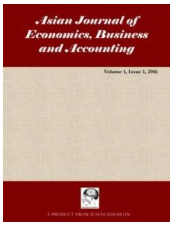

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Testing the Validity of McKinnon-Shaw Hypothesis: Empirical Evidence from Nigeria

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Authors' contributions

This work was carried out in collaboration between both authors. Author AP designed the study, wrote the first draft and managed the literature searches while author OJT performed the statistical analysis, wrote the protocol and managed the analyses of the study. Both authors read and approved the final manuscript.

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ABSTRACT

Ronald McKinnon [1] and Edward Shaw [2] explicate the notion of financial repression noting that Financial liberalization is meant to foster economic growth through increase in savings via an increase in real deposit rate and increase in private investment in high priority sectors, but how this policy has contributed to the growth of the Nigerian economy remains a lacuna. It is based on this that the study seeks to test the validity of McKinnon and Shaw Hypothesis Using Empirical evidence in Nigeria. The study employed annual time series data from 1981 to 2014 to provide response to the various determinant of Real Money Demand Balance in Nigeria, the Various determinant of Economic Growth as proxied by Gross Domestic Product in Nigeria with volatility in Financial Ratios and Various Determinant of Nigeria Investment Rate as a result of the capriciousness in Financial Ratios in Nigeria. Autoregressive Distributed lag model was used to analyze three regression models while conducting the Augmented Dickey Fuller, the Johansen Cointegration Test and Granger causal test. Of all financial ratios, It was observed that that interest

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rate has negligible, trifling or insignificant effect on Real Money balance, Investment Rate and Real Gross domestic Product in Nigeria at 95% level of Significance. Theoretical literature revealed that McKinnon-Shaw hypothesis have been seen to be valid in developed countries but its validity on Real Interest rate based on this findings when tested with empirical evidence is questionable in developing country like Nigeria owing to the undeveloped and unstructured financial system, policy inconsistency and policy mortality hence it is recommended that Nigeria financial system be revamped for a more structured, organized and developed financial system to further enable financial inclusion of all economic agents.

Keywords: Liberalization; financial repression; interest rate; real money demand.

1. INTRODUCTION

The financial sector in a typical economy is saddled with the primary responsibilities of financial resource mobilization and intermediation. It engages in the redirection of funds from surplus spending units to deficit spending units. In other words, the financial sector provides funds used as capital input by producers in other sectors of the economy as well as by final consumers. The impact of the delivery of these financial services in the form of working capital to the producers is felt in the short run. Thus, the financial sector is important in the smooth functioning of the economy [3,4].

However, the effective running of the financial sectors to perform its funds allocation intermediary role rest on various financial market indicators such as the real interest rate, Cash Reserve Ratio, Prime Lending Rate, Foreign Exchange Rate, Inflation Rate etc. The importance and volatility of these financial ratios to the aggregate economy has often resulted to its ceiling (financial Repression) in other to protect the household from the vagaries of imperfect market often dictated by the forces of demand and supply reflected most often in increased price.

However, the ceiling of this various indicators have been campaigned against by various pro-financial repression advocates.

Artificial ceilings on financial indicators are believed to reduce savings, capital accumulation, and discourage the efficient allocation of resources. Other economists have commonly argued that financial repression prevents the efficient allocation of capital and thereby impairs economic growth [5] because the rates of return are lower than what could be obtained in a competitive market.

It is on this backdrop that Ronald McKinnon [1] and Edward Shaw [2] explicate the notion of financial repression. While theoretically an economy with an efficient financial system can achieve growth and development through efficient capital allocation, McKinnon and Shaw argue that historically, many countries, including developed ones but especially developing ones, have restricted competition in the financial sector with government interventions and regulations. In such a system, financial intermediaries do not function at their full capacity and fail to channel saving into investment efficiently, thereby impeding the development of the overall economic system. The need for developing economies to allow real interests rates (along with other financial indicators) to be determined by market forces. Though originally focusing on interest rates, the Financial Repression approach also incorporated the adverse effects of high reserve ratios and government directed credit programmes, which together contributed to low savings, credit rationing and low investment [5,6].

McKinnon pointed out that Financial Repression can lead to dualism in which firms that have access to subsidized funding will tend to choose relatively capital-intensive technologies; whereas those not favored by policy will only be able to implement high-yield projects with short maturity [7]

The early hypotheses of McKinnon and Shaw assumed that liberalization, which would be associated with higher real interest rates--as controls on these are lifted—would stimulate saving. The underlying assumption is, of course, that saving is responsive to interest rates. The higher saving rates would finance a higher level of investment, leading to higher growth. Therefore, according to this view, we should expect to see higher saving rates (as well as higher levels of investment and growth) following financial liberalization.

Thus, many developing countries have implemented financial liberalization policies with the aim to delete the repressed regime. The financial liberalization policies were aimed at liberalizing interest rates by switching from an administered interest rate setting to a market based interest rate determination; reducing controls on credit by gradually eliminating directed and subsidized credit schemes; developing primary and secondary securities markets; enhancing competition and efficiency in the financial system by privatizing nationalized commercial banks. This suggests a basic complementarity between the accumulation of money balances and physical capital accumulation.

Nigeria prior to liberalization of the financial sector, had a repressed financial sector in which the government and the Central Bank of Nigeria (CBN), restricted and controlled the activities of the financial sector. However, following the adoption of SAP, Nigeria liberalized her economy in August 1987. This policy initiative commenced with the liberalization of interest rates. Apart from the liberalization of interest rates, the reform also involved promotion of market-based system of credit allocation, enhancing competition, and efficiency of the regulatory and supervisory framework [8,9,10].

The adoption of this economic package was motivated by the need to proactively put the Nigerian financial sector and the economy at large on the path of global competitiveness. Interest rate liberalization which was the first financial reform to be undertaken was aimed at enhancing the ability of banks to charge market based loan rates and hence guarantee the efficient allocation of scarce resources [10] cited in [11].

The Economic growth rate on Nigeria shows that the economy has been fluctuating prior and after the liberalization era. Nigeria experience shows that from 1960 to 1980, GDP grew at an average of 4.06%, some negative growth rates of −8.75% and −10.75% in 1986 and 1987 respectively and of −1.05% and −5.0% was also observed between 1982 and 1983. This was during the period of the liberalization or SAP. There was relative improvement in the growth rate of the GDP in the years following the implantation of the SAP. Thus, the Nigerian GDP grew at 7.5%, 6.4% and 12% in 1988, 1989 and 1990 respectively. However, between 1991 and 1999, the growth rate of the GDP nosedived and recorded some negative rates and unimpressive positive rates. This was basically as result of several unpopular economic policies adopted by the military government. Following the return to democratic governance, the real GDP (RGDP) growth of the Nigerian economy experienced some level of improvement with the growth rate peaking at 33.74% in 2004. Interestingly, the growth rate has been relatively stable from 2006 to 2014 at an average of approximately 6.5% [6,9,10].

Countries that went through liberalization process, after removal of artificial ceilings on interest rates, experienced high rise of real interest rates. While it is broadly accepted that negative real interest rates have negative effect on saving and investment, this does not mean that high real interest rates have positive impact on savings and investment. For poor developing countries regardless of interest rates level, savings rates will be insensitive to changes as major part of the population lives on near subsistence.

The rate of savings increase as interest rates move from extreme negative rates to slightly less than zero, but as the interest rates become positive saving rates goes down [12].

Also, [13] state that theoretically financial liberalization can promote economic development by increasing savings, investments, and the productivity of capital. However, much of the evidence from financial liberalization episodes from both developing and developed economies points to significant destabilizing consequences, including incidents of severe financial crises.

Hence, Financial liberalization according to Mcknoon and Shaw is meant to foster economic growth through increase in savings via an increase in real deposit rate and increase in private investment in high priority sectors, but how this policy has contributed to the growth of the Nigerian economy remains a lacuna. It is based on this that the study seeks to test the validity of Mcknoon and Shaw Hypothesis Using Empirical evidence on Nigeria.

1.1 Objectives of the Study

The cardinal objective of the study is to test the validity of McKinnon Shaw Hypothesis with Empirical Evidence from Nigeria. However, while

explicating this, the following objectives will also be taken into thought;

1. To empirically examine the validity of McKinnon-Shaw Hypothesis on real money demand balances in Nigeria
2. To empirically enumerate the Various determinant of Economic Growth as proxy by Gross Domestic Product in Nigeria with volatility in Financial Ratios in Empirical Data
3. To empirically highlight the Various Determinant of Nigeria Investment Rate as a result of the capriciousness in Financial Ratios in Nigeria.

2. REVIEW OF RELATED THEORETICAL LITERATURE

2.1 Overview of Nigerian Financial Sector

The Nigerian financial sector is robust and emerging. Nigerian financial sector had undergone three Stage among which include;

- Pre-liberalization Era (1960- 1986)
- Liberalization Era (1986- 1999)
- Contemporary Era (2000 till date)

- **Pre-liberalization Era (1960- 1986):** Nigeria's financial sector is underdeveloped, primitive, dualistic, and unorganized. It is characterized by dualism, market segmentation and spatial fragmentation. The money and capital markets are thin and shallow. Financial intermediation is imperfect. Until the adoption of SAP in 1986, financial repression and bureaucratic control of interest rates were the order of the day [7].

- **Liberalization Era (1986- 1999):** This period welcomed the adoption of Structural Adjusment Program (SAP) in July 1986 which ushered in an era of laissez-faire policies, economic liberalization and price deregulation in virtually all aspects of economic life. Financial deregulation began in earnest in 1987 and had far-reaching impact especially on the banking industry. Financial deregulation was accompanied by the rapid emergence of financial innovations, deregulated interest rates, and fierce competition among and between various financial institutions. Deregulation, competition, innovation, economic recession, political instability, escalating inflation, and frequent reversals in monetary policy -- have combined to create a challenging and precarious financial environment. One major consequence of the new financial environment has been the rapidly declining profitability of traditional banking activities, arising in part from the increasing risk associated with banking. This is partly because, in a bid to survive and maintain adequate profit levels in this highly competitive environment, banks have tended to take excessive risks. But then, the increasing tendency for greater risk-taking has resulted in insolvency and failure of a large number of banks by 1996, the Central Bank of Nigeria published a list of 26 failed banks [7].

- **Contemporary Era (2000 till date):** This era witnessed the reform of Financial Sector with Several financial restructuring program put in place since early 1990s up to this period of democracy such as recapitalization, merger and acquisition, capital control and deflationary policy, all with the aim of improving the financial system. There were reforms in monetary policy which were designed mainly to stabilise the economy in the short run and to induce the emergence of a market-oriented financial sector. According to Akingunola R et al. [7] Soludo [14] Uche [15] the reforms during the era include:

  - ✓ **Rationalization of credit controls:** Commercial Banks Specific credits distribution target were compressed from 18 in 1985 to 2 in 1987 - priority (agriculture and manufacturing) and non-priority (others) although credit ceilings on banks were not completely removed.
  - ✓ **Deregulation of interest rates**: During this era all market rates became market determined. The CBN adopted the system of fixing only its minimum rediscount rate to indicate the desired direction of interest rates changes. Interest rate liberalisation was aimed at enhancing the ability of banks to charge market-based loans rates and also guarantee the efficient allocation of scarce resources. In 1989, banks were encouraged to pay interest on current account deposits. The rate to be paid was to be negotiated between banks and their customers.

- ✓ The shift from direct to indirect system of monetary control: in June 1993, an open-market operation (OMO) was introduced. During this era, it's use was prominent. Under the scheme, OMO was to be conducted exclusively through licensed discount houses, which are supposed to constitute the open market for government securities. The introduction of OMO was meant to replace the use of direct controls for managing liquidity in the economy.
- ✓ The Foreign exchange market reforms were also evident in this era. A second-tier foreign exchange market was established in 1986 as an auction forum for the sale and purchase of foreign exchange. Previously, the sale and purchase of foreign exchange was rigidly controlled through the use of import licenses and the exchange rate was fixed by fiat. This resulted in an overvaluation of the Naira with its attendant consequences. In order to restore appropriate exchange rates, the authorities began the auction sales of foreign exchange to licensed dealers. A first-tier market was retained to take care of transactions related to government debt-servicing, contributions to international organizations and transfers to Nigerian missions abroad. In 1988, the government permitted the establishment of private foreign exchange and to accord recognition to small dealers in foreign exchange. With the deregulation of the foreign exchange, all existing restrictions on capital transfers were abolished.
- ✓ Consolidation of Specific Segments of Nigeria Financial System of the Economy: In order to strengthen the Nigerian financial system, there has been an increased trend in consolidation in some segments of the financial sector like the deposit money banks, community banks, capital market and insurance companies. The consolidation exercise started in mid 2004 with the deposit money banks that were required to raise their minimum capital base from N2bn to N25bn by the end of 2005. This therefore reduced the number of deposit money banks from 89 banks to 25 mega-banks (now 24) after series of mergers and acquisition. The outcome of the consolidation exercise was the emergences of 25 banks in Nigeria which together accounted for about 93.5% of aggregate deposit liabilities and a larger capital base from about $3 billion to $5.9 billion. The strong capital has ensured a basic indication of solvency of the banks and has provided the vehicle for taking out the weak banks and forcing others into a marriage of convenience. The reform in the banking sector has made many of the Nigerian banks to be active participants in the global commerce. Insurance Companies sectors was not neglected as the Federal Ministry of Finance with the National Insurance Commission (NAICOM) increased the capital base of life insurance business to N2 billion while that general insurance business was increased to N 3 billion and that of re-insurance business was also increased to N 10 billion. This has therefore reduced the number of the insurance companies to 71 from 103 comprising of 43 general insurance, 26 life insurance and 2 re-insurance companies. The community banks in Nigeria were converted to microfinance banks through increase in the capital base of the banks to N20million for a single-branch bank and N1billion for those interested in establishing cash centers and more branches state wide.
- ✓ Growth of the Capital Market: During the last two decades, there has been an encouraging development in the growth of the capital market. The Nigerian Stock Exchange has been expanding and evolving. The number of quoted stocks has increased and market capitalization has burgeoned. The reforms in the Nigerian capital market are concern about a strong and viable capital as a vehicle for mobilizing capital for developmental purposes. The reform was target at the secondary market represented by the Nigerian Stock Exchange (NSE). The operation standards of the NSE are now comparable to what obtains in the developed economies. The Central Securities Clearing System (CSCS) and the Automated Trading System (ATS) have enhanced the efficiency in stock trading and also made the market more investor friendly due to honesty and transparency in-built in the system.

2.2 Concept, Forms and Justification for Financial Repression

Financial repression refers to the notion that a set of government regulations, laws, and other non-market restrictions prevent the financial intermediaries of an economy from functioning at their full capacity. The policies that cause financial repression include interest rate ceilings, liquidity ratio requirements, high bank reserve requirements, capital controls, and restrictions on market entry into the financial sector, credit ceilings or restrictions on directions of credit allocation, and government ownership or domination of banks.

The key reason for the government to implement financially repressive policies is to control fiscal resources. By having a direct control over the financial system, the government can funnel funds to itself without going through legislative procedures and more cheaply than it could when it resorts to market financing.

More specifically, by restricting the behavior of existing and potential participants of the financial markets, the government can create monopoly or captive rents for the existing banks and also tax some of these rents so as to finance its overall budget. Existing banks may try to collude with each other and to interrupt possible liberalization policies as long as they are guaranteed their collective monopoly position in the domestic market [5].

Also, the quest to protect the household, the consuming unit and the nucleus of the economy from the vagaries of market forces induces the government to implement various financial repressive policies as such policies usually set the price below the market determined price. The free market is still subject to a range of market failures - even if liberalized successfully, market failure can still exists and impede development regardless. Prudent regulation is needed on some level to provide a sufficient legal and institutional framework in order to promote development - immediate liberalization is likely to create instability, wreak havoc and reduce the scope for investment and development.

Financial repression can occur in various forms. Typical policies that constitute financial repression and that are motivated by the Government's fiscal needs include high reserve requirements, liquidity ratio requirements, interest ceilings, and government directives on the directions of credit

Capital controls are restrictions on the inflows and outflows of capital and are also financially repressive policy. Despite the intended goals seek to achieve, the use of capital controls can involve costs. Because of their uncompetitive nature, capital controls increases the cost of capital by creating financial autarky; limits both domestic and foreign investors' ability to diversify portfolios; and helps inefficient financial institutions survive.

Financial repression also takes the form of direct action in which government issues directives for banks to allocate credit at subsidized rates to specific firms and industries to implement industrial policy. Forcing banks to allocate credit to industries that are perceived to be strategically important for industrial policy ensures stable provision of capital rather than leaving it to decisions of disinterested banks or to efficient securities markets. It is also more cost effective than going through the public sector's budgetary process.

Governments often impose quantitative controls on the interest rate banks can offer to depositors. This control is usually in the form of price ceiling than price floor. The intended aim of the control is to allow financial institution charged price below the equilibrium rate. Interest ceilings function in the same way as price controls, and thereby provide banks with economic rents. Like high required reserve ratios, those rents benefit incumbent banks and provide tax sources for the government, paid for by savers and by borrowers or would-be-borrowers. The rents borne by the interest ceiling reduce the number of loans available in the market – the real interest rates on loans and deposits are higher and lower, respectively, thereby discouraging both saving and investment. In return for allowing incumbent banks to reap rents, the government often require banks to make subsidized loans to certain borrowers for the purpose of implementing industrial policy (or simply achieving some political goals). Interest ceilings in high inflation countries can victimize savers because high inflation can make the real interest rates of return negative.

In Nigeria, governments require banks to meet high rates of the reserve ratios, and use the reserves as a method to generate revenues. Because reserves earn no interest, reserve

requirements function as an implicit tax on banks and also restrict banks from allocating a certain portion of their portfolios to productive investments and loans. When high reserve ratios are required, the lending and borrowing rate spread must widen to incorporate the amount of no-interest reserves, which can reduce the amount of funds available in the financial market. If high reserve requirements are combined with interest ceilings and protective government directives for certain borrowers, savers who are usually unaware of the requirement policy become the main taxpayers because they face reduced rates of interest on their savings. Inflation can aggravate the reserve tax because it reduces the real rates of interest. Thus, high reserves requirement make the best use of the government's monopolistic power to generate seigniorage revenue as well as to regulate reserve requirements [5].

2.3 Structural Rigidities in the Implementation of Financial Liberalization in Nigeria

Financial repression leads to inefficient allocation of capital, high costs of financial intermediation, and lower rates of return to savers, it is theoretically clear that financial repression inhibits growth [16].

The possible negative effect of financial repression on economic growth does not automatically mean that countries should adopt a laissez-faire stance on financial development and remove all regulations and controls that create financial repression. Many developing countries that liberalized their financial markets experienced crises partly because of the external shocks that financial liberalization introduces or amplifies. Financial liberalization can create short-term volatility despite its long-term gains [17].

Also, because of market imperfections and information asymmetries, removing all public financial regulations may not yield an optimal environment for financial development. An alternative to a financially repressive administration would be a new set of regulations to ensure market competition as well as prudential regulation and supervision [5].

Various factors limit the prowess of financial liberalization policy from affecting the financial indicators which might result in the deviation from the apriori expectation [18].

Substitution and income effect to interest change. Total savings may not increase when interest rates are liberalized. In the case of liberalizing interest rates (allowing them to rise) the substitution effect encourages financial saving as it increases the relative cost of non-financial savings – meaning the cost of holding money or using it for current consumption is now relatively more expensive.

However the income effect will discourage financial saving as liberalized interest rate entails that a reduced level of financial saving is now required to provide the same rate of return on saving deposits as before. Therefore the income effect reduces financial savings as fewer financial savings are required to maintain the same return of interest on deposits. Therefore as the substitution and income effect can work in opposite directions the net effect may be no increase in the level of total savings, just a change in the composition of total savings between financial and non-financial savings (assets).

Secondly, there is an assumption that if savings deposits increase, that loans and investment will increase automatically - this is untrue. The supply of credit is endogenous in as much as it does not depend solely upon saving deposits but upon the ability of the banks to create credit with the backing of a central bank as the lender of last resort. If the central bank acts as a lender of last resort then the supply of loans will be dependent only on the demand for loans - which will be determined by other factors (not saving deposits), such as interest rates and future expectations.

Thirdly, liberalising interest rates and allowing them to rise to attract savings may not necessarily stimulate investment; especially if the equilibrium interest rate is high enough to reduce potential investment returns to the extent that it discourages some investors from borrowing. This is because whilst the increased supply of credit has a positive effect on investment there is also a negative effect of higher interest rates which reduces demand for loans; the net effect may be that higher real interest rates have an adverse impact on investment.

Fourthly, asymmetric information and adverse selection will still exist in the market for saving and investment once financial repression is removed - meaning that allocative inefficiency and credit rationing still may exist even after

financial liberalization has taken place. One reason for this is that when interest rates are higher, the risk of default is also higher - therefore credit rationing could remain as banks may be more averse to lending at higher interest rates (if it increases the probability that they will not be paid back). When the probability of default increases, informational asymmetries become more important as the banks do not want to lend to those whom are likely to default on their loan – this could lead to further credit rationing even after liberalization.

Fifthly, there is also an assumption that the interest rate elasticity of savings is positive, elastic and significant. However across less developed countries the interest rate elasticity of financial savings is still not clearly established. Many studies show that the elasticity is very small, inelastic and not largely significant - therefore the change in the real interest rate may have little impact on total savings.

Lastly, liberalising interest rate may have adverse impacts on other parts of the economy, for example it could lead to higher unemployment and cost inflation (problems of stagflation). It could also lead to an overvaluation of the currency as hot money flows into the country when interest rates increase – due to overvaluation of the currency there will be an adverse impact on exports as the economy becomes less competitive internationally. This further thwarts the ability of developing countries to obtain foreign currency reserves and leads to either detrition in the terms of trade or reduction in output – both of which hugely destabilise the development process.

2.4 Empirical Literature

Adamopoulos [19] investigated the relationship between financial development and economic growth for Ireland for the period 1965-2007 using a vector error correction model (VECM). The results gotten implied that economic growth has a positive effect on stock market development and credit market development in Ireland.

Can Erbil [20] examined the effect of financial liberalization on long-run income per capita and economic growth in a sample of 10 new EU member countries and Turkey using quarterly longitudinal panel between 1995 and 2007. Their static robust and dynamic panel data estimates indicate clear evidence between the long-run growth and a number of indicators of financial liberalization which confirms the anticipations of the 'new growth theory'. Their results emphasize the importance of financial liberalization as a policy tool

Bouzid [21] tested for empirical evidence to confirm the complementarity hypothesis for the Arabic Maghrebean countries from 1973 to 2003. The money demand and investment function were estimated in static long-run formulations (cointegration regression) as well as in the dynamic formulation (VECM). The coefficients of the investment ratio in the money demand function (M2/P) were positive only for Algeria. Their findings supported [22,23,24]. The study established that the hypothesis are valued if the financial system is well developed and structured.

Tswamuno, Pardee and Wunnava [25] asserted that following liberalization in South Africa, uncertainty on the part of foreign investors due to lack of a credible macroeconomic framework led to increased volatility of capital flows; characterized by huge capital inflows and subsequent capital flight. Post-liberalization Foreign Portfolio Investments had no positive effect on economic growth. In addition, increased post-liberalization stock market turnover had a negative effect on economic growth. In contrast to this situation, evidence shows that foreign portfolio investment and increased turnover contributed positively to economic growth in a more controlled pre-1994 South African economy. They concluded that liberalization of the capital account is necessary but not sufficient for economic growth. Instead, countries need to adopt and implement credible macroeconomic policies meant to stabilize foreign capital flows in order for them to benefit fully from liberalization.

Muhammad and Malarvizhi [26] examined the linkage among financial liberalization on economic growth and poverty reduction in six sub-Saharan African countries using panel unit root and panel vector error correction tests over the period of 1980-2010. The results showed that poverty reduction was positively related to economic growth and financial liberalization coefficients are positively related to economic growth. Thus, it implies that financial liberalization causes economic growth. The coefficients of financial liberalization was found to be insignificant to poverty reduction suggesting that financial liberalization does not have direct impact on poverty reduction in the six Sub-

Saharan African countries, hence, implying that the financial liberalization effects of poverty are dependent on the distributional changes made possible by the growth and the existence of good governance and strong institutions.

Omankhanlen [27] examined the financial sector reforms and its effect on the Nigerian Economy. Employing the OLS method and covering the period 1980-2008, it showed a positive impact on the economy of Nigeria even though the lending rate is still so far unstable. Hence, the author concluded that the financial sector reforms in the financial sector are not solely responsible for the sector being better off.

Also, Owusu and Odhiambo [28] employed the autoregressive distributive lag-Bounds testing approach to study the impact of financial liberalization on economic growth in Nigeria, between 1969 and 2008. They found long-run relationship between economic growth and financial liberalization represented by an index calculated using principal component analysis. They substantiated the results from Omankhanlen [27], that financial liberalization policies have a positive and significant effect on economic growth in Nigeria.

Obamuyi and Olorunfemi [29] investigated the implications of financial reforms and interest rate behavior on economic growth in Nigeria. Making use of cointegration and ECM data from 1970 to 2006, they found out that financial reform and interest rates have significant impact on economic growth in Nigeria which implies that the behaviour of interest rate is important for economic growth.

Imene Ben Fredj and Schalck [30] studied the relationship between financial development and economic growth in Tunisia. They focused on link between finance and growth according to the maturity of financial systems. The Tunisian economy knew a long period of financial repression before starting several phases of liberalization. They identified economic and financial development indicators of Tunisian economy. The empirical study on Tunisia is based on causality tests within B-VAR framework. Reciprocal relationships are only finding between the ratio of investment on GDP and the loans granted to private and public sectors. The economic role of government is highlighted, over the pre-reforms period as well as during the recent time.

Khan and Qayyum [31] empirically investigated the impact of trade and financial liberalization on economic growth in Pakistan using annual observations over the period 1961-2005. The analysis is based on the bound testing approach of cointegration advanced by Pesaran. The empirical findings suggest that both trade and financial policies play an important role in enhancing growth in Pakistan in the long-run. However, there is further acceleration of reform process. The feedback coefficient suggests a very slow rate of adjustment towards long-run equilibrium. The estimated short-run dynamics are stable as indicated by CUSUMQ test.

Odhiambo [32] employed the autoregressive distributive lag-Bounds testing approach to study the impact of financial liberalization on economic growth in Nigeria, between 1969 and 2008. They found long-run relationship between economic growth and financial liberalization represented by an index calculated using principal component analysis.

Reinhart and Tokatlidis [33] in a study of 50 countries (14 developed and 36 developing) report that financial liberalization appears to deliver: higher real interest rates (reflecting the allocation of capital toward more productive, higher return projects.); lower investment, but not lower growth (possibly owing to a shift to more productive uses of financial resources); a higher level of foreign direct investment; and high gross capital flows.

Khalid, M [34] tested the financial repression hypothesis in Pakistan and observed that Pakistan made several attempts to initiate a similar liberalization process since 1980s. However, these attempts did not work due to political instability and macroeconomic mismanagement. Using the annual data to see the impact of certain deregulation policies on saving, investment and growth. The empirical results, in general, are mixed, though found some support for financial liberalization argument.

Anthony-Orji et al. [11] construct an index of financial liberalization to investigate its impact on economic growth in Nigeria The ordinary least squares methodology and cointegration analysis which reveals that financial liberalization (FINDEX) and private investment (PINV) have significant positive impact on economic growth in Nigeria. Hence, conclude that the monetary authorities and policy makers in Nigeria need to support the liberalization process by formulating

complementary policies and financial sector reform measures that will help in strengthening the impact of the liberalization process on the economy and also ensure that the benefits of the liberalization exercise is maximized.

2.5 Theoretical Framework

The McKinnon Shaw Model forms the theoretical framework of this study.

McKinnon [1] and Shaw [2], analyzed the benefits of (if not eliminating) Financial Repression, atleast reducing its impact on the domestic financial system within developing countries. Their analyses- (sometimes referred to as the Complementarity Hypothesis)- concluded that alleviating financial restrictions in such countries (mainly by allowing market forces to determine real interest rates) can exert a positive effect on growth rates as interest rates rise toward their competitive market equilibrium. According to this tradition, artificial ceilings on interest rates reduce savings, capital accumulation, and discourage the efficient allocation of resources. Additionally, McKinnon pointed out that Financial Repression can lead to dualism in which firms that have access to subsidized funding will tend to choose relatively capital-intensive technologies; whereas those not favored by policy will only be able to implement high-yield projects with short maturity.

Thus, McKinnon–Shaw framework argues that in order for an economy to experience economic growth via greater efficiency in capital accumulation and allocation, interest rate and ceilings, credit control and other restrictive financial legislations should be removed.

They further enunciated the implicit “credit rationing” effect which results from the Feast and Famine consequences of excessive government intervention in money and credit markets in developing countries. Given that real interest rates are prevented from adjusting to clear the market, other “non-market” forms of clearing have to take their place. These can include various forms of “queuing” arrangements to “ration” the available credit such as auctions, quantitative restrictions (for example quotas), as well as different types of “bidding” systems which themselves may be open to nepotism or even outright corrupt practices. In essence, these manifestations of Financial Repression mean that not only is the **quantity** of savings (and investment) low, or at the very least irregular; it also means that the level of activity which does occur is of poor **quality**. This is really what the term Financial Repression entails. If the real interest rate is not allowed to clear the money and credit markets, both the overall level as well as the quality of savings and investment will be repressed. The quantity and the quality effects compound each other. In a Feast and Famine environment, the typical borrower may borrow too much (too little) and this very tendency will reinforce the Feast and Famine problem itself [5]

McKinnon–Shaw [1] viewed financial liberalization as

1. Market-determined interest rates; [11]
2. Greater ease of entry into the banking sector to encourage competition; [11]
3. The elimination of directed credit programmes; [11]
4. Reduced fiscal dependence of the state on credit from the banking system (to allow for greater expansion of credit to the private sector); [11]
5. The integration of formal and informal markets; [11]
6. A movement towards equilibrium exchange rates and, eventually, flexible exchange rate regimes with open capital accounts [11].
7. A saving function that responds positively to both the real rate of interest on deposits and the real rate of growth in output [35].
8. An investments function that responds negatively to the effective real loan rate of interest and positively to the growth rate.
9. An administratively fixed nominal interest rate that holds the real below its equilibrium level; and
10. Inefficient non-price rationing of loanable funds.

Fry [36] identified five prerequisites for successful financial liberalization:

1. Adequate prudential and supervision of commercial banks, implying some minimal levels of accounting and legal infrastructure
2. A reasonable degree of price stability
3. Fiscal discipline taking the form of a sustainable government borrowing requirement that avoids inflationary effects
4. Profit-maximizing, competitive behaviour by the commercial banks
5. A tax system that does not impose discriminatory explicit or implicit taxes on financial intermediation.

The Mckinnon-Shaw hypothesis shows that banks allocate credit not according to expected productivity of the investment projects, but according to transaction costs and perceived risks of default. Here, quality of collateral, political pressures, name, covert benefits to loans officers also play major role in the allocation of loans. The consequence of all these is the reduction in the average efficiency of investment as the loan rate ceiling is lowered because investment with lower returns now becomes profitable. This occurs when interest rates are set too low, thus resulting in credit rationing. Such interest rate ceilings distort the economy in four ways:

1. Low interest rate produces a bias in favour of current consumption against future consumption. This may reduce saving below the socially optimum level;
2. Potential lenders may engage in relatively low-yielding direct investment instead of lending by way of depositing money in banks;
3. Bank borrowers able to obtain all the funds they want at low loan rates will choose relatively capital-intensive projects; and
4. The pool of potential borrowers contains entrepreneurs with low-yielding projects who would not want to borrow at the higher market-clearing interest rate. In the effect that banks' selection process contains an element of randomness, some investment projects that are financed will have yields below the threshold that would be self-imposed with market-clearing interest rate [36,35]

2.5.1 The complementarity hypothesis (McKinnon [1], Shaw [2]

This hypothesis implies that the demand for real money balances (*M/P*) depends on real income, Y, the ratio of gross investment to GNP, I/Y, and the real deposits rate of interest, d-πe, (where d is the nominal deposit rate and πe is the expected rate of inflation). The demand for real money balance according to Mckinnon is expressed thus:

$$Md= F (Y, , d-\pi^e,)$$

Where

Md: The Real Money Demand Balance. This is defined as the amount of money held by a person, household, firm or amount in circulation. This includes savings and time deposit.

Y: The real Income. This is derived by dividing the nominal income by the price level.

: The investment rate. This is the ratio of real investment to real Income.

d : Nominal interest rate

π^e : Anticipated inflation rate

$d-\pi^e$: Real interest rate

The investment ratio, *I/Y*, must be positively related to the real rate of return on money balances. This is because a rise in the real return on bank deposits, d-πe, if it raises the demand for money and real money balances is complementary to investment. It must also lead to a rise in the investment ratio [35,37].

The McKinnon-Shaw model of financial repression further enunciated that Investment (I) is a negative function of the real interest rate (r) whilst savings (S) - at different income levels are a positive function of the real interest. The savings curve is therefore influenced by both the real rate of interest (shifts along the savings curve) and the growth in national income (shifts in the savings curve) real interest rate is measured on the vertical axis and investments/savings are measured on the horizontal axis.

In the absence of financial repression the equilibrium interest rate R_o brings about the equality of savings and Investment at point E. When Equilibrium Interest rate is altered via financial repression, two disequilibrium situations exist.

Firstly, if interest rate ceiling (The maximum Rate of Interest that can be charged) is imposed by setting the Interest rate below the Equilibrium Interest rate determined by the interplay of market forces this will lead to a fall in the level of savings and a subsequent rise in the level of investment i.e Investment rate will be higher than saving rate. This will further lead to pressure on the demand for loanable fund. The Pressure ultimately ought to increase the rate of interest but financial repression hence limits this tendencies. If the interest rate ceiling applies to both nominal deposits and loans there will exist an excess demand for investment this is due to the interest rate being held below equilibrium and thus increasing demand for investment. However due to the low rate of interest curbing financial savings there exists not enough deposits to fund the level of investment demanded – as a result credit must be rationed by the banks . One

specific problem that arises as a result of credit rationing which further impedes development is that commercial banks are more likely to allocate their limited credit to a few large borrowers opposed to many small borrowers – this is in order to minimise risk and administrative overhead costs. As a result, smaller businesses do not have access to credit and cannot undertake investment (as they are seen to be more risky and prone to default as they often operate on lower margins) in order to expand and develop the manufacturing sector.

Secondly, if Interest rate Floor (The minimum Rate of Interest that can be charged) is imposed by setting interest rate above the market determined rate of interest, this will increase the level of savings as interest rate is a positive incentive to savings while it will constrain the level of investment. If the interest rate ceiling (c) applies only to deposits and not to loans then the banks are not constrained in the rate of interest they can charge on loans – as a result the interest rate floor R_2 will prevail. The high rate of interest will deter many from taking out loans and investing (as the expected rate of return of investment is now diminished due to the high cost of borrowing). Consequentially investment is condemned halt. Here, Savings will climax with lower consumption which will shift the aggregate demand curve to the left. The effect will be more evident if the Higher interest rate cannot be accommodated by marginal efficiency of Capital. The labour market will not be spared as the level of employment wil halt as a result of lower level of income.

The McKinnon-Shaw model proposes that the removal of interest rate ceilings will curb financial repression and remove the credit rationing. Complete removal of the ceiling would remove financial repression and result in the market equilibrium. Credit rationing would be completely removed as no excess demand for investment exists; the deposits of savings match exactly the demand for loans. As a result of the higher interest rates there is increased savings and thus increased scope for borrowing and investment. The increase in investment further raises national income (and savings) pushing the savings curve further until equilibrium investment is achieved [35,37].

The McKinnon-Shaw hypothesis argues that suppressive regulations in the financial markets lead to financial repression distorting incentives of savers and investors in an economy. Regulations such as deposit interest rate ceiling, minimum/maximum lending rates, quantity restrictions on lending, etc. cause real interest rates to be negative and unstable especially in the presence of high inflation in an economy. Regulation does lead to negative impact on the amount of domestic savings and thus capital formation, which retards economic growth and development. Thus, the policy prescription of the McKinnon-Shaw hypothesis (McKinnon, 1989; Shaw, 1973) is financial liberalization especially deregulation of interest rate restrictions [34].

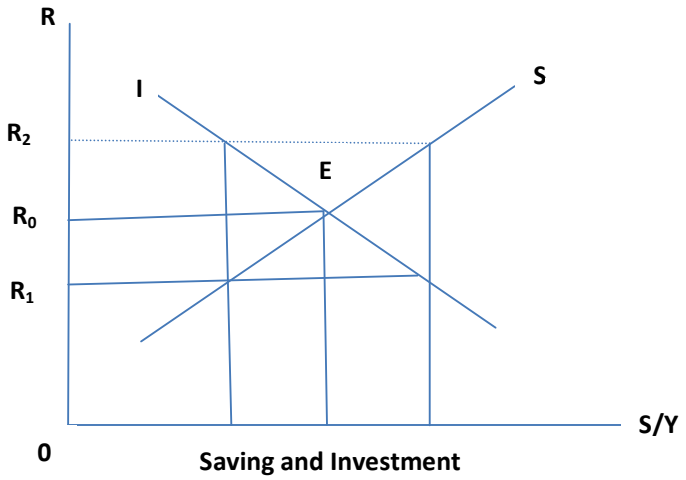

Fig. 1. Saving/Invesment curve of financial institution
Source: Author's 2016

3. METHODOLOGY

The data employed in this study are secondary data. The study employed annual time series data from 1981 to 2014. The data series were gotten from The CBN statistical bulletin of various years, Nigerian Bureau of Statistics and the World Bank development indicators This study adopts the ARDL bound testing approach Bound Test known as Autoregressive Distributed Lag (ARDL developed by Pesaran and Shin (1995) to estimate the long run equilibrium and to establish the direction of causation between variables. To make use of this method, a unit root test will first be conducted using the augumented Dickey Fuller test to ascertain the level of stationarity of the variables. The variance decomposition that will aid the interpretation of the structural responses of endogenous variable with the exogenous. The results of the variance decomposition using the cholesky - dof ordering are presented . The result shows the effect of one standard deviation shock or innovation on self and other variables. To ensure the appropriateness of the model, the last steps of the ARDL procedure are employed to using diagnostic checking. Furthermore, this study used several diagnostic tests, including the tests for serial correction, heteroscedasticity, normality The Lagrange multiplier (LM) and The F-statistics and critical values .Test of statistical adequacy, such as the adjusted R-square, t-statistic, F-statistic, standard error of coefficient, Durbin-Watson were carried out to assess the relative significance of the variables, the desirability and reliability of model-estimation parameters.

3.1 Model Specification

The model specified below are modification to empirical studies of [38,39]

Functional relationship is given thus,

$Md = F(Y, ,RIR)$
$INV_t = F(RGDPt_{-1,}, RIR, PDCt, FS_t)$
$RGDP_t = f(INF_{t,} FS_t, IVTgt, FLP_t, RIR)$

3.1.1 Structured econometric model

$$LogMd^* = a_o + a_1LogY_t + a_2Log\ INV_t^* + a_o\ RIR_t^* + U_{at} \quad (3.1)$$

$$INV_t = \beta_0+\beta_1LogRGDP_{t-1}+\beta_2RIR_t + \beta_3LogPDC_t + \beta_4LogFS_t + v_t \quad (3.2)$$

$$LogRGDPt= \gamma o + \gamma 1INFt + \gamma 2LogFS_t + \gamma 3LogIVTgt + \gamma 4FLPt + \gamma 5RIR + \xi \quad (3.3)$$

Where

1. Y = National Income
2. Inv= Investment Level
3. Md= Real Money demand
4. PDC = Private Domestic Credit
5. FS = Financial Saving
6. INF = Inflation Rate
7. RIR= Real interest Rate
8. RGDP= Real gross Domestic Products
9. FLP = dummy variable for financial liberalization 1 is for era of deregulation while 0 for Era of regulation.

4. RESULTS AND FINDINGS

The result of the findings are presented and analysed based on each model specification as a follow up to the various objectives of the study as detailed below;

Objective 1: To Test the various determinant of Real Money Demand Balance as explicated by McKinnon-Shaw with Empirical Data from Nigeria.

Model 1 Specification:

$$LogMd^* = a_o + a_1LogY_t + a_2INV_t^* + a_o\ RIR_t^* + U_{at} \quad (4.1)$$

Table 1. Unit root test result of model 3.1

Variable	Trace-statistics	1%critical value	5% critical value	10% critical value	Probability	Level of integration
$LogMd^*$	-0.44561	-3.6617	-2.9604	-2.6192	0.8888	1(0)
$LogY_t$	-7.2826	-3.6617	-2.9604	-2.6192	0.0000	1(1)
INV_t^*	-7.3625	-3.6617	-2.9604	-2.6192	0.0000	1(1)
RIR	-7.3625	-3.6793	-2.9678	-2.6292	0.0000	1(1)

Source: Author's computation from unit root test (ADF)

The result of the unit root test portray that all the selected variable were not stationary at their level with the exception of LogMd which was stationary at its level. The other variable are however stationary at first order level of integration. Having conducted the Stationary test and having established that the variables are not coherent in the stationary level we proceed to apply we can Run ARDL when we have our data stationary mix I.e. one variable are stationary at level and few ones at first difference but it's also important to know that ARLD also can be run if our variables are purely stationary at level or purely at first differences.

The finding from Table 2 shows that 70 Percent of the total variation in Real demand for Money is caused by Aggregate Income, Investment Rate and Real Interest rate as indicated by the adjusted coefficient of determination of 0.70. The other 30% variations are caused by variables not captured in the model. The R2 and adjusted R2 show that ARDL models are the most appropriate. The model passes the normality tests. Therefore, the ARDL model is correctly specified.

Aggregate income and Investment rate has a positive significant effect on Real demand of Money balances using standard error test both in the short and long run. But Real Interest rate has a negligible or insignificant effect on Real demand for Money balance in the short-run. While it has a significant effect in the short-run. A negative relationship of interest rate with real money demand that an increase in the interest rate will reduce the amount of money held by the economic agents. It further stipulated that a unit percent increase in interest rate will lead to 30% decrease in the real money demand in the long-run. This is because interest rate is the opportunity cost of holding money balance. Hence if interest rate rises the return of moving in and out of money into other asset will increase which will ensure that economic agents hold a lower level of money balance. Therefore, at high Real interest Rate, Real money demand will be low as the amount of the portfolio that economic agents will wish to hold as money will be low. This is however a confirmation to the view expressed by Milton Friedman who argued that " it is eminently plausible that uncertainty should raise the demand for cash balance that reduce velocity, if so the increase demand for money would be reflected in greater reluctance to hold securities thus raising interest rate. Durbin Watson estimate of 1.89 shows the absence of perfect serial correlation serial correlation between the explanatory variable. The coefficients of the error term lag (1) which is the ECM shows the speed at which the dependent variable adjust to equilibrium in the short run. According to a priori expectations, the ECM should be significant and negative to show that the error in the previous period has been corrected and the model has returned back to equilibrium. The ECM (-1) is rightly signed and highly significant and posit the speed at which disequilibrium in the short run is corrected. The ECM (-1) value of -0.861 shows that disequilibrium is corrected 62.3 percent in one year.

Table 2. Long-run and short-run estimate of real demand balances using ARDL approach

Regressors	Coefficient	Standard error	t-test
Short-run estimation			
Constant	0.3233	0.1032	3.2634
$LogY_t$	0.4989	0.2313	2.1597
INV_t	0.3706	0.1382	2.6855
RIR	-0.2490	0.1335	-1.8721
ECM(-1)	-0.623	0.1252	-4.984
Long-run estimation			
Constant	0.2354	0.1023	2.3010
LogMd	0.3976	0.1728	2.2996
$LogY_t$	0.6136	0.2668	2.2998
INV_t	0.4553	0.1981	2.2972
RIR	-0.3027	0.1331	-2.2731
R^2	0.7232		
$R^2_{adjusted}$	0.701		
Dw	1.89		

Source: Author's computation from E-view 8.0

4.1 Variance Decomposition of Model 3.1

The variance decomposition that will aid the interpretation of the structural responses of Real Income, Investment Rate, Real Interest Rate to changes in Real Demand Balance in Nigeria overtime. The results of the variance decomposition and impulse response function of variables using the cholesky - dof ordering are presented.

Specifically, period 1 of the table indicates that a shock to LogMd causes a positive standard deviation value of 100.00 in LogMd (own shock). The table also shows that LogMd does respond to innovations from $LogY_t$, INV_t but doesn't respond to shock to RIR_t in period 1. While all the variable responds to shock from LogMd in Period 5.

Table 3. Variance decomposition of Model 3.1

Period	LogMd	$LogY_t$	INV_t	RIR_t
1	100.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
2	28.13 (6.14)	45.44 (5.27)	23.22 (1.94)	3.21 (2.52)
5	32.60 (18.70)	20.89 (8.05)	35.30 (7.94)	11.11 (02.43)

Source: Author's computation from E-view 8.0

Table 4. Pairwise granger causality tests of Model 3.1

Null hypothesis	Obs	F-statistic	Prob.
RIR does not Granger Cause LOGMd	32	7.11772	0.0124
LOGM/P does not Granger Cause RIR		0.75092	0.3933
LOGY does not Granger Cause LOGMd	32	13.9553	0.0008
LOGMd does not Granger Cause LOGY		4.57350	0.0410
IVT does not Granger Cause LOGMd	32	3.27562	0.0807
LOGMd does not Granger Cause IVT		0.46730	0.4997

Source: Author's computation from E-views 8.0

The result of Pairwise Granger's causality between the variable under study is provided in Table 4 above. The rule of thumb states that the probability of the f-statistic must be less than 0.05 to show causal relationship at the 5% level. The concern here is to ascertain the causal relationship between Real Money Demand (Md) and Real Interest Rate, Investment Rate, Real Income. The null hypothesis states that RIR, LogY and INV does not Granger cause LogMd, and LogMd does not Granger cause RIR,LogY and INV. The probabilities for our causal variables RIR and LogMd are 0.0124 and 0.3933 respectively. Therefore we reject the null hypothesis of no causal relationship between RIR and Logmd and accept the alternative Hypothesis of causal relationship between Logmd and RIR hence conclude that there is one-dimensional causal relationship between Real Interest Rate and Real Money Demand. Also, the probabilities for our causal LogY and LogMd are 0.0008 and 0.0410. Therefore we reject the null hypothesis and conclude that there is bi-dimensional causal relationship between Real Income and Real Money Demand. While the probabilities for our causal variables INV and LogMd are 0.0807 and 0.4997. Therefore we accept the null hypothesis that no causal relationship exist betwen between Investment Rate and Real Money Demand. However, Granger causality is neither necessary nor sufficient to establish exogeneity. Granger causality is necessary (but not sufficient) for strong exogeneity [40]. Hence the absence of causal relationship between Investment rate and Real money demand is an indication that caution should be taken when applying forecasting Real Money demand based on investment Rate.

4.2 Diagnostic Test of Model 3.1

Diagnostics test for serial auto correlations, normality and heteroskedasticity were carried out for the estimated model at lag 1.

Table 5. Diagnostic test

Diagnostic test tests	Coefficient	Prob.
Autocorrelation (LM Stat)*	42.3854	0.2148
Normality**	3.1042	0.20248
Heteroskedasticity***	287.0237	0.7534

Source: Author's computation from E-views 8.0.
**Serial correlation LM Test*
***Jarque bera (JB) Residual Normality Test*
****Residual Heteroskedasticity Test (No Cross Term*

The Lagrange multiplier (LM) shows that there is no serial correlation at the chosen lag. In addition, the model passes the normality test through the joint Jaeque-Bera (JB) statistics indicating that residual have normal and identical distribution. It also passes through the heteroskedasticity test with the chi-square distribution of 287.

Objective 2: To Test the Various Determinant of Nigeria Investment Rate as a result of the capriciousness in Financial Ratios in Nigeria.

$$INV_t = \beta_0 + \beta_1 LogRGDP_{t-1} - \beta_2 RIR_t + \beta_3 LogPDC_t + \beta_4 LogFS_t + v_t \quad (4.2)$$

The Table 6 shows the Augmented Dickey Fuller result of unit root test. The result shows all the LogPDC, INV and RIR have to differenced at first difference before they become stationary while

LogRGDP and LogFS are stationary at level. The mix in the stationary level of the variables depicts the importance of ARDL.

The Table 7 result shows that the overall variation in Investment rate in Nigeria is caused by 53% variation in the various explanatory variables. Hence, it can be deduce that Gross Domestic Product in period, Real Interest Rate, Private Domestic Credit, Financial Saving and Investment in the Previous Period all account for 53 percent of the total variation of the investment rate in Nigeria as evidence in the Co-efficient of Determination R^2 of 0.53. The model further depict that all the variables are significant in the short and long run using standard error and t-test with the exception of Real Interest Rate whose effect is negligible or insignificant both in the short and long run.. The result further stipulated that a unit increase in the Real Gross Domestic Product in the previous period resulted to 32%, 31% increase In Current investment rate in the short and long run respectively. The result further opines that Real interest rate has a insignificant effect on Investment rate in short and but its effect is experience in the long run as a Unit rise in Real Interest rate will result to a 49% fall in Investment rate over the long run time frame. The Durbin Wastons value of 1.81 shows the presence of minimal serial correlation among the explanatory variables. The value of ECM (-1) 0f -0.48 shows that disequilibrium is corrected 48 percent in one year.

4.3 Variance Decomposition

The variance decomposition that will aid the interpretation of the structural responses of Real Income, Investment Rate, Real Interest Rate to changes in Real Demand Balance in Nigeria overtime. The results of the variance decomposition and impulse response function of variables using the Cholesky - dof ordering are presented.

Table 6. Unit root test result for variable in model 3.2

Variable	Trace-statistics	1% critical value	5% critical value	10% critical value	Probability	Level of integration
$LogRGDP_{t-1}^{*}$	-7.2826	-3.6617	-2.9604	-2.6192	0.0000	1(0)
$LogPDC_t$	-4.2446	-3.6617	-2.9604	-2.6192	0.0000	1(1)
RIR	-7.3625	-3.6793	-2.9678	-2.6292	0.0000	1(1)
LogFS	-3.1921	-3.6617	-2.9604	-2.6192	0.0312	1(0)

Source: Author's computation from E-views 8.0

Table 7. Long-run and short-run estimate of Nigeria investment rate using ARDL approach

Regressors	Coefficient	Standard error	t-test	p-value
Short-run estimation				
Constant	0.2342	0.2232	1.0492	0.000
$D(LogRGDP_{t-1})$	0.3252	0.1951	2.0408	0.000
D(RIR)	- 0.1392	0.0835	-1.4285	0.500
D(LogPDC)	0.3906	0.2343	3.3333	0.000
D(LogFS)	-0.5166	0.3099	-1.6666	0.000
ECM(-1)	-0.4812	0.2211	-2.178	0.000
Long-run estimation				
Constant	0.5423	0.2311	2.346	0.000
$D(LogRGDP_{t-1})$	0.3180	0.1383	2.2996	0.005
D(RIR)	-0.4908	0.2134	-2.2998	0.000
D(LogPDC)	0.3642	0.1585	2.2972	0.000
D(LogFS)	0.2421	0.1065	2.2731	0.000
R^2	0.53			
$R^2_{adjusted}$	0.51			
DW	1.81			

Source: Author's computation from E-views 8.0

Table 8. Variance decomposition of Model 3.2

Period	INV_t	$LogRGDP_{t-1}$	RIR	$D(LogPDC_t$	LogFS
1	100.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
2	24.2 (9.68)	22.30 (8.92)	14.02 (5.608)	12.23 (4.892)	27.25 (10.9
5	27.2 (10.88)	14.03 (5.612)	12.01 (4.804)	37.3 (14.92)	9.46 (3.784)

Source: Author's computation from E-view 8.0

Specifically, period 1 of the table indicates that a shock to INV_t causes a positive standard deviation value of 100.00 in INV_t (own shock). The table also shows that INV_t respond to innovations all other variables* in period 2 and 5 concurrently.

We ascertain the causal relationship between Investment rate (INV) and Real Interest Rate (RIR), Financial Saving (LogFS), Private Domestic Credit (LogPDC). The null hypothesis states that RIR, INV and LogFS does not Granger cause INV, and INV does not Granger cause RIR,LogPDC and LogFS. The probabilities for our causal variables RIR and INV are 0.3864 and 0.0288 respectively. Therefore we accept the null hypothesis that there is no causal relationship between Real Interest Rate and investment rate but causal relationship exist between Investment rate and real Interest Rate. Also, the probabilities for our causal LogFS and INV are 0.6348 and 0.1712. Therefore we accept the null hypothesis and conclude that there is no causal relationship between Financial Saving and Investment rate. It implies that financial saving doesn't granger cause investment rate vice versa. While the probabilities for our causal variables LogPDC and INV are 0.4378 and 0.4978. Therefore we accept the null hypothesis and conclude that there no way causal relationship between Investment Rate and Real Money Demand. Hence, Investment rate does not granger cause Real Money Demand and vice versa. Also, there is no causal relationship between Investment rate and financial Savings.

4.4 Diagnostic Test of Model 3.2

Diagnostics test for serial auto correlations; normality and heteroskedasticity were carried out for the estimated model at lag 1.

The result from Table 10 indicate that the model passes the normality test through the joint Jaeque-Bera (JB) statistics, heteroskedasticity test with the chi-square distribution of 107.02, Autocorrelation test with the Lagrange multiplier (LM).

Table 9. Pairwise granger causality tests

Date: 11/18/16 Time: 05:31
Sample: 1 34
Lags: 2

Null hypothesis	Obs	F-statistic	Prob.
RIR does not Granger Cause INV	31	0.98666	0.3864
INV does not Granger Cause RIR		4.07751	0.0288
LOGFS does not Granger Cause INV	31	0.46243	0.6348
INV does not Granger Cause LOGFS		1.89038	0.1712
LOGPDC does not Granger Cause INV	31	0.85273	0.4378
INV does not Granger Cause LOGPDC		0.71660	0.4978

Source: Author's computation from E-views 8.0

Table 10. Diagnostic test of Model 3.2

Diagnostic test tests	Coefficient	Prob.
Autocorrelation (LM Stat)*	31.305	0.2148
Normality**	4.0042	0.2024
Heteroskedasticity***	107.02	0.7534

Source: Author's computation from E-views 8.0.
**Serial correlation LM test*
***Jarque bera (JB) residual normality test*
****Residual Heteroskedasticity Test (No cross term)*

Objective 3: To Test the Various determinant of Economic Growth as proxy by Gross Domestic Product in Nigeria with volatility in Financial Ratios in Empirical Data.

$$LogRGDPt = \gamma o + \gamma 1INFt + \gamma 2LogFS_t + \gamma 3LogIVTgt + \gamma 4FLPt - \gamma 5RIR + \xi \quad (4.3)$$

4.5 Unit Root Test

The Table 11 shows the Augumented Dickey Fuller result of unit root test. The result shows that RIR and INV are differenced at first difference before they become stationary while INF and LogFS are stationary at level.

The result from Table 12 shows the Real Growth Rate Model of Nigeria Economy. The model depicts that the real Gross domestic growth rate in Nigeria is affected by Inflation rate (INF), Financial Saving (M_2-M_1) (FS), Investment Rate (IVT), and Real interest rate.

The model further depicts that 59% of the total variation in Real gross domestic product is caused by the explanatory variable captured in the model while the rest 41% are caused by variable outside the model. The model further shows all the explanatory variables are significant at 95% level of Significance using the Standard Error Test and T-test while Real Interest Rate has a negligible or insignificant effect on the real Gross Domestic Product in the short run. The result further posited that all the explanatory variables have positive correlation with the Dependent variable except real interest rate. This however conform with the our economic a priori expectation. Also, a unit increase in the investment rate will lead to 9 percent increase in the Real Growth domestic Rate in the short run. The result of the study further posit that a unit increase in Financial Saving in the will jumpstart the Real Gross Domestic Product of the current period by 88% percent in the short run while 106% in the long

Table 11. Unit root test for model 3.3

Variable	Trace-statistics	1% critical value	5% critical value	10% critical value	Probability	Level of integration
Log INV_t	-7.3625	-3.6617	-2.9604	-2.6192	0.0000	1(1)
RIR	-7.3625	-3.6793	-2.9678	-2.6292	0.0000	1(1)
LogFS	-3.1921	-3.6891	-2.9791	-2.6251	0.0312	1(0)
INF	-3.3762	-3.6537	-2.9571	-2.6174	0.0195	1(0)

Source: Author's computation from E-views 8.0

Table 12. Long-run and short-run estimate of determinant of economic growth using ARDL approach

Regressors	Coefficient	Standard error	t-test	p-value
Short-run estimation				
Constant	2.232	0.3480	6.4137	0.000
D(RIR)	-0.122	0.1071	-1.1428	0.500
D(INF)	0.012	0.0060	1.9736	0.000
D(LogFS)	0.888	0.1056	8.4090	0.000
D(INV)	0.792	0.0256	30.937	0.002
D(LogFLP)	0.3744	0.1871	0.5010	0.010
ECM(-1)	-0.632	0.0880	-7.1818	0.011
Long-run estimation				
Constant	2.6784	0.5220	5.1310	0.0000
D(RIR)	-0.1468	0.1836	-0.8000	0.0010
D(INF)	0.0144	0.0091	1.5789	0.0000
D(LogFS)	1.0656	0.1584	6.7272	0.0000
D(INV)	0.9504	0.0384	24.750	0.0000
D(LogFLP)	0.312	0.1170	2.6666	0.0010
R^2= 0.608				
$R_{adjusted}$ = 0.59				
Dw 2.1				

Source: Author's computation from E-views 8.0

run. The financial Liberalization policy has Limited indecisive significant positive effect on the Real Gross Domestic Product in Nigeria in the short run but its effect is felt in the long run. This is because using the rule of thumb for the standard error test it was observed that the value of the standard error test is equal to halve of the co-eficient of the Variable. However, Real Interest Rate denoted by RIR has a negligible or insignificant effect Real Gross Domestic Product In Nigeria in the short run but has a significant effect on Real Gross Domestic product in the Long run.

The Value of Durbin Watson depicts the absence of Serial autocorrelation among the explanatory variables. The implication of this is that the error term relating to an observation is not related to or influenced by the error term relating to another observation are not automatically correlated to one another. The Co-efficient of Error Correction Model which measures the speed of adjustment towards long-run equilibrium is negative and significant. This implies that the rate at which variation of growth RGDP adjust to the single long run co-integration relationship is different from Zero. Hence the coefficient of ECM of 63% depicts the rate at which the rate of growth of Real domestic Growth rate adjusts the repressors is about 63% in the short run.

4.6 Variance Decomposition of Model 3.3

The variance decomposition that will aid the interpretation of the structural responses of Investment rate, Real Interest Rate, Private domestic credit, Financial Savings to changes in Real Demand Balance in Nigeria overtime. The results of the variance decomposition and impulse response function of variables using the Cholesky - dof ordering are presented.

Specifically, period 1 of the table indicates that a shock to INV_t causes a positive standard deviation value of 100.00 in INV_t (own shock). The table also shows that INV_t respond to innovations all other variables* in period 2 and 5 concurrently.

We ascertain the causal relationship between Real Growth Domestic Product (RGDP) and Real Interest Rate (RIR), Financial Saving (LogFS), Inflation rate (INF), investment Rate (INV),. The null hypothesis states that RIR, INV, INF and LogFS does not Granger cause LogRGDP, and LogRGDP does not Granger cause RIR, INF, LogPDC and LogFS. The probabilities for our causal variables RIR and LogRGDP are 0.1955 and 0.2588 respectively. Therefore we accept the null hypothesis and conclude that there is no causality between Real Interest Rate and Real Gross Domestic Products. Also, the probabilities for our causal LogFS and LogRGDP are 0.1056 and 0.1312. Therefore we accept the null hypothesis no way causal relationship between Financial Saving and Real Gross Domestic Products. While the probabilities for our causal variables LogFLP and LogRGDP are 0.1013 and 0.9317. Therefore we accept the null hypothesis and conclude that there is no way causal relationship between financial Liberalization Policy and Real Gross Domestic Products. The lack of causality might indicate weak exogeneity. Hence, it can be shown that Granger causality is neither necessary nor sufficient to establish exogeneity. On the other hand, Granger causality is necessary (but not sufficient) for strong exogeneity “In general, weak exogeneity is all that is needed for estimating and testing, strong exogeneity is necessary for forecasting and super exogeneity for policy analysis. This is however in conformity to the weak R^2 result of 59%.

4.7 Diagnostic Test of Model 3.3

Diagnostics test for serial auto corr|Elations, normality and heteroskedasticity were carried out for the estimated model at lag 1.

The result from Table 10 indicate that the model passes the normality test through the joint Jaeque-Bera (JB) statistics, heteroskedasticity test with the chi-square distribution of 227.02, Autocorrelation test with the Lagrange multiplier (LM).

Table 13. Variance decomposition

Period	LogRGDP	D(INF)	D(LogFS)	D(INV)	LogFS	D(LogFLP)
1	100.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
2	24.2 (9.68)	22.30 (8.92)	14.02 (5.608)	12.23 (4.892)	27.25 (10.9	27.25 (10.9
5	27.2 (10.88)	14.03 (5.612)	12.01 (4.804)	37.3 (14.92)	9.46 (3.784)	9.46 (3.784)

Source: Author’s computation from E-view 8.0

Table 14. Pairwise granger causality tests

Date: 11/19/16 Time: 22:26
Sample: 1 34
Lags: 2

Null Hypothesis	Obs	F-statistic	Prob.
RIR does not Granger Cause LOGRGDP	31	1.73904	0.1955
LOGRGDP does not Granger Cause RIR		1.42448	0.2588
LOGFLP does not Granger Cause LOGRGDP	31	2.50369	0.1013
LOGRGDP does not Granger Cause LOGFLP		0.07090	0.9317
LOGFS does not Granger Cause LOGRGDP	31	2.45391	0.1056
LOGRGDP does not Granger Cause LOGFS		2.19818	0.1312
INF does not Granger Cause LOGY	31	0.76696	0.4746
LOGY does not Granger Cause INF		0.15166	0.8600

Source: Author's computation from E-views 8.0

Table 15. Diagnostic test for model 3.3

Diagnostic test tests	Coefficient	Prob.
Autocorrelation (LM Stat)*	52.105	0.2138
Normality**	6.0152	0.2121
Heteroskedasticity***	227.02	0.7534

Source: Author's computation from E-views 8.0.
**Serial correlation LM Test*
***Jarque bera (JB) Residual Normality Test*
****Residual Heteroskedasticity Test (No Cross Term)*

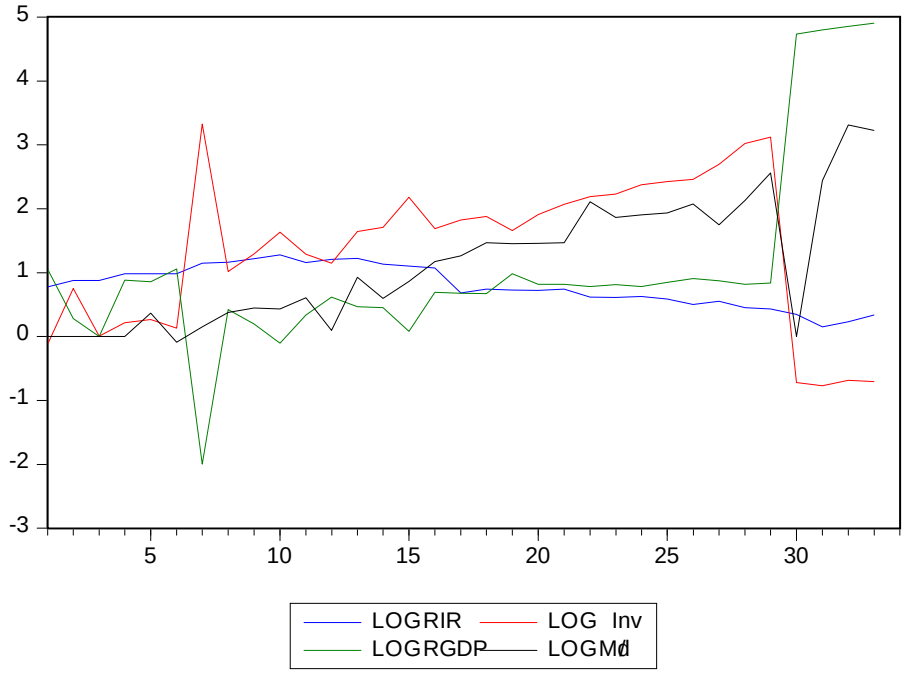

Fig. 2. Real interest rate, investment rate, real money demand and real gross domestic product dynamics in Nigeria
Source: Author's computation from E-views 8.0

A major deviation form the economic a prori expectation which is co-herent in all the model is the dynamics of Real Interest Rate in Nigeria. Real Interest rate In Nigeria was discovered to have a negligible or insignificant effect on Real Money Demand, Investment rate and Ultimately Real Gross domestic Product in Nigeria. However, using statistical criteria and econometric criteria of Standard error test and t-test it was discovered that interest rate has negligible or insignificant effect on Real Money balance, Investment Rate and Real Gross domestic Product in Nigeria at 95% level of Significance. [21] while studying financial liberalization in 8 Developing Countries using 8 Indicators (e.g. reserve requirements; interest rates; de-regulation etc) discovered a Short-run effect on the stated indicators. However, a Negligible Long-Run effects sizeable, some Positive (e.g. Turkey and Ghana); others Negative (Korea and Mexico) was discovered.

A negative relationship of interest rate with real money demand was discovered. This implies that an increase in the interest rate will reduce the amount of money held by the economic agents. Real Interest rate has a negligible or insignificant effect on Real demand for Money balance in the short-run While it has a significant effect in the long-run It further stipulated that a unit increase in interest rate will lead to 30% decrease in the real money demand in the long-run. however, there is unilateral causal relationship between Real Interest Rate and Real Money Demand which means Real Interest rate has causal effect on Real Money demand and not vice versa. |Real Money demand does respond to innovations from real income, investment rate but doesn't respond to shock to Real interest rate in the short-run but respond to innovation in the mid-term. On the converse, investment rate respond to innovation from Real Interest rate.

The result further opines that Real interest rate has a insignificant effect on Investment rate in short and but its effect is experience in the long run as a Unit rise in Real Interest rate will result to a 49% fall in Investment rate over the long run time frame. There is unilateral relationship between Real Interest Rate and investment rate.

Also, a unit increase in the investment rate will lead to 79 percent increase in the Real Growth domestic Rate in the short run while a unit increase in Financial Saving in the will jumpstart the Real Gross Domestic Product of the current period by 88% percent in the short run while 106% in the long run. Financial liberalization policy effect is felt more in the long run. Furthermore, Real Interest Rate has a negligible or insignificant effect Real Gross Domestic Product in Nigeria. The result is however in contradiction to the finding of Obamuyi and Olorunfemi [29] found out that financial reform and interest rates have significant impact on economic growth in Nigeria. Also, financial Liberalization policy was discovered to have Limited indecisive significant and positive effect on the Real Gross Domestic Product in Nigeria. The reason for this faltering effect can be linked to the negligible effect on Real Interest rate on all the selected financial indicators in Nigeria.

The negligible effect of interest rate on major financial indicators can be due to the following reasons;

Rational expectation of investors as to if the volatility in interest rate is temporary. Economic agents might be extremely reluctant to make additional investment in cash management system in small interest rate volatility particularly if that increase is expected to be temporary.

Another Reason for the negligible effect of interest rate on real money demand is the economic agents perspective of money as alternative to Long term fixed assets in financial portfolio decision making. In Nigeria, Money is not seen as a good alternative to long term Fixed assets especially real estate investment. At low real interest rate investors often shift investment to real estate which is not easily convertible/liquidate when Real Interest rate is high; hence liquidity premium is low in real estate.

Policy divergence between Central bank of Nigeria and Ministry of Finance. Whereas Central bank of Nigeria employs restrictive Monetary Policy Tools, the federal Ministry of Finance embarks on fiscal Expansion could cause the negligible effect on Interest rate on real demand for money [11].

The negligible or insignificant effect of real interest rate to Real Demand for Money Balance could be attributed to the fact that interest rate work through the financial system and with the underdeveloped nature of Nigerian financial System the effectiveness of Interest rate as a monetary Policy is challenged as most agents hardly take notice of its votality. [41] finds that savings rates both at individual and corporate

level fell after the implementation of financial liberalization. [12] found the same effect in UK after financial deregulation in the 1980s. [42] examine sixty-three countries from 1961 to 1990 and find that real interest rates are negatively correlated with investment. However, [43] finds very weak positive relation between real interest rates and investment. [44] opines that long term interest rate is significant (unstable Demand for Money) but short term rate are insignificant (Stable Demand for Money Function) major argument proposed by Mai-Lafia [40] owing to the underdeveloped nature of the financial structure of less developed countries the substitution between money and real assets may be quantitatively more important than that between money and financial assets. This was further buttress by the findings of Owoye and Onafowora (2007) who found that the income elasticity of money is 2.07 and interest elasticity for money is 0.36 for both narrow and broad money in Nigeria. This findings was supported by the empirical findings of Yamdem, P [12].

5. CONCLUSION AND RECOMMENDATION

Theoretical literature revealed that McKinnon-Shaw hypothesis have been seen to be valid in developed countries but its validity on Real Interest rate is questionable in developing country like Nigeria in the short run owing to the undeveloped and unstructured financial system, policy inconsistency and policy mortality when tested with empirical evidence. However, this following are recommendations are posited.

The financial system of Nigeria should be revamp for a more structured organized and developed financial system to further enable financial inclusion of all economic agents.

Monetary and Fiscal Policy should be harmonized to ensure a more stable policy consistency as this will portray a good signal for prospective investors in making investment decision as persistence dwindling of Financial ratios is a constraint to investment.

Impunity from external shock in form of policy should be put in place to further protect ensure the stability of basic financial indicators has this will further dampen the Rational expectation of investors as to volatility in interest rate.

Greater attention should be channel ass boosting the productive capacity of the economy by Increasing more private domestic credit and a conducive business environment to further increase the investment rate as the study revealed that the a unit increase in the investment rate in the preceding year will lead to 95 percent increase in the Real Growth domestic Rate.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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