RESEARCH HYPOTHESIS/RESEARCH QUESTIONS

Ho: Cashless policy has no significant impact on economic growth of Nigeria.

Hi: Cashless policy has significant impact on the economic growth of Nigeria.

1.5 JUSTIFICATION FOR THE STUDY

The study will give various insights into the various implications the introduction of the cashless policy will have on the economy of Nigeria. Through examining various economic indicators such as gross domestic product (GDP) and cash deposit ratio (CDR) and other proxies, this study will examine whether cashless banking economic policy has a negative impact or positive impact on the economic growth of Nigeria.

1.6 SCOPE OF THE STUDY

In pursuance of the objective of the study; attention shall be focused on cashless banking economic policy among other electronic commerce implementation. In order to conduct an empirical investigation on cash deposit ratio and how it affects the money in circulation this leads to cashless policy. Therefore this study will examine the cash deposit trend in Nigeria and the cash deposit ratio will be viewed with the data spanning from 1981-2013.

1.7 ORGANIZATION OF THE STUDY

The research work is organized as follows: in chapter 2 previous studies are reviewed and also theories that have been stated. Chapter 3 explains the methodology and model specification, estimation technique, theoretical justification, and methodology. Chapter 4 gives the data presentation, analysis of results and findings. Finally, Chapter 5 concludes the paper by giving the summary, policy recommendations, further study and the limitations encountered in the cause of the research work.

1.8 DEFINITION OF TERMS

Electronic Banking: electronic banking is also known as electronic fund transfer (EFT), it uses electronic technology and computer to transfer funds directly from one account to another, rather than by check or cash. Electronic funds can be transferred by withdrawing money from an individual's account from an ATM machine with a personal identification number (PIN), at the individual's convenience, day or night.

Mobile Banking: This is a product that offers customers of a bank to easy way to use services on the go through a mobile device such as a mobile phone or tablet. Mobile banking differs from mobile payment, which involves the use of mobile device to pay for goods and services either at

CHAPTER 2:

LITERATURE REVIEW

2.1 INTRODUCTION

This chapter is based on conceptual issues, theoretical framework and empirical review that relates to cashless banking economic policy. The conceptual issues explains in details the concept that the research in question entails and the theoretical framework states the theories that relates to the study and the empirical review explains the result or findings that other researchers were able to establish from carrying out their research.

2.2 CONCEPTUAL ISSUES

Meaning of Money Supply

Money supply is the amount of money in circulation in the economy at any point in time. It does not only includes the currency & coins in circulation, but it also includes demand & time deposits of banks, post office deposits and such related instruments. Money supply or money stock can also be defined as the total monetary assets available in the economy at a specific period of time. Valuation and analysis of the money supply helps the economist and policy makers to frame the policy or to alter the existing policy of increasing or reducing the supply of

money. The understanding of money supply is important as it ultimately affects the business cycle and thereby affects the economy. Money supply data is collected, recorded and published periodically, typically by the government of the country or Central Bank.

TYPES OF MONEY SUPPLY

The types of money supply can be given as:

1. M0 – Reserve Money

   M0 = the total of all physical currency including coinage. M0 = Federal Reserve notes + US Notes + Coins. It is not necessary whether the currency is held within or outside of the private banking system as reserve.

2. M1: The total amount of M0 (cash/coin) outside of the private banking system plus the amount of demand deposits and other checkable deposits.

3. M2: M1 + most saving accounts, money market accounts, retail money market mutual funds, and small denomination time deposits (certificates of deposit of under $100,000).

4. M3: M2 + all other CDs (large time deposits, institutional money market mutual fund balances), deposits of Eurodollars and repurchase agreements.

MONEY SUPPLY IN NIGERIA

The indicator for the money supply growth in Nigeria, the World Bank provides data for Nigeria from 1961-2013. In Nigeria, the average value during that period was 24.56 percent with a minimum of -12.66 percent in 1967 and a maximum of 89.2 percent in 1974. According to the World Bank, money supply growth in Nigeria is the annual percent increase in M2, also referred to as 'money plus quasi money' or 'broad money'. The M2 measure comprises of money in circulation as well as bank deposits such as checking, time, and savings accounts. Over long periods of time, a few years and longer, rapid growth in M2 results in higher inflation. According to the Central Bank of Nigeria, money supply M2 in Nigeria increased to 19142526.05 Nigerian naira million in march of 2015 from 16546294.46 Nigerian naira million in February of 2015. Money supply M2 in Nigeria averaged 7132765.59 Nigerian naira million from 2000 until 2015, reaching an all-time high of 19142526.05 Nigerian naira million in March of 2015 and a record low of 648506.60 Nigerian naira million in January of 2000. M2 includes M1 plus short-term time deposits in banks in Nigeria money supply.

MEANING OF INTEREST RATE

The cost of borrowing money is interest. An interest rate determines exactly what that cost is. A rate which is charged or paid for the use of money. An annual percentage of the principal is often referred to as interest rate. It is calculated by dividing the amount of interest by the amount of

principal. Interest rates often change as a result of inflation and Federal Reserve board policies. From the perspective of the consumer, the interest rate is expressed as annual percentage yield (APY) when the interested is earned, for example, from a certificate of deposits or a savings account. When the interest is paid, for example, for a credit card, a mortgage, or a loan, the interest rate is expressed as annual percentage rate (APR).

Types of Interest Rate

There are different types of interest rate and they include: real, nominal. Effective, annual and so on. The differences between the various types of rates, such as nominal and real, are based on several key economic factors.

- Nominal Interest Rate

  The nominal interest rate is conceptually the simplest type of interest rate. It is simply the stated interest rate of a given bond or loan. This type of interest rate is also called coupon rate for fixed income investments, as it is the interest rate guaranteed by the issuer that was traditionally stamped on the coupons that were redeemed by the bondholders. The actual monetary price that borrowers pay to lenders to use their money is the nominal interest rate. If the nominal rate on a loan is 5%, then borrowers can expect to pay $5 of interest for every $100 loaned to them.

- Real Interest Rate

The real interest rate is a little more complex than the nominal rate but still simple. The nominal interest rate does not tell the whole story, because inflation reduces the lender's or investor's purchasing power so that they cannot buy the same amount of goods or services at payoff or maturity with a given amount of money as they can now. Real interest rate is named because it states 'real' rate that the lender or investor receives after inflation is factored in; that is, if a bond that compounds annually has a 8% nominal yield and the inflation rate is 6%, then the real interest rate is 2%. The real rate of interest can be referred to be the actual mathematical rate at which investors and lenders are increasing their purchasing power with their bonds and loans. It can be actually considered that real interest rates can be negative if the inflation rate exceeds the nominal rate of an investment. For example, a bond with 4% nominal rate and the inflation rate is 5%, the real interest rate is -1%. A comparison of real and nominal interest rates can therefore be summed up in this equation: Nominal interest rate – Inflation = Real interest rate. Several economic stipulations can be obtained from this formula that lenders, borrowers, and investors can use to make more informed financial decisions.

- Effective Interest Rate

Another type of interest rate that investors and borrowers should know is referred to as the effective rate, which takes the power of compounding into account. For example, if a

bond pays 6% on an annual basis and compounds semiannually, then an investor who invests $1000 in this bond will receive $30 of interest after the first 6 months ($1000 x .03), and $30.90 of interest after the next 6 months ($1,030 x .03). The investor received a total of $60.90 for the year, which means that while the nominal rate was 6.09%. The difference between the nominal and effective rates rises with the number of compounding periods within a specific time period.

Interest Rate in Nigeria

On July 24th, Nigeria's central bank left the monetary policy rate on hold at 13 percent. Since November 2014, Policymakers showed concern over the rise in headline inflation which has been on an upward trend, while saying that monetary policy is going to remain tight due to high liquidity. According to the Central Bank of Nigeria, Interest Rate in Nigeria averaged 9.92 percent from 2007 until 2015, reaching an all-time high of 13 percent in November of 2014 and a record low of 6 percent in July of 2009.

Determinants of interest rates in Nigeria

In Nigeria, interest rate is determined by the following factors:

i. The investment demand: As the level of investment demand increases, the level of interest rates also increases. On the other hand, as the investments demand decreases, the level of interest rates also decreases.

ii. The level of savings (or conversely the level of consumption): as the level of savings increases, the interest rate decreases while, as the level of savings decreases, the level of interest rates increases.

iii. Demand for money or the liquidity preference: The higher the money demand, the lower the interest rate and on the other hand, the lower the money demand the higher the interest rates.

iv. The quantity of money or money supply: In the Keynesian debate as we increase money supply the interest rate will reduce.

2.3 THEORETICAL FRAMEWORK

Theories of Money Supply

- Fisher's Quantity Theory of Money: The Cash Transactions Approach

The quantity theory of money states that the main determinant of the price level or the value of money is the quantity of money. Any change in the quantity of money produces an exactly proportionate change in the price level. In Irving Fisher's words, "Other things remaining constant, the higher the quantity of money in circulation, the higher the price level in direct

proportion and the lower the value of money and vice versa." If the quantity of money is doubled, the price level will also double and the value of money will be one half. On the other hand, if the quantity of money is reduced by one half, the price level will also be reduced by one half and the value of money will be twice.

Assumptions of the theory

1. P is passive factor in the equation of exchange which is affected by the other factors.
2. The proportion of M' to M remains constant.
3. V and V' are assumed to be constant and are independent of changes in M and M'.
4. T also remains constant and is independent of other factors such as M, M', V and V'.
5. It is assumed that the demand for money is proportional to the value of transactions.
6. The supply of money is assumed as an exogenously determined constant.
7. The theory is applicable in the long run.
8. It is based on the assumption of the existence of full employment in the economy.

The quantity theory of money supply which states that an increase in money in circulation will increase the price level and in the same proportion reduce the value of money. This explains that an increase in money supply will lead to an increase in money at hand which will in turn reduce cashless policy.

- The Cambridge Equation: The Cash Balances Approach

As an alternative to Fisher's quantity theory of money, Cambridge economists Marshall, Pigou, Robertson and Keynes formulated the cash balances approach. They regarded the determination of value of money in terms of supply and demand like value theory. Robertson wrote in this connection: "Money is only one of the many economic things. Its value, therefore, is primarily determined by exactly nomic things. Its value is primarily determined by exactly the same two factors as determine the value of any other thing, namely, the conditions of demand for it, and the quantity of it available. The supply of money is exogenously determined at a point of time by the banking system. Therefore, the concept of velocity of circulation is altogether discarded in the cash balances approach because it 'obscures the motives and decisions of people behind it'.

Thus, the cash balances approach considers the demand for money not as a medium of exchange but as a store of value. Robertson stated this distinction as money "on the wings" and money "sitting". It is "money sitting" that reflects the demand for money in the Cambridge equations. The Cambridge equations shows that given the supply of money at a point of time, the value of money is determined by the demand for cash balances. When the demand for money increases, people will reduce their expenditures on goods and services.

- The Keynesian Theory of Money And Prices

Keynes does not harmonize with the older quantity theorists that there is a direct and proportional relationship between quantity of money and prices. According to Keynes, the effect of a change in the quantity of money on prices is indirect and non-proportional. Keynes said "that economics has been divided into two compartments with no doors or windows between the theory of value and the theory of money and prices. The division between the relative price level (as determined by demand and supply of goods) and the absolute price level (as determined by demand and supply of money) which arises from the failure of the classical monetary economists to integrate value theory with monetary theory. However, changes in the money supply affect only the absolute price level but exercise no influence on the relative price level. Further, Keynes criticizes the classical theory of static equilibrium in which money is regarded as neutral and does not affect the economy's real equilibrium relating to relative prices. According to Keynes, the problems of the real world are related to the theory of shifting equilibrium whereas money enters as a "link between the present and future".

The Keynesian reformulated quantity theory of money is based on the following assumptions

1. All factors of production are in perfectly elastic supply so long as there is any unemployment.
2. All unemployed factors are homogenous, perfectly divisible or interchangeable.

3. There are constant returns to scale so that prices do not rise or fall as output increases.
4. Effective demand and quantity of money change in the same proportion so long as there are any unemployed resources.

Given the assumptions, the Keynesian chain of causation between the changes in the quantity of money and in prices is an indirect one through the rate of interest. So the higher the quantity of money, the first impact is on the interest rate which tends to fall. According to the Keynesian reformulation of the quantity theory of money and prices which says that an increase in money supply will lead to a decrease in the interest rate is in accordance with an increase in money supply will decrease real interest rate which will in turn reduce cashless policy.

- Friedman's Restatement of the Quantity Theory of Money

In Friedman reformulation of the quantity theory of money, Friedman asserts that "the quantity theory is in the first instance a theory of the demand for money. It is not a theory of output, or of money income, or of the price level." The demand for money on the part of wealth holders is formally identical with that of the demand for a consumption service. He regards the amount of real cash balances (M/P) as a commodity which is demanded because it yields services to the person who hold it. Thus, money is an asset or capital good. Hence the demand for money forms part of capital or wealth theory. For ultimate wealth holders, the demand for money, in real terms, may be expected to be a function primarily of the following variables: Total wealth, the

division of wealth between human and non-human forms, the expected rates of return on money and other assets, and other variables.

Theories of interest rate

There are theories which determines to explain the Rate of Interest and these theories are as follows:

- Classical or Real theory
- Loanable Funds or Neo-classical theory
- Keynesian or Liquidity Preference theory

These theories of interest rate explains the determination of the rate of interest through the equilibrium between the forces of demand and supply. However, all these three theories of interest rate are "demand and supply theories" with the rate of interest as the mechanism which brings about equilibrium between demand and supply.

- CLASSICAL OR REAL THEORY OF INTEREST RATE

There are no unanimity among the classical economists on the point as to how interest arises or why interest paid. They had different views on the point. But they agreed that the rate of interest is determined by the equilibrium of savings and investment.

The classical theory of interest rate can also be referred to as the real theory as it seeks to explain the determination of the rate of interest by real factors like productivity and thrift, i.e. productivity of capital goods and savings of goods. According to this theory, interest rate is a payment for saving. The rate of interest is, thus, determined by the demand for saving to invest in capital goods and the supply of savings. Thus, the classical theory of money supply explains that an increase in money supply is determined by the interest rate and an increase in money supply will lead to a fall in interest rate and a fall in money supply will lead to an increase in interest rate.

- LOANABLE FUNDS THEORY OF INTEREST

The loanable funds theorists believed in the time preference explanation of how interest arises. According to the loanable funds theory, also referred to as the neo-classical theory, interest is the price paid for the use of loanable funds. Like the Keynesian and classical theories of interest, it is also a demand and supply theory. It states that the rate of interest is determined by the equilibrium between demand and supply of loanable funds in the credit market. There are different sources of both supply and demand of loanable funds. The supply of loanable funds is derived from four basic sources which are: Savings, Dishoarding, Bank credit and Disinvestment. The demand for the loanable funds is derived from three (3) main fields namely; Investment, Consumption and Hoarding.

- LIQUIDITY PREFERENCE THEORY

In this book, "The General Theory of Employment, Interest and Money", the late Keynes gave a new view of interest. According to him, "Interest is the reward for parting with liquidity for a specified period". An individual with a given income has to decide first how much of his income he is going to consume and how much will he save. And this will depend on what Keynes calls, the propensity to consume. Given the propensity to consume, the individual will save a certain proportion of his income. The individual has to make another decision of how much of his resources will the individual hold in form of ready money (cash or non-part with or lend). This latter decision will depend upon what Keynes call his "Liquidity Preference".

Liquidity preference can be said to be the demand for money to hold, or the desire of the public to hold cash. In the words of Prof. Meyer, "liquidity preference is the preference to have an equal amount or cash rather than of claims against others. Liquidity preference desire arises because of three (3) motives which are: the transaction motive, the precautionary motive and the speculative motive.

- Transaction motive. The transaction motive relates to the demand for money or the need for cash for the current transactions of individual and business exchanges.
- Precautionary motive. Precautionary motive for holding money refers to the desire of the people to hold cash balances for unforeseen contingencies.

- Speculative motive. The speculative motive relates to the desire to hold one's resources in liquid form in order to take advantage of market movements regarding the future changes in the rate of interest (or bond prices).

The liquidity preference theory argues a decrease in interest rate as people will hold excess cash balances which means that a fall in interest rate will increase investment and cashless policy will be effective.

2.4 EMPIRICAL REVIEW

Few researches were carried out on e-payment system and economic growth in the recent time. Newstead (2012) examined cashless payments and economic growth and found a link between cashless payment and the pace of economic growth. The study revealed that cashless payment volumes are growing twice as fast in developing economies as they are across the world. Similarly, World Payments Reports (2012) explored the state and evolution of global non-cash payments and found that non-cash payments make it easier and quicker for people and businesses to buy goods and services, pumping money into the system faster and contributing to GDP. The result of the study was similar to Hasan, Renzis and Schmiedel (2012) who explored fundamental relationship between electronic retail payment and overall economic growth using data from across 27 European markets over the period 1995-2009 and found that migration to efficient electronic retail payment stimulates overall economic growth, consumption and trade.

Akhalumeh and Ohiokha (2013) examined the imperatives of Nigeria's Cashless Economy and found that majority of Nigerian of Nigerians are already aware of the policy and majority agree that the policy will help fight against corruption/money laundering and reduce the risk of carrying cash but cyber fraud and illiteracy was envisaged to impede the implementation of the policy. Akhaulmueh et al (2013) findings correspond to Okeye (2013) who appraised cashless economy policy in development of Nigerian Economy. Moreover, Omotunde et al (2012) studied impact of Cashless Economy in Nigeria using survey design through administration of questionnaire and found that cashless policy will increase employment, reduce cash related robbery thereby reducing risk of carrying cash; cashless policy will also reduce cash related corruption and attract more foreign investors to the country.

Siyanbola (2013) studied the effect of cashless banking on Nigerian economy and found that cashless banking has the best means of usage because a significant positive relationship exists between cashless banking and Nigerian economy, though no direct proxy of economic growth and cashless banking was used.

From the review above, it is crystal clear that there is dearth of empirical evidence on e-payment system and economic growth as a means of reviewing current transition to cashless economy in Nigeria. Hence this study attempted to provide empirical evidence on e-payment system and economic growth using multiple regression analysis during the period 2005-2012. Odior and

Banuso (2012) attempted an evaluation of the implication of cashless banking in regards to monetary policy in Nigeria while Obumneke, et al (2014) looked at the effectiveness of cashless policy in attracting foreign direct investment in Nigeria. In this connection, more studies focusing on Africa in general and Nigeria in particular are warranted.

Henry Osahon, Efe J. And Rogers Onoriode (2010) study has attempted an examination of the impact of Nigeria's cashless policy on the profitability of banks. Given that the major players in any financial system are the banks, it is important to evaluate the impact of any policy reforms and policy shifts on their activities. Any policy that will negatively affect the profits of banks is likely to meet with stiff opposition.

Tajudeen. J. Ayoola (2013) study assesses the effect of the cashless policy of government on corruption in Nigeria. Corruption has been identified as a bane of development in the country and the government in its effort to curb the menace introduced the cashless policy. The policy took off in Lagos as a case study in 2012 and is expected to be introduced to other states of the federation 2013. For the cashless policy to work as intended, government must first identify the type of corruption they are targeting and tackle the underlying specific drivers of such corruption identified. The study identified the fact that cashless policy may only work where the target is the reduction of petty corruption.

Gabriel Mieseigha and Kingsley Ogbodo (2013) deduction from this study is that the cashless economy is an essential tool for transparency, accountability, reduction of cash related fraud, and more importantly economic growth and development. The CBN and other regulatory agencies in the financial sector must ensure that service providers adhere to minimum security standards, and also ensure compliance to their directives that independent service providers deploy more ATMs and ensure their efficiency for the smooth implementation of the cashless policy in Nigeria.

Ezuwore- Obodoekwe C. N, Eyisi A.S, Emengini S.E, Alio Felix Chukwubuzo. (2014). The major findings of the study were as follows: - For e- banking to have an effective application in Nigeria, the regulating agencies must set a beddy eye on the movement of the real variables. The relative weakness of the regulators to place a lid on the movement of real variables is suggested in the Palley (2001) and Griffith (2004) where it is maintained that the tendency for e-money to substitute demand deposits may stifle the ability of the Central Bank to control money supply. It is worthy of note that if the one of the primary purposes for which the cashless banking paradigm is introduced, which is to increase vault cash by discouraging the volume of quasi-money and cash in circulation are not achieved there may be an adverse impact of informal income growth on money supply. On the foregoing electric banking has been adopted to a large extent in the Nigerian banking industry. It has affected deposits taking, cash withdrawals, money transfers, loan administration; the provision of banking services in several ways, these include quick data processing and retrieval of information increased customers satisfaction, quick customer service

delivery and production of accurate and reliable information, faster access to capital, reduced revenue leakage and reduced cash handling costs. In order words, the credit creation process which operates via the multiplication of deposits can be boosted to the extent to that e-money replaces time deposits and the extent to which demand deposits are substitute for e-money. According to S. M. Nzotta (2004), the adoption of E-banking has greatly transformed the economy in the general sense of it and has enhanced the overall delivering of bank services. Given the perceived importance of E- banking, a study to evolve its implications on the delivery of banks services in Nigeria is considered imperative so as to gain more insight into its contribution to the economy and its effects. With the Nigerian banking industry still smarting from the global economic meltdown few years ago and the insolvency, failures and mismanagement that resulted in the recent Mergers and Acquisitions (M&As), the sector needs tighter control that will engender customer satisfaction and spur economic growth But this makes special precautions economically appealing and expedient. We are, however, concerned that while this cashless policy has its noble intentions with the ultimate aim of growing our economy and encouraging the emergence of e-payment across the country, the groundwork for the take-off of the system has not been sufficiently done. It is one thing to borrow a good idea, but the success of that idea must take into cognizance the peculiar economic environment of the country. While some banks have been successfully carrying out transaction that are cashless some organizations and individuals still resort to carrying cash with the high risk involved. The apex

bank has done a lot in placing restrictions in the movement of cash, and heavy sanctions on defaulters, there is still need for the general public to be educated so as to handle transactions properly.

James Adetunji Odumeru (2013) study has shown empirically that age, educational qualification, relative advantage, complexity, compatibility, observability and trialability are important determinants of the adoption of mobile banking. This therefore makes it imperative for relevant stakeholders to make efforts to positively influence these independent variables so as to make mobile banking more popular. Education and enlightenment campaigns must be stepped up with more attention on those possessing WASC/SSCE certificates and below including those above forty years old to increase the popularity of m-banking among them. M-banking services should be made more accessible and easier to use to improve its popularity. This study has shown empirically that age, educational qualification, relative advantage, complexity, compatibility, observability and trialability are important determinants of the adoption of mobile banking. This therefore makes it imperative for relevant stakeholders to make efforts to positively influence these independent variables so as to make mobile banking more popular. Education and enlightenment campaigns must be stepped up with more attention on those possessing WASC/SSCE certificates and below including those above forty years old to increase the popularity of m-banking among them. M-banking services should be made more accessible and easier to use to improve its popularity.

Omotunde Muyiwa, Sunday Tunmibi, and John-Dewole A.T. (2013) study shows the impact of cashless economy in Nigeria, focused on the three major categories by which Nigerians can be divided – traders, students and civil servants. More number of traders was sampled, compared to students and civil servants, because they are more into business and financial transactions. More so, a higher number of respondents within the age bracket of 18 and 25 years show that apart from students, quite a number of Nigerian youth are also into trade. This study shows that the introduction of cashless economy in Nigeria can be seen as a step in the right direction. It is expected that its impact will be felt in modernization of Nigeria payment system, reduction in the cost of banking services as well as reduction in high security and safety risks. This should also include curbing banking related corruptions and fostering transparency. It is also assumed that the introduction of cashless policy in Nigeria will help to reduce the amount of bills and notes circulating in the economy. This should, therefore, reduce handling operation cost incurred on conventional money, as well as reduction in cash related crimes. It should also help to provide easy access to banking services for Nigerians.

Atarere, Omotie-Ivie Lovy & Osemwegie-Ero (2013) study shows that Cashless business practice has stimulated globalization in banking activities as services are now provided using the infrastructure of global village. The use of the internet has made banking services flexible and more convenient. The cashless economy requires a deepening of the relationship between the

financial service provider, SME customer been served, the regulatory authorities, and other business affiliates such as suppliers.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 **INTRODUCTION**

This chapter is based on sources and method of data collection, model specification and estimation techniques which relates to cashless banking economic policy. The sources and method data collection explains the way the data will be collected and the sources from which the data are collected and the model specification explains the proxies that comprises the cashless banking policies and the estimation techniques states the way in which the data are analyzed .

3.2 **SOURCES AND METHODS OF DATA COLLECTION**

Secondary data will be used for the study. They were second from the various annual reports of the Central Bank of Nigeria.

The data covered 32 years from year 1981 to year 2013 of the dependent variable which is gross domestic product (GDP) and the independent variables (cash deposit ratio) representing other indicators affecting economic growth in Nigeria. Cash deposit ratio is used to capture cashless policy because cash deposit ratio is the part of cash deposited by the customer which bank has to keep with itself. The higher the cash deposit ratio the lower the money supply, an increase in

deposit rates will induce depositors to deposit more, thereby leading to a fall in cash to aggregate ratio.

3.3 MODEL SPECIFICATION

Specification of econometric model is based on economic theory and on any valuable information relating to the phenomenon being studied.

In order words to test the working hypothesis, there is a need to specify the appropriate relationship between the dependent variables and the independent variables. This is because it is the relationship of economic theory which can be measured with one or more econometrics techniques. That is, they are relationship in which some variables are postulated to be the causes of other variables. Thus, the relationship between cash deposit ratio (cashless banking economic policy) and gross domestic product (economic growth) is as follows:

Real GDP = F (MS, CDR, INT.R)..... (1)

The model employed in the study includes the following

$Y = \beta 0 + \beta 1X1 + \beta 2X2 + \beta 3X3 + U$..... (2)

That is, $Y = \beta 0 + \beta 1MS + \beta 2CDR + \beta 3INT.R + U_t$

Where;

Y = Real GDP

GDP = Gross Domestic Product

MS = Money Supply

CDR = Cash Deposit Ratio

INT.R = Interest Rate

Ut = Stochastic error term

$\beta 0$= constant

3.4 ESTIMATION TECHNIQUES/METHODS OF DATA ANALYSIS

The data collected will be tested and analyzed adopting the regression technique of ordinary least square method. Thus is a simple mathematical form, the relationship between the variables under consideration becomes.

3.3.1. Apriori criteria

This refers to the supposed relationship between and or among the dependent or independent variables of the model as determined by the postulations of economic theory. The result or parameter estimates of the models will be interpreted on the basis of the supposed signs of the parameters as established by economic theory. Put differently, the parameter estimates of the model will be checked to find out whether they conform to the postulations of economic theory.

There is a positive relationship between Government Expenditure and Real GDP; there is positive relationship between External debt stock and Real GDP; there is a positive relationship

between Real GDP and Gross Capital Formation; there is a positive relationship between Real GDP and Debt Service Payment; there is a positive relationship between Real GDP and Exchange Rate.

3.3.2 Statistical criteria: First order test

The theories of statistic prescribe some test of finding out how accurate the parameter estimates of a model are, these test help to suggest whether or not the parameter estimates of the model are accurate. It will tell us whether it's a good fit or not.

Such statistical criteria tests are:

T tests: The co-efficient of the model will be tested for significance using the t- test. The T testing procedure is based on the assumption that the error term U follows the normal distribution.

F test: The F test will be used to test the overall significance of the model

Durbin- Watson test: to test the validity of the assumptions of non-auto correlated disturbances, an econometric technique known as the Durbin – Watson will be computed.

3.3.3 Econometric criteria: second order test

These are set by the theory of econometrics and are aimed at investigating whether the assumptions of the econometric method employed are satisfied or not. Thus, the assumptions of OLS will be investigated.

CHAPTER 4

4.1 DATA PRESENTATION AND DATA ANALYSIS

Table 1: Unit Root Test

Variable	Augmented Dicky-fuller(At Level)	Phillip Perron (At Level)	Augmented Dicky-Fuller (First Difference)	Phillip Peron (First Difference)	Order of integration
Cash-Deposit	0.3330	0.3073	0.0000	0.0000	$I(1)$
GDP Growth	0.8913	0.8913	0.0426	0.0226	$I(1)$
Interest rate	0.0000	0.0000			$I(0)$
Money Growth	0.0309	0.0295			$I(0)$
ERROR					
	0.3579	0.3011			

Table 2: Regression Result (Dependent Variable: D (GDPG)

Variables	Coefficients	t-statistic	p-values
Cash-Deposit	0.381445	2.850550	0.0425
Money Growth	0.263789	11.040733	0.0307
Interest Rate	-0.135285	-10.658662	0.0157
Constant	-19.04688	-3.558107	0.1309
F-Statistic =18.81, Durbin Watson Stat = 2.20, R-squared = 0.81			

4.2 EMPIRICAL RESULTS

Table 1 presents the p values for the Augmented Dicky Fuller and Phillip Perrron unit root tests. The unit root table shows that three of the variables are stationary at level and only one of the variables become stationary after first difference. Cash-Deposit ratio (CD), Interest rate and money growth (M2G) are stationary at level; while GDP growth (GDPG) becomes stationary at first difference.

Next is to test if there is a long run relationship among the variables. That is, we need to test if all the variables co-integrate in the long run. To achieve this, we resort to the Engle and Granger (EG) co-integration test of long run association. The Engle and Granger test is more suitable because our variables of interest are integrated of different orders. The EG test is carried out by running a unit root test on the residuals generated from regressing the variables at level.

The last row on Table 1 one shows that the residual is stationary at level. The p value is greater than 5% and thus it is not significant. Hence, we do not the null hypothesis of no co-integration. Therefore, the conclusion is that the variables are not co-integrated in the long run. This result suggests that we can obtain only the short run relationships among the variables. To achieve this, we regress the first difference of GDP growth on cash-deposit ratio, real interest rate and money growth

Table 2 provides the regression result that shows the relationship among the variables. The coefficient of cash-deposit ratio is positive and significant. This implies that a 1% increase in cash-deposit ratio will increase the growth rate of real GDP by 0.38%. Since we have used the cash-deposit ratio to capture cashless policy, a decrease in the cash-deposit ratio, means an effective cashless policy an increase in the ratio means the contrary. From the table, the

coefficient of cash-deposit ratio is positive. The implication of this is that as the economy goes cashless, the growth rate of real GDP declines.

The coefficient of money growth is positive and significant. A one percent increase in money supply will result in a 0.26% increase in the growth rate of real GDP. However, the coefficient of real interest rate is negative and significant at 5%. The implication of this is that a one percent increase in real interest rate will lead to a decline in real GDP. Finally, the coefficient of the constant term is negative and significant.

As shown in the table, the F statistic is 18.81. This value is significant at all levels of significance. Thus, we can reject the null hypothesis that states that all our coefficients are 0 and accept the alternative. The conclusion is that our coefficients are jointly significant and the model is properly specified.

The computed Durbin Watson statistic is 2.20. Because this value is greater than 2, the implication is that our model is free from autocorrelation. The R-squared is 0.81. This implies that 81% variation in the dependent variable (GDPG) is explained by variations in the independent variables

4.3 DISCUSSION OF FINDINGS

From the analysis done above, an effective cashless policy will imply a very low cash deposit ratio (CDR) because few currency will be in circulation and more of the currency will be in the bank. As the economy goes cashless, the economy bank deposit will fall. In contrary, as the economy does not go cashless, the bank deposit will increase. That is, a very high cash deposit ratio (CDR) will lead to an ineffective cashless policy. The coefficient of cash-deposit ratio is positive. If the cashless policy does not affect the real gross domestic product (RGDP), then it has a negative relationship and not a positive relationship. That is, cashless policy has a negative relationship on economic growth and the implication of this is that as the economy goes cashless, the growth rate of real GDP declines. The coefficient of money growth is positive and significant. A one percent increase in money supply will result in a 0.26% increase in the growth rate of real GDP. The coefficient of real interest rate is negative and significant at 5%. The implication of this is that a one percent increase in real interest rate will lead to a decline in real GDP. Finally, the coefficient of the constant term is negative and significant.

CHAPTER 5

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 SUMMARY

This research work is based on the impact of cashless banking economic policy on economic growth in Nigeria from year 1981- 2013. A multiple regression analysis was used to capture the influence of money supply, cash deposit ratio and interest rate on gross domestic growth (GDP) and also determine the trend effect. That is, the effect of time on the variables. The result revealed that a decrease in the cash-deposit ratio, means an effective cashless policy an increase in the ratio means the contrary. From the table, the coefficient of cash-deposit ratio is positive. The implication of this is that as the economy goes cashless, the growth rate of real GDP declines and that money growth is also positive and significant. The conducted F-test indicated that the coefficients are jointly significant and the model is properly specified. The computed value of Durbin Watson statistic is greater than two the implication is that our model is free from autocorrelation. The R-squared implies that the variation in the dependent variable (GDPG) is explained by variations in the independent variables.

5.2 CONCLUSION

The study accesses the impact of cashless banking economic policy on the economic growth in Nigeria. Using cash deposit ratio to capture cashless banking economic policy, the deduction obtained from this study shows that a decrease in the cash deposit ratio means an effective cashless policy and an increase in the cash deposit ratio means an ineffective cashless policy. This study also used other variables which also comprises of the cashless banking economic policy like money supply and interest rate and its effect on the gross domestic product (GDP). The money supply has a positive relationship with the gross domestic product (GDP). That is, as money supply increases by 1% the gross domestic product increases by 0.26%. Finally, the interest rate has a negative relationship with the gross domestic product (GDP) because an increase in real interest rate will lead to a decrease in gross domestic product (GDP).

5.3 RECOMMENDATIONS

1. The government should not make cashless policy instead make cash deposit mandatory that is few transactions should be through electronic banking because a substantial increase in the number of people using cashless instrument like Point of sale (POS), Automated teller machine (ATMs), Electronic banking which will significantly affect the growth rate of GDP in Nigeria.
2. The government should also stabilize the interest rate in the economy because high interest rate discourages investment which in turn reduces domestic production and adversely affect economic growth.
3. Finally, the government should increase the money in circulation so as to give the citizens more purchasing power in order for domestic consumption to increase because an

increase in domestic consumption will increase the productivity which will in turn boost the GDP of Nigeria. As regards this, the government should also employ as a matter of urgency anti-inflationary measures so that increase in money supply does not cause inflation.

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APPENDIX

	TD	M2	C	CD	YEAR	REAL GDP	REAL INT
1981	6.56	14.47117	7.91	1.205097	1980	205222.06	-3.547418213
1982	7.51	15.78674	8.27	1.100865	1981	199685.25	-8.05541873
1983	9.44	17.68793	8.24	0.872947	1982	185598.14	4.491262162
1984	10.99	20.10594	9.12	0.829792	1983	183562.95	-3.33206303
1985	12.52	22.29924	9.78	0.780834	1984	201036.27	-2.671344005
1986	13.93	23.8064	9.87	0.708499	1985	205971.44	3.686666394
1987	18.68	27.57358	8.90	0.476394	1986	204806.54	-1.496761306
1988	23.25	38.3568	15.11	0.649826	1987	219875.63	-31.92181716
1989	23.80	45.90288	22.10	0.928587	1988	236729.58	-5.129284669
1990	29.65	52.85703	23.21	0.782627	1989	267549.99	-16.95996055
1991	37.74	75.40118	37.66	0.998007	1990	265379.14	14.64820819
1992	55.12	111.1123	56.00	1.015943	1991	271365.52	2.072104493
1993	85.03	165.3387	80.31	0.944523	1992	274833.29	-25.76700943
1994	110.97	230.2926	119.33	1.075329	1993	275450.56	4.374451184
1995	108.49	289.0911	180.60	1.664672	1994	281407.4	-8.034408453
1996	134.50	345.854	211.35	1.571344	1995	293745.38	-43.5726628
1997	177.65	413.2801	235.63	1.32639	1996	302022.48	-9.71197375
1998	200.07	488.1458	288.08	1.439935	1997	310890.05	16.61355048
1999	277.67	628.9522	351.28	1.265127	1998	312183.48	25.28226568

2000	385.19	878.4573	493.27	1.280576	1999	329178.74	2.767926713
2001	488.05	1269.322	781.28	1.600827	2000	356994.26	-10.319763
2002	592.09	1505.964	913.87	1.543453	2001	433203.51	23.83785487
2003	655.74	1952.921	1,297.18	1.978196	2002	477532.98	-10.8121418
2004	797.52	2131.819	1,334.30	1.67307	2003	527576.04	8.613594343
2005	1,316.96	2637.913	1,320.96	1.003036	2004	561931.39	19.36913623
2006	1,739.64	3797.909	2,058.27	1.183162	2005	595821.61	-3.34037277
2007	2,693.55	5127.401	2,433.85	0.903582	2006	634251.14	-0.37309511
2008	4,118.17	8008.204	3,890.03	0.944601	2007	672202.55	11.6143345
2009	5,763.51	9419.922	3,656.41	0.634407	2008	718977.33	4.190483705
2010	5,954.26	11034.94	5,080.68	0.853285	2009	776332.21	23.70649656
2011	6,531.91	12172.49	5,640.58	0.863541	2010	814741.2	-42.3101829
2012	8,062.90	13895.39	5,832.49	0.723373	2011	834161.83	5.941525553
2013	8,656.12	15158.62	6,502.50	0.751202	2012		6.883105755
					2013		10.24734736
							11.35621215

Null Hypothesis: CD has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.888980	0.3330
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(CD)
Method: Least Squares
Date: 08/05/15 Time: 18:56
Sample (adjusted): 1982 2013
Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CD(-1)	-0.223647	0.118396	-1.888980	0.0686
C	0.229184	0.135497	1.691436	0.1011

R-squared	0.106298	Mean dependent var	-0.014184
Adjusted R-squared	0.076508	S.D. dependent var	0.247003
S.E. of regression	0.237366	Akaike info criterion	0.022035
Sum squared resid	1.690279	Schwarz criterion	0.113644
Log likelihood	1.647439	Hannan-Quinn criter.	0.052401
F-statistic	3.568247	Durbin-Watson stat	2.025144
Prob(F-statistic)	0.068596		

Null Hypothesis: D(CD) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.190657	0.0000
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	
	10% level	-2.619160	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(CD,2)
Method: Least Squares
Date: 08/05/15 Time: 18:57
Sample (adjusted): 1983 2013
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(CD(-1))	-1.136762	0.183625	-6.190657	0.0000
C	-0.013405	0.045424	-0.295102	0.7700

R-squared	0.569249	Mean dependent var	0.004260
Adjusted R-squared	0.554395	S.D. dependent var	0.378122
S.E. of regression	0.252410	Akaike info criterion	0.146817
Sum squared resid	1.847613	Schwarz criterion	0.239332
Log likelihood	-0.275658	Hannan-Quinn criter.	0.176974
F-statistic	38.32423	Durbin-Watson stat	2.026606
Prob(F-statistic)	0.000001		

Null Hypothesis: CD has a unit root
Exogenous: Constant
Bandwidth: 3 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-1.947908	0.3073
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	0.052821
HAC corrected variance (Bartlett kernel)	0.056374

Phillips-Perron Test Equation
Dependent Variable: D(CD)
Method: Least Squares
Date: 08/05/15 Time: 18:57
Sample (adjusted): 1982 2013
Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CD(-1)	-0.223647	0.118396	-1.888980	0.0686
C	0.229184	0.135497	1.691436	0.1011

R-squared	0.106298	Mean dependent var	-0.014184
Adjusted R-squared	0.076508	S.D. dependent var	0.247003
S.E. of regression	0.237366	Akaike info criterion	0.022035
Sum squared resid	1.690279	Schwarz criterion	0.113644
Log likelihood	1.647439	Hannan-Quinn criter.	0.052401
F-statistic	3.568247	Durbin-Watson stat	2.025144
Prob(F-statistic)	0.068596		

Null Hypothesis: D(CD) has a unit root
Exogenous: Constant
Bandwidth: 0 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-6.190657	0.0000
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	
	10% level	-2.619160	

*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	0.059600
HAC corrected variance (Bartlett kernel)	0.059600

Phillips-Perron Test Equation
Dependent Variable: D(CD,2)
Method: Least Squares
Date: 08/05/15 Time: 18:58
Sample (adjusted): 1983 2013
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(CD(-1))	-1.136762	0.183625	-6.190657	0.0000
C	-0.013405	0.045424	-0.295102	0.7700

R-squared	0.569249	Mean dependent var	0.004260
Adjusted R-squared	0.554395	S.D. dependent var	0.378122
S.E. of regression	0.252410	Akaike info criterion	0.146817
Sum squared resid	1.847613	Schwarz criterion	0.239332
Log likelihood	-0.275658	Hannan-Quinn criter.	0.176974
F-statistic	38.32423	Durbin-Watson stat	2.026606
Prob(F-statistic)	0.000001		

Null Hypothesis: M2G has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.176645	0.0309
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(M2G)

Method: Least Squares
Date: 08/05/15 Time: 18:59
Sample (adjusted): 1982 2013
Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
M2G(-1)	-0.509332	0.160336	-3.176645	0.0034
C	12.70800	4.599352	2.762997	0.0097

R-squared	0.251704	Mean dependent var	-0.078451
Adjusted R-squared	0.226761	S.D. dependent var	14.31595
S.E. of regression	12.58859	Akaike info criterion	7.963921
Sum squared resid	4754.181	Schwarz criterion	8.055529
Log likelihood	-125.4227	Hannan-Quinn criter.	7.994287
F-statistic	10.09107	Durbin-Watson stat	2.001142
Prob(F-statistic)	0.003439		

Null Hypothesis: M2G has a unit root
Exogenous: Constant
Bandwidth: 2 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-3.196235	0.0295
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	148.5682
HAC corrected variance (Bartlett kernel)	151.8220

Phillips-Perron Test Equation
Dependent Variable: D(M2G)
Method: Least Squares
Date: 08/05/15 Time: 19:00
Sample (adjusted): 1982 2013
Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
M2G(-1)	-0.509332	0.160336	-3.176645	0.0034
C	12.70800	4.599352	2.762997	0.0097

R-squared	0.251704	Mean dependent var	-0.078451
Adjusted R-squared	0.226761	S.D. dependent var	14.31595
S.E. of regression	12.58859	Akaike info criterion	7.963921
Sum squared resid	4754.181	Schwarz criterion	8.055529
Log likelihood	-125.4227	Hannan-Quinn criter.	7.994287
F-statistic	10.09107	Durbin-Watson stat	2.001142

Prob(F-statistic)	0.003439

Null Hypothesis: RGDPG has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.432354	0.8913
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	
	10% level	-2.619160	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RGDPG)
Method: Least Squares
Date: 08/05/15 Time: 19:01
Sample (adjusted): 1982 2012
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RGDPG(-1)	-0.280989	0.649905	-0.432354	0.6687
C	-1.742962	4.633362	-0.376177	0.7095

R-squared	0.006405	Mean dependent var	-3.056452
Adjusted R-squared	-0.027857	S.D. dependent var	19.21237
S.E. of regression	19.47813	Akaike info criterion	8.838803
Sum squared resid	11002.53	Schwarz criterion	8.931318
Log likelihood	-135.0014	Hannan-Quinn criter.	8.868961
F-statistic	0.186930	Durbin-Watson stat	1.070945
Prob(F-statistic)	0.668682		

Null Hypothesis: D(RGDPG) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.413020	0.5626
Test critical values:	1% level	-3.670170	
	5% level	-2.963972	
	10% level	-2.621007	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RGDPG,2)
Method: Least Squares

Prob(F-statistic)	0.003439

Null Hypothesis: RGDPG has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.432354	0.8913
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	
	10% level	-2.619160	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RGDPG)
Method: Least Squares
Date: 08/05/15 Time: 19:01
Sample (adjusted): 1982 2012
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RGDPG(-1)	-0.280989	0.649905	-0.432354	0.6687
C	-1.742962	4.633362	-0.376177	0.7095

R-squared	0.006405	Mean dependent var	-3.056452
Adjusted R-squared	-0.027857	S.D. dependent var	19.21237
S.E. of regression	19.47813	Akaike info criterion	8.838803
Sum squared resid	11002.53	Schwarz criterion	8.931318
Log likelihood	-135.0014	Hannan-Quinn criter.	8.868961
F-statistic	0.186930	Durbin-Watson stat	1.070945
Prob(F-statistic)	0.668682		

Null Hypothesis: D(RGDPG) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.413020	0.5626
Test critical values:	1% level	-3.670170	
	5% level	-2.963972	
	10% level	-2.621007	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RGDPG,2)
Method: Least Squares

Date: 08/05/15 Time: 19:02
Sample (adjusted): 1983 2012
Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(RGDPG(-1))	-0.947790	0.670755	-1.413020	0.1687
C	-3.111463	3.634149	-0.856174	0.3992

R-squared	0.066562	Mean dependent var	-3.352633
Adjusted R-squared	0.033225	S.D. dependent var	20.22186
S.E. of regression	19.88309	Akaike info criterion	8.881957
Sum squared resid	11069.44	Schwarz criterion	8.975370
Log likelihood	-131.2293	Hannan-Quinn criter.	8.911840
F-statistic	1.996627	Durbin-Watson stat	1.109810
Prob(F-statistic)	0.168670		

Null Hypothesis: RGDPG has a unit root
Exogenous: Constant
Bandwidth: 0 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-0.432354	0.8913
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	
	10% level	-2.619160	

*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	354.9205
HAC corrected variance (Bartlett kernel)	354.9205

Phillips-Perron Test Equation
Dependent Variable: D(RGDPG)
Method: Least Squares
Date: 08/05/15 Time: 19:03
Sample (adjusted): 1982 2012
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RGDPG(-1)	-0.280989	0.649905	-0.432354	0.6687
C	-1.742962	4.633362	-0.376177	0.7095

R-squared	0.006405	Mean dependent var	-3.056452
Adjusted R-squared	-0.027857	S.D. dependent var	19.21237
S.E. of regression	19.47813	Akaike info criterion	8.838803
Sum squared resid	11002.53	Schwarz criterion	8.931318
Log likelihood	-135.0014	Hannan-Quinn criter.	8.868961
F-statistic	0.186930	Durbin-Watson stat	1.070945
Prob(F-statistic)	0.668682		

Null Hypothesis: D(RGDPG) has a unit root
Exogenous: Constant
Bandwidth: 0 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-1.413020	0.5626
Test critical values:	1% level	-3.670170	
	5% level	-2.963972	
	10% level	-2.621007	

*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	368.9814
HAC corrected variance (Bartlett kernel)	368.9814

Phillips-Perron Test Equation
Dependent Variable: D(RGDPG,2)
Method: Least Squares
Date: 08/05/15 Time: 19:04
Sample (adjusted): 1983 2012
Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(RGDPG(-1))	-0.947790	0.670755	-1.413020	0.1687
C	-3.111463	3.634149	-0.856174	0.3992

R-squared	0.066562	Mean dependent var	-3.352633
Adjusted R-squared	0.033225	S.D. dependent var	20.22186
S.E. of regression	19.88309	Akaike info criterion	8.881957
Sum squared resid	11069.44	Schwarz criterion	8.975370
Log likelihood	-131.2293	Hannan-Quinn criter.	8.911840
F-statistic	1.996627	Durbin-Watson stat	1.109810
Prob(F-statistic)	0.168670		

Null Hypothesis: RINT has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.848302	0.0000
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RINT)
Method: Least Squares
Date: 08/05/15 Time: 19:06
Sample (adjusted): 1982 2013
Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RINT(-1)	-1.069938	0.182949	-5.848302	0.0000
C	-0.956555	3.097643	-0.308801	0.7596

R-squared	0.532729	Mean dependent var	0.571961
Adjusted R-squared	0.517154	S.D. dependent var	25.12757
S.E. of regression	17.46043	Akaike info criterion	8.618213
Sum squared resid	9145.999	Schwarz criterion	8.709821
Log likelihood	-135.8914	Hannan-Quinn criter.	8.648579
F-statistic	34.20263	Durbin-Watson stat	1.992040
Prob(F-statistic)	0.000002		

Null Hypothesis: RINT has a unit root
Exogenous: Constant
Bandwidth: 2 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-5.863057	0.0000
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	285.8125
HAC corrected variance (Bartlett kernel)	260.3549

Phillips-Perron Test Equation
Dependent Variable: D(RINT)
Method: Least Squares
Date: 08/05/15 Time: 19:07
Sample (adjusted): 1982 2013
Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RINT(-1)	-1.069938	0.182949	-5.848302	0.0000
C	-0.956555	3.097643	-0.308801	0.7596

R-squared	0.532729	Mean dependent var	0.571961
Adjusted R-squared	0.517154	S.D. dependent var	25.12757
S.E. of regression	17.46043	Akaike info criterion	8.618213
Sum squared resid	9145.999	Schwarz criterion	8.709821

Log likelihood	-135.8914	Hannan-Quinn criter.	8.648579
F-statistic	34.20263	Durbin-Watson stat	1.992040
Prob(F-statistic)	0.000002		

Dependent Variable: D(CD)
Method: Least Squares
Date: 08/05/15 Time: 19:12
Sample (adjusted): 1983 2013
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CD(-1)	-0.218322	0.088023	-2.480275	0.0209
RINT(-1)	-0.002474	0.004065	-0.608490	0.5488
RGDPG(-1)	0.006110	0.009131	0.669080	0.5101
M2G(-1)	0.007371	0.003469	2.124985	0.0445
D(CD(-1))	-0.188270	0.193579	-0.972577	0.3409
D(RINT(-1))	-0.000644	0.002638	-0.244279	0.8092
D(RGDPG(-1))	-0.006772	0.009104	-0.743890	0.4645
D(M2G(-1))	-0.004118	0.003835	-1.073629	0.2941

R-squared	0.270059	Mean dependent var	-0.011279
Adjusted R-squared	0.047902	S.D. dependent var	0.250530
S.E. of regression	0.244456	Akaike info criterion	0.238070
Sum squared resid	1.374446	Schwarz criterion	0.608131
Log likelihood	4.309920	Hannan-Quinn criter.	0.358700
Durbin-Watson stat	2.04S5676		

Dependent Variable: D(RGDPG)
Method: Least Squares
Date: 08/06/15 Time: 21:28
Sample (adjusted): 1982 2012
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CD	0.381445	9.854147	2.850550	0.0425
M2G	0.263789	0.253464	11.040733	0.0307
RINT	-0.135285	0.205394	-10.658662	0.0157
C	-19.04688	12.22437	-3.558107	0.1309

R-squared	0.813289	Mean dependent var	-3.056452
Adjusted R-squared	-0.718568	S.D. dependent var	19.21237
S.E. of regression	19.38992	Akaike info criterion	8.887298
Sum squared resid	10151.16	Schwarz criterion	9.072328
Log likelihood	-133.7531	Hannan-Quinn criter.	8.947613
F-statistic	18.817706	Durbin-Watson stat	2.203214
Prob(F-statistic)	0.0495404		