

# Impact of Rational Expectation Hypothesis on The Growth of Nigeria Economy

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**Abstract:** *The paper examined the impact of the rational expectation hypothesis on the growth of the Nigerian Economy. The study was carried out to fulfill 3 main objectives which are: to assess the performance of the Nigerian Economy, the rational expectation hypothesis in Nigeria and determine whether Rational expectation hypothesis explains the growth of the Nigerian Economy. Detailed review of literature was carried out on conceptual, theoretical framework and empirical evidences. Econometric tools such as correlation analysis and trend analysis was used and it was found that there exists a strong positive correlation between the growth rate of the actual Nigeria's consumer price index and the 12-month moving average of the consumer price index (which was used to capture the overall economic agents' expectation). The real GDP of the economy has also been on the rise during the period under study, although certain shocks was encountered which led the economy to a recession at some point. And it was observed that ability to use information by economic agent are affected by their literacy level, literacy level which is very low in Nigeria. The paper thus recommended that the government should invest more into education of her citizens, encourage research and promote data collection institutes and also let the individual agents in the economy play more active role in policy formulations.*

**Keywords:** Economic growth, Nigeria, GDP

## 1.0 INTRODUCTION

### BACKGROUND TO THE STUDY

If right at this moment you pick up a textbook in economics, all you need to do if you are wondering whether you have grabbed a good one or not is to just skim through the content, and, if you are reading a bad text, it will most likely not contain the cliché that: market prices provide signals which facilitate the allocation of resources in order to ensure that they [resources allocated] are optimized, that is, put to best use. The world that we live in gives room for random shocks, shocks that may be external or internal to the market, however, let's take into consideration an hypothetical world, an ideal one, where such shocks are absent, then if an hypothetical consumer or producer is faced with a number of competitive prices, he will need not to look no further than his own preferences or production technology to be able to make a decision. But coming back to the actual world that we live in, that is, the one where shocks exist, the case is entirely different, as economic agents [consumers, producers and governments] are faced with the problem of forecasting future states of nature and more importantly, the problem of forecasting the impact of these states of nature on the actions of other agents. Towards making these forecasts, given its complexity, economic agents need a model, and economists has made available the Rational expectations theories on which such models can stand.

The forecasts or views of agents about the future trend of relevant variables based on information or perceptions in Economics is referred to as "Expectation". In macroeconomic contexts, the significance of expectations was earliest emphasized by J.M Keynes in 1936, Keynes who stressed the central role of expectations in the determination of the behavior exuded by economic agents. However, Keynes have not an explicit model of how economic agents form the expectations, he however suggests that they often depend on the their "animal spirits".

Theory of Rational Expectations (RE) was put forward by Muth in 1961, the theory was based on the assumption that the rational economic agents, make an optimal use of every single available information when making a choice. In this theory, Muth is of the following opinion: i) the expectations formulated by rationally informed agents have to be derived from the economic theory; ii) the economic agents make an optimal use of the scarce and costly information; iii) the expectations' model is endogenous with respect to the economic system. The subjective forecast of any agent is the 'mean' of the expected value of the variable conditioned to the available information set.

### 1.1 STATEMENT OF PROBLEM

Rational expectation hypothesis has been through several rebirths since its birth in the 1930s, and the study of the body of literature reveal that most research work were carried out on rational expectation in relation to the macro economic environment of different economies by several academics from different economic journals, some of which will be reviewed in the next chapter. However,

little attention has been paid to effect of rational expectation hypothesis on the growth of Nigeria economy. So, this study has been embarked on so as to solve problems that includes; finding out the validity of the hypothesis within the Nigerian economy, knowing if the hypothesis has experienced any development overtime, and make findings, if at all the rational expectation hypothesis has in anyway contributed to the growth of the Nigerian economy be it directly or indirectly.

## 1.2 RESEARCH QUESTIONS

The questions to be answered by this study is therefore as follows:

- i) How has the Nigeria economy been performing, is it performing up to expectation?
- ii) Several economists have been pushing forward the rational expectation hypothesis, especially in the developing nations, and they have been getting empirical evidences, so what is the status of the hypothesis in Nigeria? Is it as valid as it is in those economies?
- iii) Lastly, does a significant relationship exists between the rational expectation hypothesis and the growth of the Nigerian Economy? If yes, to what extent?

## 1.3 OBJECTIVES OF THE STUDY

The aim and objective of this study is to;

- i) Assess the performance of the Nigerian Economy
- ii) Assess the rational expectation hypothesis in Nigeria
- iii) Determine whether Rational expectation hypothesis explains the growth of the Nigerian Economy.

## 1.4 SIGNIFICANCE OF THE STUDY

A significant number of works has been carried out on rational expectation hypothesis, however, little or even no attention has been paid to rational expectation in relation to the growth of the Nigerian economy. This term paper will make findings, findings backed up by data from year 2009 through to 2018, on not only rational expectation hypothesis in Nigeria, but also its impact on the growth of the whole of the Nigerian economy.

## 1.5 SCOPE OF THE STUDY

This study shall do enough review of the literature body, where secondary data from the period of 2009-2018 will be obtained, analyzed and interpreted, these will then form the basis on which sound conclusions shall be drawn and recommendations will be made. Secondary data (monthly data) will be sourced from the Central Bank of Nigeria's Statistical Bulletin (CBN).

## 2.0 LITERATURE REVIEW

This section serves to educate and familiarize the reader on the existing body of the literature. We will take a look at the concept of rational expectation hypothesis, what it is really about and also a quick look at the Nigerian economy in the light of its history, performance and academic opinions. Finally, in the last section, we will look at the empirical literature which shall contain the past empirical evidences that has been collected on the studies that are related to rational expectation hypothesis.

## 2.1 RATIONAL EXPECTATION HYPOTHESIS

In all ramifications except one, the methodological assumptions of the New Keynesian School and of the Real Business Cycle theorists are different. The exception is that both schools share the assumption of rational expectations, which has been broadly accepted and gradually become one of the key elements of modern macroeconomic theory. Nevertheless, there are still some arguments against the hypothesis.

To describe simply how rational expectations are formed, Muth advances the hypothesis that they are essentially the same as the predictions of the relevant economic theory, that is, the hypothesis suggests that the economy does not generally waste information and that expectations depend specifically upon the structure of the entire system. He emphasized the relevance of the kind of information that is used and the process through which such information has been put together to frame an estimation of future conditions, because the character of the dynamic process is typically very delicate to the way expectations are influenced by the actual cause of events. He also claimed that it was very important to make predictions about the way expectations would change when either the amount of available information changes and/or the structure of the system changes. He claimed that dynamic models do not make adequate allowance for rationality; i.e. that the subjective probability distribution of outcomes tends to be distributed for the same information set about the prediction of theory of the objective probability distribution of outcomes.

Rational expectations hypothesis stands on the following assertions:

- that information is scarce and that the economic system does not generally waste it,
- the way expectations are formed depends specifically on the structure of the relevant system describing the economy,
- a public prediction will have no substantial effect on the operation of the system unless it is based on inside information.

The first assertion by implication is that; all the available and relevant information must be examined and analyzed, indeed many theorists have criticized rational expectations in that it seems to suggest that the marginal cost of gathering and using information is equated to the marginal benefit and that information is implicitly assumed a free good, if all the available information is to be used by everyone. Since expectations are informed predictions of future events they are essentially the same as the predictions of the relevant economic theory. So the suggestion is that people are able to gather and analyze and form accurate predictions of outcomes from the available information. But according to Muth, what rational expectations does suggest is that the expected value of formal expectations equals the true value. Individuals will use the information that they have analyzed which in most cases will represent only part of the information available and trade accordingly. If enough arbitrage takes place the equilibrium market price will behave as if it is rational even though many individuals in the market will remain passive. Quoting Rawls; ‘the rationality of a person’s choice depends not upon how much he knows but upon how well he reasons from whatever information he has, however incomplete’.

The use of expectations in economic theory is not new. Many earlier economists, including A. C. Pigou, John Maynard Keynes, and John R. Hicks, assigned a central role in the determination of the business cycle to people’s expectations about the future. Keynes referred to this as “waves of optimism and pessimism” that helped determine the level of economic activity. But proponents of the rational expectations theory are more thorough in their analysis of expectations.

The influences between expectations and outcomes flow both ways. In forming their expectations, people try to forecast what will actually occur. They have strong incentives to use forecasting rules that work well because higher “profits” accrue to someone who acts on the basis of better forecasts, whether that someone is a trader in the stock market or someone considering the purchase of a new car. And when people have to forecast a particular price over and over again, they tend to adjust their forecasting rules to eliminate avoidable errors. Thus, there is continual feedback from past outcomes to current expectations. Meaning that, in recurrent situations the way the future unfolds from the past tends to be stable, and people adjust their forecasts to conform to this stable pattern.

The concept of rational expectations asserts that outcomes do not differ systematically from what people expected them to be. The concept is motivated by the same thinking that led Abraham Lincoln to assert, “You can fool some of the people all of the time, and all of the people some of the time, but you cannot fool all of the people all of the time.” From the viewpoint of the rational expectations doctrine, Lincoln’s statement gets things right. It does not deny that people often make forecasting errors, but it does suggest that errors will not persistently occur on one side or the other.

Economists who believe in rational expectations base their belief on the standard economic assumption that people behave in ways that maximize their utility (their enjoyment of life) or profits. Economists have used the concept of rational expectations to understand a variety of situations in which speculation about the future is a crucial factor in determining current action. Rational expectations is a building block for the “random walk” or “efficient markets” theory of securities prices, the theory of the dynamics of hyperinflation, the “permanent income” and “life-cycle” theories of consumption, and the design of economic stabilization policies.

### **The Efficient Markets Theory of Stock Prices**

One of the earliest and most striking applications of the concept of rational expectations is the efficient markets theory of asset prices. A sequence of observations on a variable (such as daily stock prices) is said to follow a random walk if the current value gives the best possible prediction of future values. The efficient markets theory of stock prices uses the concept of rational expectations to reach the conclusion that, when properly adjusted for discounting and dividends, stock price changes follow a random walk. The chain of reasoning goes as follows. In their efforts to forecast prices, investors comb all sources of information (see Information and Prices), including patterns that they can spot in past price movements.

Investors buy stocks they expect to have a higher-than-average return and sell those they expect to have lower returns. When they do so, they bid up the prices of stocks expected to have higher-than-average returns and drive down the prices of those expected to have lower-than-average returns. The prices of the stocks adjust until the expected returns, adjusted for risk, are equal for all stocks. Equalization of expected returns means that investors’ forecasts become built into or reflected in the prices of stocks. More precisely, it means that stock prices change so that after an adjustment to reflect dividends, the time value of money, and

differential risk, they equal the market's best forecast of the future price. Therefore, the only factors that can change stock prices are random factors that could not be known in advance. Thus, changes in stock prices follow a random walk.

The random walk theory has been subjected to literally hundreds of empirical tests. The tests tend to support the theory quite strongly. While some studies have found situations that contradict the theory, the theory does explain, at least to a very good first approximation, how asset prices evolve (see efficient capital markets).

### **The Permanent Income Theory of Consumption**

The Keynesian consumption function (see Keynesian Economics and New Keynesian Economics) holds that there is a positive relationship between people's consumption and their income. Early empirical work in the 1940s and 1950s encountered some discrepancies in the theory, which Milton Friedman successfully explained with his celebrated "permanent income theory" of consumption. Friedman built on Irving Fisher's insight that a person's consumption ought not depend on current income alone, but also on prospects of income in the future. Friedman posited that people consume out of their "permanent income," which can be defined as the level of consumption that can be sustained while leaving wealth intact. In defining "wealth," Friedman included a measure of "human wealth"—namely, the present value of people's expectations of future labor income.

Although Friedman did not formally apply the concept of rational expectations in his work, it is implicit in much of his discussion. Because of its heavy emphasis on the role of expectations about future income, his hypothesis was a prime candidate for the application of rational expectations. In work subsequent to Friedman's, John F. Muth and Stanford's Robert E. Hall imposed rational expectations on versions of Friedman's model, with interesting results. In Hall's version, imposing rational expectations produces the result that consumption is a random walk: the best prediction of future consumption is the present level of consumption. This result encapsulates the consumption-smoothing aspect of the permanent income model and reflects people's efforts to estimate their wealth and to allocate it over time. If consumption in each period is held at a level that is expected to leave wealth unchanged, it follows that wealth and consumption will each equal their values in the previous period plus an unforecastable or unforeseeable random shock—really a forecast error.

The rational expectations version of the permanent income hypothesis has changed the way economists think about short-term stabilization policies (such as temporary tax cuts) designed to stimulate the economy. Keynesian economists once believed that tax cuts boost disposable income and thus cause people to consume more. But according to the permanent income model, temporary tax cuts have much less of an effect on consumption than Keynesians had thought. The reason is that people are basing their consumption decision on their wealth, not their current disposable income. Because temporary tax cuts are bound to be reversed, they have little or no effect on wealth, and therefore have little or no effect on consumption. Thus, the permanent income model had the effect of diminishing the expenditure "multiplier" that economists ascribed to temporary tax cuts.

The rational expectations version of the permanent income model has been extensively tested, with results that are quite encouraging. The evidence indicates that the model works well but imperfectly. Economists next extended the model to take into account factors such as "habit persistence" in consumption and the differing durabilities of various consumption goods. Expanding the theory to incorporate these features alters the pure "random walk" prediction of the theory and so helps remedy some of the empirical shortcomings of the model, but it leaves the basic permanent income insight intact.

### **Expectational Error Models of the Business Cycle**

A long tradition in business cycle theory has held that errors in people's forecasts are a major cause of business fluctuations. This view is embodied in the Phillips curve (the observed inverse correlation between unemployment and inflation), with economists attributing the correlation to errors people make in their forecasts of the price level. Before the advent of rational expectations, economists often proposed to "exploit" or "manipulate" the public's forecasting errors in ways designed to generate better performance of the economy over the business cycle. Thus, Robert Hall aptly described the state of economic thinking in 1973 when he wrote:

*"The benefits of inflation derive from the use of expansionary policy to trick economic agents into behaving in socially preferable ways even though their behavior is not in their own interest.... The gap between actual and expected inflation measures the extent of the trickery.... The optimal policy is not nearly as expansionary [inflationary] when expectations adjust rapidly, and most of the effect of an inflationary policy is dissipated in costly anticipated inflation."*

Rational expectation undermines the idea that policymakers can manipulate the economy by systematically making the public have false expectations. Robert Lucas showed that if expectations are rational, it simply is not possible for the government to manipulate those forecast errors in a predictable and reliable way for the very reason that the errors made by a rational forecaster are inherently unpredictable. Lucas's work led to what has sometimes been called the "policy ineffectiveness proposition." If people have rational

expectations, policies that try to manipulate the economy by inducing people into having false expectations may introduce more “noise” into the economy but cannot, on average, improve the economy’s performance.

### **Design of Macroeconomic Policies**

The “policy ineffectiveness” result pertains only to those economic policies that have their effects solely by inducing forecast errors. Many government policies work by affecting “margins” or incentives, and the concept of rational expectations delivers no policy ineffectiveness result for such policies. In fact, the idea of rational expectations has been used extensively in such contexts to study the design of monetary, fiscal, and regulatory policies to promote good economic performance.

The idea of rational expectations has also been a workhorse in developing prescriptions for optimally choosing monetary policy. Truman Bewley and William A. Brock have been important contributors to this literature. Bewley’s and Brock’s work describes precisely the contexts in which an optimal monetary arrangement involves having the government pay interest on reserves at the market rate. Their work supports, clarifies, and extends proposals to monetary reform made by Milton Friedman in 1960 and 1968.

Rational expectations have been a working assumption in recent studies that try to explain how monetary and fiscal authorities can retain (or lose) “good reputations” for their conduct of policy. This literature has helped economists understand the multiplicity of government policy strategies followed, for example, in high-inflation and low-inflation countries. In particular, work on “reputational equilibria” in macroeconomics by Robert Barro and by David Gordon and Nancy Stokey showed that the preferences of citizens and policymakers and the available production technologies and trading opportunities are not by themselves sufficient to determine whether a government will follow a low-inflation or a high-inflation policy mix. Instead, reputation remains an independent factor even after rational expectations have been assumed.

## **2.2 THE NIGERIAN ECONOMY**

Prior to the Nigeria’s independence, the British ruled the country for almost 100 years, exploiting her natural resources. Owing to the interest of the colonialists, agriculture and trade were used as the drivers of the colonial economy. They put in place several measures to stimulate the production of industrial raw materials such as palm oil and kernels, cocoa, cotton, groundnut and rubber. This leads to the dominant role of commodities export in the economy. “The rise in export demand triggered the production of other major agricultural products such as cocoa, groundnut, cotton, and rubber”, Onimode (1983). During this colonial era, the main source of the foreign exchange earnings was the trade in the major agricultural commodities. The promotion of major agricultural goods for export led to the problem of food insecurity as the production of food crops was handled by small scale farmers. Also, exploitation of mineral resources like coal, tin, columbite, petroleum and gold. The British colonialists managed the gold mining activities while other minerals were left to the private foreign companies. Their economic interest prevented the promotion of industrial activities especially manufacturing with the aim of protecting the market for the products from their home country. Since the independence of Nigeria in 1960, the average growth rate of its per capita GDP has been 1.7 percent per year. The stability of the country’s economic growth is an indication that the country is very close to its long-run steady state balanced growth path. This evidently shows in the absence of trends in its capital-output ratio and its real interest rates. The average real GDP per capita was about US\$ 1222 between 1950 and 1959. The amount rose to US\$1477 under the regime of the country’s first president. The GDP per capita reached a peak of about US\$1804 on average between 1976 and 1979 during the military period of Olusegun Obasanjo. After the Obasanjo’s military regime, the declining trend of average real GDP per capita was observed. Prior to the adoption of 1986 Structural Adjustment Program (SAP) in the country, the average per capita was almost US\$ 1544 between 1960 and 1985. However, a decline in real GDP per capita was experienced after the SAP era. The real GDP per capita on average stood at US\$1446 when the country was under the military regime. Since the adoption of a democratic system in the country, there was an improvement in the real GDP per capita. This might reflect the positive effect of democracy on the economic growth identified in the literature. Also, the highest annual growth rate of Nigeria’s GDP per capita was observed between 1999 and 2007. The least growth rate in the country was attributed to the period before the democratic system of government.

In the same vein, the rate of GDP per capita growth in the post-SAP era was higher compared to the pre-SAP era. Under the Gowon administration, the country witnessed the highest growth rate of economic growth but its real GDP per capita had the highest during the military administration of Olusegun Obasanjo. The drastic fall in the growth rate of per capita GDP was noticeable when Shehu Shagari controlled the affairs of the country. However, the country’s average annual GDP per capita since its independence was US\$1627.59 compared to US\$1222.48 between 1950 and 1959. This indicates that Nigeria was able to contribute about US\$405(33% increase) to its pre-independence per capita income for more than 55 years of its independence. The dynamics of political system and regimes in the country contribute to the level of economic performance.

## **2.3 EMPIRICAL LITERATURE**



Godwin Nwaobi from Veritas University Abuja in his work in 2020, noted that, when using empirical data to test the validity of the rational expectation hypothesis, two difficulties will be faced:

1. Much of the evidence for rational expectations is sought in macroeconomic models which incorporate other assumptions particularly price clearing postulates. Negative findings concerning such models do not therefore invalidate rational expectations *per se*.
2. There is the problem of observational Equivalence by which we mean that for any rational expectations model which fits the data there will always be non-rational expectations model which fits the data equally well.

It is in recognition of these difficulties, that various approaches have been adopted in carrying out empirical test of this theory (Shaw, 1987).

Lucas (1973) attempted to test the rational expectations model of the natural rate of unemployment by examining the relation between unemployment and the variance of the price changes across countries. He used data from eighteen countries and the regression equation was estimated for each of them using annual data over the period 1952 to 1967. In general, the predictions of the theory are confirmed by Luca's results. A number of other authors Albero (1981) and Kormendi and Meguire (1984) have employed something like the Lucas approach using data from more countries and have generally found much the same result as that reported in Lucas.

Baro (1977) has also tested the rational expectations hypothesis. Barro's studies attempt to show that it is only the unanticipated component of monetary growth that affects employment, real output and the price level. He used annual data for the USA covering the period from 1941 to 1973. In accordance with certain theoretical considerations and after some empirical experimentation, Barro obtained a measure of anticipated monetary growth. He then computes the unanticipated component of monetary growth in each period as the difference between actual monetary growth in the period and the anticipated component of monetary growth in that period. His statistical tests all seemed to support one of the main predictions made by the simple rational expectations model: that it is unpredictable monetary growth that is important in the determination of the level of unemployment and that predictable monetary growth is irrelevant.

In subsequent papers Barro (1978), Barro and Rush (1980) extended his analysis in two directions. First, he examined the influence of predictable and unpredictable monetary growth on real output rather than unemployment: he found evidence too that only the unpredictable component of monetary growth affected real output, a positive monetary surprise leading to a rise in output above its natural level. Secondly he introduced a third equation, a price equation - and found that as the rational expectations theory predicts an anticipated rise in monetary growth, of say X percent leads to an immediate X percent rise in the price level, whereas a similar unpredictable rise in monetary growth leads initially to a less than X percent rise in the price level.

One criticism of Barro's approach is that he employs a two-step estimation procedure and this is not fully efficient in that it does not use all the information contained in the model, in particular it fails to take account of its cross equation restrictions. This led to Attfield, Demery and Duck (1981a) model application to U.K. annual data for the period 1946-1977. They argued that their method of dealing with the relationship between fiscal and monetary policy is simpler than that used by Barro (1977). The use of real value of borrowing requirement avoids the problem of estimating the normal level of government expenditure which, they argued, Barro handles inconsistently since he assumes an adaptive expectations mechanism for this relationship whilst assuming that agents form their expectations rationally elsewhere in the system. They employed full information maximum likelihood method as their estimation technique.

Furthermore, Attfield, Demery and Duck (1981b) estimated a three equation quarterly model of unanticipated monetary growth, output and the price level for the United Kingdom for the period 1963 to 1978. Apart from the use of quarterly data the main difference in this study is that the current monetary shock is included in the output equation rather than being relegated to the error term. They reach broadly the same conclusion as in the paper using annual data: that is only unanticipated monetary growth which affects real output and that the cross equation restrictions imposed by the model cannot be rejected. Thus, their results lend support to the findings of Barro.

Again, Leiderman (1980) pointed out that Barro's model embodied two important but separate hypothesis - rational expectations and structural neutrality - and that it was possible to test for rational expectations separately, and then, given rational expectations test for structural neutrality. The structural neutrality hypothesis in the Barro model is simply the assumption that any growth in the quantity of money which is anticipated, whether those anticipations are formed rationally or not, will not affect the level of real output or unemployment. Leiderman carries out his test using similar data to that used by Barro (1977) on Barro's money growth and unemployment model. He used a full information maximum likelihood technique and concludes that the restrictions implied

buy the constituent hypothesis of rational expectations and 'structural neutrality', as well as by the joint neutrality hypothesis, are not rejected by the sample information at the usual significance levels of five and one percent.

In a different empirical study, Attfield and Duck (1983) combined locals and Barro approaches. To test the two predictions, they test the restrictions implied in their model. They used annual data for the period 1951 to 1978 from eleven different countries namely the USA, Netherlands, Canada, Denmark, Australia, the UK, Philippines, Columbia, El Salvador, Guatemala and Argentina. The particular countries were selected because an adequate explanation of monetary growth was possible on the basis of a simple and common process. They estimated their model using maximum likelihood techniques and find that unanticipated monetary growth does generally have a positive effect on real output. They also find that the null hypothesis that the anticipated component of monetary growth exerts no influence on real output cannot be rejected for any country at the 1% level. However, their overall conclusion is that there is some support for the propositions that monetary growth affects real output of unpredictable monetary growth declines the more unpredictable monetary growth becomes. In a different paper, Kormedi and Meguire (1984) reach broadly the same conclusion using a similar model but with a much larger sample of forty-seven countries.

Now, the Lucas (1973) model has two limitations: non-testing for structural neutrality and the failure to allow for other influences on changes in aggregate demand. An improvement in the weaknesses is an extension to Lucas test and this was the main feature of an empirical paper by Gordon (1982). He examined the behavior of nominal income growth net of the natural growth of output over the period 1890 to 1980 in the USA. Gordon claims that lagged inflation terms of up to 5 years exerted a significant negative effect on output and that the coefficient on anticipated nominal income growth was significantly positive in all periods. These findings directly contradict the evidence put forward by Barro (1977) and Attfield, Demery and Duck (1981); for in these studies anticipated money growth was found to have no real output effect in either the United States or United Kingdom. Gordon suggested a reconciliation of these contradictory findings. Since anticipated aggregate demand (measured by anticipated nominal income growth) does influence output but anticipated money does not, it follows that anticipated money growth does not influence aggregate demand. Also, Gordon provide a more powerful test and rejected the main feature of the Lucas (1973) model - that only unanticipated changes in aggregate demand affect output. Similar results were obtained for the UK by Demery (1984).

The main feature of Mishkin's (1982) tests that distinguishes it from others is the length of the Lag on anticipated and unanticipated money growth., in his test, lagged terms in anticipated and unanticipated money growth up to twenty quarters were included in the output equation. Following Leiderman (1980), Mishkin estimated aggregate demand and output equations simultaneously, imposing the relevant cross-equation restrictions. This permitted him to test separately for rational expectations and structural neutrality. He adopted three alternative aggregate demand variables, inflation, nominal income growth and money growth. According to structural neutrality, only unanticipated values of each of these should influence output. His equations were estimated using quarterly US data over the period 1954-1976. when adopting money growth as the aggregate demand variable, his results constitute an emphatic reversal of the Barro result.

Another critique of the Barro model illustrates an important methodological point. Pesaran (1982) argued that the tests conducted by Barro (and others) are inadequate in one important respect. It is quite possible for Barro's model to be quite 'comfortable' to the data and yet be rejected when compared with an alternative model which is also conformable to the data. A "proper test" of an hypothesis, argues Pesaran, invariably requires consideration of at least one genuine alternative. He attempted to do this by comparing the Barro model with a 'Keynesian' alternative. He first modified the Barro model and then set up alternative Keynesian models. He used non-nested hypothesis testing procedures and was able to reject the Barro model on the assumption that the Keynesian model is true; however, he was not able to reject the Keynesian model under the assumption that the Barro model was true. By performing what he calls a 'proper' test, Pesaran was able to reject the Barro model in favor of a Keynesian alternative.

In a novel critique, Laidler (1986) also takes issue with the Barro approach on methodological grounds. Barro examined the period 1945-76 in determining the division between anticipated and unanticipated monetary growth but assumed that economic agents respond to anticipated changes with a new classical macro-economic model in mind. However, the dominant orthodoxy throughout most of this period was decidedly Keynesian. Since, in the new classical macroeconomics, agent's knowledge or understanding of the way in which the economic system operates, is itself a determinant of the system then it becomes imperative to model expectations formation accordingly. In particular, Laidler suggested that much econometric modeling may have been fully appropriate at the time.

Casual empiricism with respect to trade cycle behavior also runs counter to the rational expectations hypothesis. For example, output changes occur in response to general price changes being perceived as relative price changes. Thus, output and employment fluctuations should be observed to lag behind price level fluctuations but the evidence indicates, on the contrary, that output changes precede price-level changes (Shaw, 1981). Earlier, Fischer (1977) showed that due to the long-term contracting, the neutrality proposition breaks down, which compelled a notable advocate of rational expectations to write that "the potential

usefulness of activist policy rules in dampening fluctuations may survive the rational expectation revolution". Thus, Neary and Stiglitz (1983) argued that once the assumption of price flexibility is dropped the conventional Keynesian policy prescription re-emerges and in some cases its potency is reinforced because of the assumption of rationality.

In conclusion, Perry (1984) noted that rational expectations hypothesis amounts to a kind of "studied neglect" entailing clear costs and risks. He argues that it is bad science to build models that are inconsistent with the facts because they fit a particular theory. However, all the above reviewed empirical studies tend to suggest the inconclusiveness of the theory.

We conclude that expectations might be rather backward-looking and adaptive since forward-looking expectations require more extensive set of knowledge and rational man demands only limited amount of pieces of information. Then, expectations are based on mostly recent development which is the same for all men in the population; they all use the same knowledge and, thus, their expectations may be on average biased in one direction. Since men learn from their previous mistakes, accuracy of their expectations might gradually increase in time. Nonetheless, expectations accurate enough are a general tendency, not a current state when expectations might be rather backward-looking. Furthermore, accuracy of aggregate expectations might even decrease in time due to population turnover since experienced men with accurate expectations die and young men does not have enough experience yet to form expectations accurate enough. Instead of assuming rational expectations, using mixed expectations is suggested as reasonable approach to man's expectations. The idea is such that some fraction of the population forms rational expectations and expectations of the remaining fraction are adaptive. Accuracy of aggregate expectations is, hence, somewhere between these two extreme cases.

#### 4.0 RESEARCH METHODOLOGY

##### DEFINITIONS OF VARIABLE

In this work, the impact of rational expectation on the growth of the Nigerian economy is being studied, which implies that our variables are as classified below:

- **Dependent variable:** This is otherwise known as the explained variable, that is, a variable whose behavior is being determined within a model, and the variable is the growth of the Nigeria economy. In capturing this variable, this study used the real GDP, Consumer Price Index as the proxy variable.
- **Independent variable:** this is the explanatory variable, rational expectation, and it is the sole independent variable in our study, it is the variable that tries to explain the growth of the Nigerian economy. Given its "qualitative" nature, lagging indicators used in the stock/currency market was adopted, 12-months Moving average in particular is used as the summary of the peoples' expectation the economy's future inflationary performance.

In achieving the objectives of this study, the methods adopted are discussed below:

##### **Objective 1:** Assess the performance of the Nigerian Economy

In assessing the Nigerian economy, as rightly captured by the nation's real GDP, the real GDP is analyzed between the period under consideration (2009-2018), using annual data.

##### **Objective 2:** Assess the rational expectation hypothesis in Nigeria

In assessing the rational hypothesis in Nigeria, the analyzes will be done using the Muth's assertions as the framework. This will give insight on how much importance we can place on the hypothesis in the economy, and consequently how much we can use people's expectation to predict the future performance.

##### **Objective 3:** Determine whether Rational expectation hypothesis explains the growth of the Nigerian economy.

Achieving this objective is based on the principles of the Kaminsky-Reinhart (KLR) Signals Approach, which was applied to test leading indicators of currency crisis. This approach was modified and adopted by Bascos-Deveza (2011) in his study "Quantifying Qualitative Data from Expectations Survey How Well Do Expectations Survey Forecast Inflation" in the Philippines. Also, Adamu in 2011 in his work, "Do survey-based expectations mimic inflation in Nigeria?" adopted the Bascos-Deveza (2011) modified KLR signals approach to evaluate the ability of the BES inflation index to provide advance warning signal on an impending increase in inflation rate. The approach will also be adopted in this study because it has been shown by these earlier works that indicators such as moving averages has to some extent served as a summary of consumers and producers expectations of future economic performance. The degree of correlation shown by the indicators (Moving Average) with the actual economic variable will determine how in line the rational expectation hypothesis is with the actual economic variables of the Nigerian economy.



**4.0 ANALYSIS OF FINDINGS**

Table 4.1 below, showing the line graph of the Nigeria real GDP reveal that it has been on a steady rise between 2009 till 2018. However, between 2014 and 2016, the graph seems flattened, this represents a slowdown in growth, and this can be attributed to the effect of the oil price shock, that drove the economy into a recession. This shock was external and it was not expected, although on the over all, the graph reveal that the economy performed well within the period under study.

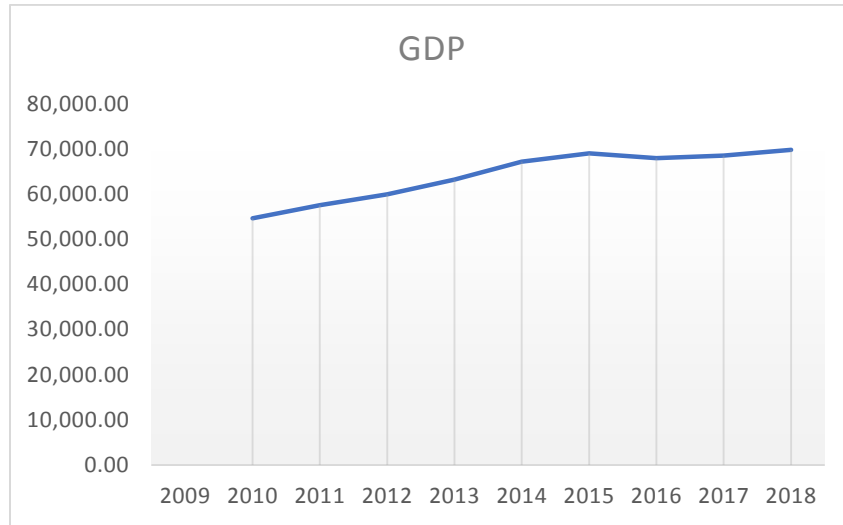


Figure 4.1

Muth, in his assertions first posit that information is scarce and that the economic system does not generally waste it, Information indeed is scarce, and in order to get it, one need to pay handsomely for it, getting information has also gotten easier, especially given the continuous development of ICTs in Nigeria, but getting information according to Muth is just as important (if not less) as analyzing it, and the data on literacy level in Nigeria does not really speak well of the extent to which the available information can be analyzed, as it was about 52% in 2009 and 62% in 2018, compared to the US and other more developed countries which has remained at 99% for decades.

Figure 4.1 Below is the graph showing the relationship that exists between the monthly data of Nigeria’s consumer price index (INF), Year on year percentage change in CPI (YOC) and the lagging indicator, 12-months Moving Average of the CPI (INF 12-MA).

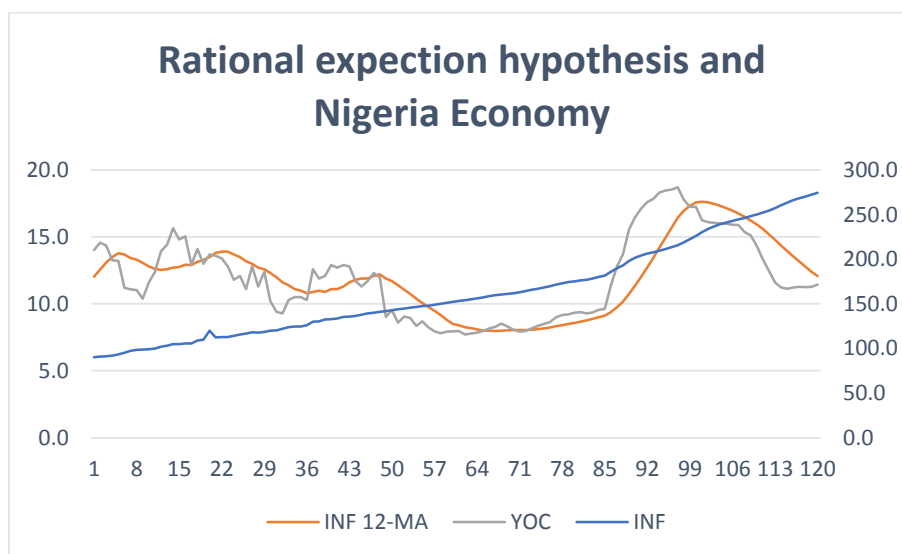


Figure 4.2

Chartists in stock/currency market believes that, whenever actual market price of a stock crossover a moving average indicator, the market participants, both buyers and sellers will make decisions such that the market price will keep going in that direction, until the momentum dries up, or the price crossover the moving average again. Looking at the *figure 4.1* above, the graph supports this, as at every point where the actual year on year % change (YOC) crosses over the 12 months moving average, the YOC keeps moving in that direction. The graph above was made up of 120 data points (120 months between 2009 and 2018). And the YOC crosses over the INF 12-MA in about 12 times, both YOC only failed to keep going in the particular direction only 3 times out of like 11 crossovers. For instance, at the early months of 2009, the YOC (around 14.5%) was well above the 12-MA (around 12.5), but in April-May period, the YOC fell and equals the 12-MA and went below it, that is, crossed over, and then the year on year % change in consumer index kept falling until it fell to about 10%. In fact, the YOC stayed below 12-MA until it crosses over again at the end of 2009 and continue to rise and got to as high as 15.8% in early 2010. This cycle goes on. In the overall, the YOC kept rising above the 12-MA, which is the reason why the Consumer Price Index (INF) remains on an upward trend.

Table 4.1 below shows the result of the correlation analysis, between the 3 variables: INF, YOC and 12-MA

Correlation Matrix

	YOC	12_MA	INF
YOC	1.000000		
12_MA	0.798355	1.000000	
INF	0.270050	0.329118	1.000000

Table 4.1

The Table 4.1 above reveal a very strong positive correlation (+0.798355) between the year on year change in the consumer price index and the 12-months Moving Average. Also, there is +0.329118 correlation between Consumer Price Index and the 12-months Moving Average. What this imply is that, to a reasonable extent, and with adequate information on the past experience and indices of the economy, especially on a key macroeconomic data such as inflation, and with ability and willingness to analyze these information, one can through indicators, such as Moving Averages, rationally expects what the rate of change in inflation will be in the coming year, just as any economic model will depict, at least to a reasonable extent.

## 5.0 UMMARY, CONCLUSION AND RECOMMENDATIONS

### SUMMARY

The focus of this term paper throughout has been on the impact of the rational expectation hypothesis on the growth of the Nigeria Economy, and the objective has been to assess the performance of the Nigerian Economy, the rational expectation hypothesis in Nigeria and determine whether Rational expectation hypothesis explains the growth of the Nigerian Economy.

The section one looked into the background study of the rational expectation hypothesis, within the section the problem was stated and research questions were asked. In-depth literature review was carried out, both conceptual and empirical. This provided the insight needed into the existing body of literature. Research methodology was discussed in chapter 3, and the study, based on the 10 years of rich data, Trend and correlation analysis was carried out. Section four featured the analysis of findings, where we found that the real GDP of Nigeria within the timeframe has been growing, and a drawback, caused by recession was observed between 2015 and 2016, It was also found that there is a limit to which Rational expectation hypothesis can be questioned in Nigeria as the low literacy level proves to be a limiting factor in the information utilization. And finally it was discovered that there exists a strong positive correlation between the rate of change in annual consumer price index and the 12-month moving average.

### CONCLUSION

In a nutshell, rational expectation hypothesis has gone through several phases of empirical scrutiny, especially in the developed nations, and the hypothesis is still standing. The study here also revealed that the indicators (such as Moving Averages), that summarizes market sentiment and expectation goes a long way in predicting the actual movement of economic variables. And this also proves the hypothesis to hold true, as that is just the way any economic model would have predicted. One should however appreciate the fact that all theories are based on assumptions, and these assumptions serves as the source of their respective limitations, rational expectation hypothesis is not an exception, which is why the criticisms leveled against it cannot be totally removed.

In Nigeria, the question should not, for now at least, be whether the rational expectation hypothesis has impact on the growth of the economy or not, rather it should be whether the economic agents formulate their expectations rationally or not.

## RECOMMENDATIONS

Based on the findings of this paper, it is recommended that:

- 1) Government should channel more funds into the educational sector by making available quality education. This will improve the literacy level, information utilisation and aid her citizen's analytical skills, leading to better strategic decision making that can ensure that potential opportunities are well anticipated and fully exploited, while in the same vein, the potential threats can be avoided.
- 2) Institutions that deals in data collection should be given adequate attention, so that past economic performances can be well documented. This will give the economic agents access to information needed (raw data) in analyzing and forming their expectations. Currently, in terms of data availability, Nigeria is poor, and even poorer in terms of data accuracy.
- 3) Lastly, several macroeconomic policies made by the Nigerian government are Top-bottom, and this is why several of these policies have been failing. In forming policies, individual economic agents should be carried along, hence, bottom-top policies will be better as it will factor-in sentiments of the general market participants, and therefore keeps her economy in its expected growth path.

## REFERENCES

- Akinkunmi, Ph.D. Nigeria's Economic Growth: Past, Present and Determinants, *Journal of Economics and Development Studies* June 2017, Vol. 5, No. 2, pp. 31-46
- Charles Almeida, Geraldo Souza and Tito Moreira Rational Expectation Hypothesis: An Application of the Blanchard and Khan Approach, *Economic Bulletin*
- Godwin Chukwudum Nwaobi, Rational Expectations and Monetary theory: an investigative paper (1960-1989).
- Ibrahim Adamu, Do survey-based expectations mimic inflation in Nigeria? *CBN Journal of Applied Statistics* Vol. 6 No. 1(b) (June, 2015)
- John Chukwudi Anyanwu, The Effects of Monetary and Fiscal Policies Under Rational-Expectations: The Nigerian Case, 1970-1988
- John F. Muth, Rational Expectations and the Theory of Price Movements, *Econometrica*, Vol. 29, No. 3 (Jul., 1961), pp. 315-335.
- Mark Munroe, The Rational Expectations Hypothesis, Chapter 7
- Olorunsola E. Olowofeso, Sani I. Doguwa, Business Expectations Survey in Nigeria: Its Techniques, Uses and Challenges. *American Journal of Applied Mathematics and Statistics*, 2016, Vol. 4, No. 6, 169-172
- Onye, Kenneth Ugwu, Basse, Godwin E., Daasi, Gibson L. K, Monetary Policy Instability in Nigeria: A Rational Expectation Approach, *IOSR Journal of Humanities and Social Science (JHSS)* ISSN: 2279-0837, ISBN: 2279-0845. Volume 2, Issue 3 (Sep-Oct. 2012), PP 31-37
- Sanford J. Grossman, An Introduction to the Theory of Rational Expectations Under Asymmetric Information, *Review of Economic Studies* (1981) XLVIII. 541-559
- Thomas J. Sargent and Neil Wallace, Rational Expectations and The Theory of Economic Policy, *Journal of Monetary Economics* 2 (1976) 169-183.
- Tomáš Frömmel, The Rational Expectations Hypothesis: Theoretical Critique *E-LOGOS – Electronic Journal for Philosophy* 2017, Vol. 24(2) 4–12 ISSN 1211-0442 (DOI 10.18267/j.e-logos.436), Peer-reviewed article
- Umoru David, Monetary models and exchange rate determination: The Nigerian evidence Department of Economics, Banking & Finance
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**APPENDIX**

Data for Figure 1

Year	GDP
2009	49856.099
2010	54612.264
2011	57511.041
2012	59929.893
2013	63218.721
2014	67152.785
2015	69023.929
2016	67931.235
2017	68490.980
2018	69810.022

Data for Figure 2

Months	INF	INF 12-MA	YOC
Jan-09	90.2	12.0	14.0
Feb-09	90.8	12.6	14.6
Mar-09	91.4	13.1	14.4
Apr-09	91.9	13.5	13.3
May-09	93.6	13.8	13.2
Jun-09	95.3	13.7	11.2
Jul-09	97.3	13.4	11.1
Aug-09	98.4	13.3	11.0
Sep-09	98.9	13.1	10.4
Oct-09	99.4	12.8	11.6
Nov-09	100.0	12.6	12.4
Dec-09	102.2	12.5	13.9
Jan-10	103.1	12.6	14.4
Feb-10	105.0	12.7	15.6
Mar-10	104.9	12.8	14.8
Apr-10	105.7	12.9	15.0
May-10	105.7	12.9	12.9
Jun-10	108.8	13.1	14.1
Jul-10	109.9	13.3	13.0
Aug-10	119.9	13.5	13.7
Sep-10	112.4	13.8	13.6

Oct-10	112.7	13.9	13.4
Nov-10	112.8	13.9	12.8
Dec-10	114.2	13.7	11.8
Jan-11	115.6	13.5	12.1
Feb-11	116.7	13.2	11.1
Mar-11	118.3	13.0	12.8
Apr-11	117.7	12.7	11.3
May-11	118.7	12.6	12.4
Jun-11	119.9	12.3	10.2
Jul-11	120.3	12.0	9.4
Aug-11	122.3	11.6	9.3
Sep-11	124.0	11.4	10.3
Oct-11	124.6	11.1	10.5
Nov-11	124.7	11.0	10.5
Dec-11	126.0	10.8	10.3
Jan-12	130.2	10.9	12.6
Feb-12	130.5	11.0	11.9
Mar-12	132.6	10.9	12.1
Apr-12	132.8	11.1	12.9
May-12	133.8	11.1	12.7
Jun-12	135.3	11.3	12.9
Jul-12	135.7	11.6	12.8
Aug-12	136.6	11.8	11.7
Sep-12	138.0	11.9	11.3
Oct-12	139.2	11.9	11.7
Nov-12	140.0	12.1	12.3
Dec-12	141.1	12.2	12.0
Jan-13	141.9	11.9	9.0
Feb-13	143.0	11.7	9.5
Mar-13	144.0	11.4	8.6
Apr-13	144.8	11.1	9.1
May-13	145.8	10.8	9.0
Jun-13	146.6	10.4	8.4
Jul-13	147.4	10.0	8.7
Aug-13	147.8	9.8	8.2
Sep-13	148.9	9.5	8.0
Oct-13	150.0	9.2	7.8
Nov-13	151.1	8.8	7.9
Dec-13	152.3	8.5	8.0



Jan-14	153.3	8.4	8.0
Feb-14	154.0	8.3	7.7
Mar-14	155.2	8.2	7.8
Apr-14	156.2	8.1	7.9
May-14	157.4	8.0	8.0
Jun-14	158.6	8.0	8.2
Jul-14	159.7	8.0	8.3
Aug-14	160.4	8.0	8.5
Sep-14	161.3	8.0	8.3
Oct-14	162.1	8.0	8.1
Nov-14	163.1	8.0	7.9
Dec-14	164.4	8.0	8.0
Jan-15	165.8	8.1	8.2
Feb-15	166.9	8.1	8.4
Mar-15	168.4	8.2	8.5
Apr-15	169.7	8.2	8.7
May-15	171.6	8.3	9.0
Jun-15	173.2	8.4	9.2
Jul-15	174.4	8.5	9.2
Aug-15	175.4	8.6	9.3
Sep-15	176.5	8.7	9.4
Oct-15	177.2	8.8	9.3
Nov-15	178.4	8.9	9.4
Dec-15	180.1	9.0	9.6
Jan-16	181.7	9.1	9.6
Feb-16	185.9	9.4	11.4
Mar-16	189.9	9.8	12.8
Apr-16	193.0	10.2	13.7
May-16	198.3	10.7	15.6
Jun-16	201.7	11.4	16.5
Jul-16	204.2	12.0	17.1
Aug-16	206.3	12.7	17.6
Sep-16	208.0	13.5	17.9
Oct-16	209.7	14.2	18.3
Nov-16	211.3	15.0	18.5
Dec-16	213.6	15.7	18.5
Jan-17	215.7	16.4	18.7
Feb-17	218.9	17.0	17.8
Mar-17	222.7	17.3	17.3

Apr-17	226.3	17.6	17.2
May-17	230.5	17.6	16.3
Jun-17	234.2	17.6	16.1
Jul-17	237.0	17.5	16.1
Aug-17	239.3	17.3	16.0
Sep-17	241.2	17.2	16.0
Oct-17	243.0	17.0	15.9
Nov-17	244.9	16.8	15.9
Dec-17	246.4	16.5	15.4
Jan-18	248.4	16.2	15.1
Feb-18	250.3	15.9	14.3
Mar-18	252.4	15.6	13.3
Apr-18	254.5	15.2	12.5
May-18	257.3	14.8	11.6
Jun-18	260.5	14.4	11.2
Jul-18	263.4	13.9	11.1
Aug-18	266.2	13.5	11.2
Sep-18	268.4	13.2	11.3
Oct-18	270.4	12.8	11.3
Nov-18	272.6	12.4	11.3
Dec-18	274.6	12.1	11.4