EDUCATION IN ECONOMICS SERIES

NO. 3

INTEREST RATE

CENTRAL BANK OF NIGERIA

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1. Introduction

Interest rate has gained considerable attention from economists, lenders, and borrowers alike, as it has to a large extent played a very important role in the economy. Interest rate facilitates the flow of funds from lenders to borrowers. It is the cost of borrowing, and shows what a borrower pays to the lender for the use of money. Interest rate aids the flow of credit in the economy and helps financial entities such as corporate organization, banks, mutual funds and insurance companies carry out their intermediation role. In other words, the economic activity in any economy, to a large extent, is influenced by interest rate. Interest rate affects the demand for and allocation of available loanable funds. It also affects the level of consumption, and the level and pattern of investment. High interest rate discourages borrowing and encourages thereby slowing down the economy. Low interest rate, on the other hand, encourage borrowing and economic growth in that the lower the interest rate, the higher the profit expectation (other things being equal) as businesses are expected to pay small portion of their income as interest for fund borrowed. Conversely, the higher the interest rate, the lower the profit margins.

In today's world, exchange of goods and services is done with the use of money. People usually save whatever money is left after the purchase of goods and services which could be used for investment in the economy. To facilitate this process, a price is put on the use of such money which is always referred to as interest rate. Generally, interest rate can either be thought of as the costs of borrowing money or the returns from lending money, depending on one's perspective. In either case, interest rate reflects the time value of money, or the principle that people generally would rather have money today

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than tomorrow which will also depend on the general price level or inflation. In addition, most central banks use interest rate as a policy tool to determine the supply and cost of money in an economy.

This series on interest rate is intended to explain, in simple terms, interest rate and how it influences the behaviour of economic agents. For ease of understanding, the remaining part of the paper is divided into nine parts namely: conceptual issues, types of interest rate, factors that influence interest rate, measurement of interest rate, transmission mechanism of interest rate in Nigeria, interest rate regimes in Nigeria, and the relationship between interest rate and other macroeconomic variables.

2. Conceptual Issues

2.1 Definition of Interest Rate

Interest rate is the amount charged on borrowed money, expressed as a percentage of the principal, by a lender to a borrower for the use of money. It is often expressed as a percentage of the amount borrowed (principal) for one year or any other time period – month, week , day etc. – as agreed by the lender and borrower at the time of contracting the loan. Specifically, interest rate is the percentage of the principal that is paid as a fee over a specified period of time. It can as well be described as the rental payments for the use of credit by borrowers and return for parting with liquidity by lenders over time.

2.2 Nominal versus Real Interest Rates

Interest rates can be expressed in either nominal or real terms depending on whether or not changes in the price level (inflation) are accounted for in their computations. If there is no adjustment for the changes in the price level, then the interest rate is expressed in nominal terms. A nominal interest rate is the interest rate that does not take inflation into account. It is practically the simplest type of interest rate, the type of rates quoted/stated by banks and

other financial institutions for a given bond or loan. Another good example is the coupon rate for fixed income investments, and the interest rate paid on saving accounts. Nominal interest rate does not capture the whole story, because inflation during the tenor of the loan/investment reduces the lender's or investor's purchasing power. They are not be able to buy the same amount of goods or services with the money realized at payoff or maturity of the loan or investment relative to the time they were secured.

Real interest rate, on the other hand, is the interest rate adjusted for changes in the price level. The adjustment is done by subtracting changes in the price level from the nominal interest rate in order to make it accurately reflect the true cost of borrowing. Changes in the price level can be “expected” or “actual”. When the adjustment is made using the expected change in the price level, the resulting real interest rate is called ex-ante real interest rate. This is very important for economic decision. In instances where the adjustment is done using the actual change in the price level, the real interest rate becomes ex-post real interest rate. In general, the lower the real interest rate, the greater the incentive to borrow and lower the incentive to lend and vice versa. Furthermore, real interest rate can be positive (negative) if the changes in the price level are lower (higher) than the nominal interest rate.

2.3 Importance of Interest Rate

Interest rates play vital roles in the day to day transaction within the economy. These roles are spelt out as follows:

- Interest rates dictate the consumer's borrowing behaviour
  In some countries, purchasing a home, a new car or even university education could be financed through loans. The lower the interest rate, the more of such loans since monthly payments will be small. Lower payments allow consumers to spend more on goods and services since less of their monthly income is tied to debt service. The opposite holds if interest rates are persistently high.

- Interest rates impact capital flows
  High domestic interest rate relative to other countries, to a large extent attracts foreign capital inflows into a country because of the prospects for high returns on investments. Conversely, if the domestic interest rate is low relative to other countries, the return on investment would equally be low with possible outflow of foreign capital. We have seen this recently, with foreign capital inflows to emerging market economies slowing down on account of concerns by investors of possible capital outflows arising from the normalization of monetary policy by the United States (US) which would ultimately result in higher interest rate. The rise in interest rates in the US offers a compelling alternative for investment.

- Interest rates impact government deficit.
  Governments sometimes finance their activities through the issuance of debt securities such as treasury bills and bonds. As interest rates rise, the government has to issue bonds at those higher rates. Debt service becomes a larger component of government expenditure and ultimate government deficit since they have to spend more of the budget on interest costs.

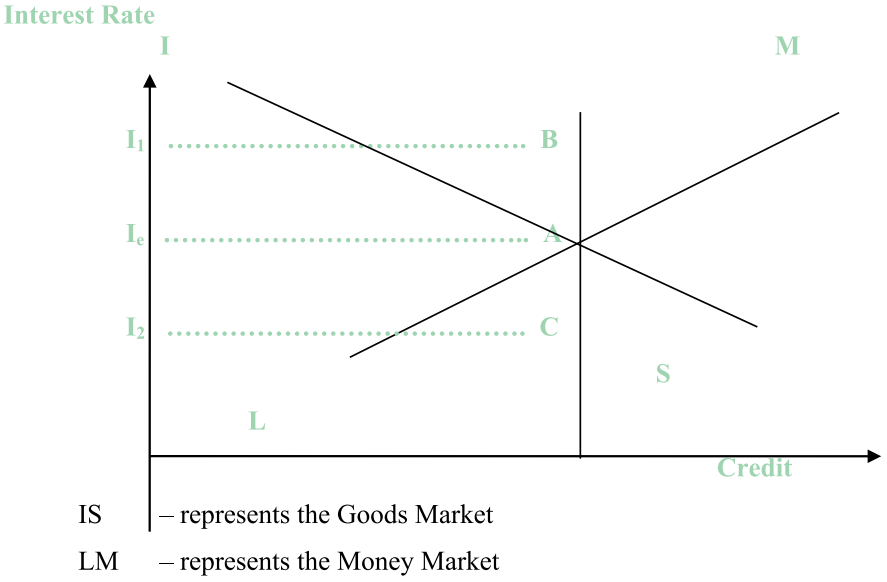
2.4 Role of Interest Rate in the Economy

The role of interest rate in the economy cannot be overemphasized. Interest rate serves as a vehicle for financial intermediation in the economy. It influences savings and investment decisions of economic agents. It also guides the flow of funds from savers to borrowers. These funds flow via financial intermediaries like DMBs, money and capital markets, insurance companies, mutual funds, government securities, etc.

The critical role interest rate plays in the economy could be highlighted in the spending and savings behaviour of consumers and businesses. Variation in interest rate would affect consumer spending and the level of savings of households, and also the production and investment decisions of firms. This

behaviour is better captured by equilibrium and disequilibrium positions of the goods and the money market sectors. The goods sector shows the combinations of income and interest rate at equilibrium whilst the money sector indicates the relationship between the quantity of money demanded and quantity supplied which describes the credit market representing the demand and supply of credit. The equilibrium level of output in the economy is consistent with the goods and credit market equilibrium; as such, any deviation from the equilibrium point in any market will cause an adjustment of the interest rate. This is diagrammatically illustrated in figure 1.

Figure 1: Interest Rate and the Macroeconomy



Note: A - represents the equilibrium level where the goods market equates the money market, B or C denotes disequilibrium level of the markets.

Point A represents the equilibrium position in the economy which indicates the combinations of credit and interest rate that will entrench stability in the economy. At this point, the demand for credit equals the supply of credit. Conversely, at point B, the supply of credit exceeds the demand for credit thereby leading to a fall in interest rate from I_1 to Ie to restore equilibrium. Also, at point C, the demand for credit exceeds the supply of credit thus causing an upward shift in the level of interest rate to the equilibrium level, from I_2 to Ie.

Because interest rate depicts a rate of return on investment, low interest rates on credit would boost investment; also, high interest rates would tend to encourage savings. If the level of interest rate is low in the economy, the cost of borrowing funds falls, consequently, increasing the level of investment and the acquisition of consumer durables.

In the same vein, low interest rates would afford banks and other lending institutions the leverage to ease their lending policies to individuals and businesses in order to stimulate investment and consumer spending which will boost overall demand in the economy, thus leading to economic growth. Whereas high interest rate makes the cost of loans on consumables and housing expensive, consequently reducing their demand, low interest rates could encourage higher demand for these products, resulting in the upward pressure on prices. Furthermore, changes in interest rates have an effect on consumer confidence. Higher interest rates impact negatively on consumer confidence whilst lower rates would have the opposite result.

2.5 Changes in Interest Rate and the Economy

Interest rates prevailing in an economy are principally influenced by the actions of the monetary authority or central banks. Central banks use their interest rates (Monetary Policy Rate (MPR) or Discount Rate) to influence the movement of other rates in the country and ultimately the level of inflation, output and employment. The way changes in the interest rate works through

the economy is illustrated in figure 1. The initial step is change in the central banks interest rate. This change affects market/commercial banks (deposit money banks, (DMBs) interest rates, asset prices, exchange rate of the national currency, and people's expectations about future developments in the economy.

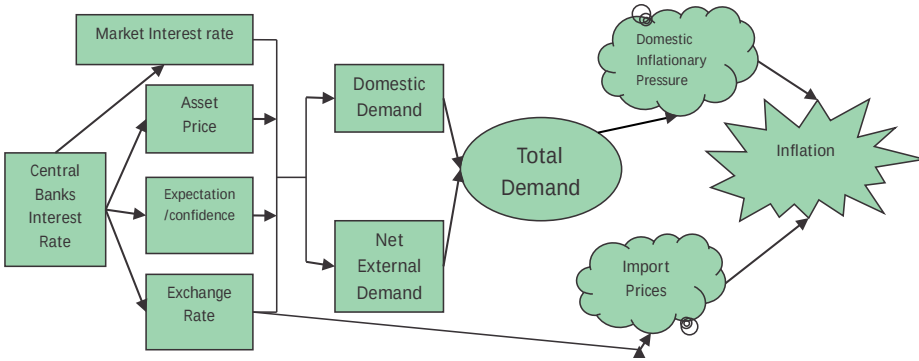
The effect of changes in central bank interest rates on market interest rates such as mortgages, consumer loan, or deposits at financial institutions includes a decline in market interest rates for instance reduces both the cost of borrowing and interest on deposits. While the reduction in the cost of borrowing tends to encourage borrowing, spending, and investing, the latter discourages saving. Overtime therefore, there would be a boost in the overall demand for goods and services. The opposite holds when market interest rates rise. Changes in central banks interest rates also affect prices of various assets such as bonds, stocks and houses. An increase in the central bank interest rates can put a damper on the prices of these assets, thereby decreasing household wealth and with possible reduction in the appetite for borrowing and spending.

Exchange rates are also affected by changes in central banks interest rates. An increase in a country's interest rate relative to other countries makes the domestic currency denominated assets more attractive to foreign (and domestic) investors. This can lead to a rise in demand for (and thus the value of) the domestic country's currency vis-à-vis other currencies. As the domestic currency strengthens, imported goods would become cheaper while the domestic country's product would become more expensive in the foreign market resulting in reduction in demand for them. Apart from the possible dampening effect on inflation, there could be a reduction in foreign exchange earnings with possible balance of payments problem if it persists.

The last channel is the effect of changes in the central banks interest rate on people's expectations of future interest rates, economic growth and inflation.

These expectations influence the decision of firms and households to save and invest which in turn affect wages, the prices of goods and services, and assets. If, for example, inflation were expected to rise in the future, long-term interest rate would typically rise in tandem with this expectation. Firms and households may therefore reconsider their savings and investment plans with possible effects on the demand for goods and services.

Figure 2: Changes in Interest Rate and the Economy



3. Types of Interest Rate

There are various types of interest rates categorised into policy, deposit, and lending rates. Policy rate is the rate used by the central banks or monetary authorities to determine the cost, availability and quantity of money in the economy so as to achieve desired macroeconomic objectives. Deposit rates are paid on savings and time deposits of different maturities such as one-month and fixed deposits in financial institutions. Lending rates, on the other hand are interests charged by money lenders, banks, etc. for meeting the short and medium-term financing needs of borrowers. This rate is usually differentiated according to credit worthiness of borrowers and objectives of financing.

3.1 Monetary Policy Rate (MPR)

Monetary policy rate is the rate at which central banks lend to deposit money banks (DMBs) in performing their duties as lender of last resort. It is usually set at a level that is consistent with the objectives of price stability of central banks. The MPR is expected to communicate the stance of monetary policy and acts as a guide for all other market interest rates. Since its adoption by the Central bank of Nigeria (CBN) in December 2006, the MPR has been used to define the central point of a standing facility meant to steer market interest rates. It is usually set with a corridor in which the upper bound represents the CBN lending rate to DMBs under the Standing Lending Facility (SLF), and the lower bound represents the deposit rate at which the CBN accepts deposits from DMBs under the Standing Deposit Facility (SDF).

3.2 Lending Rates

This is the rate which DMBs charge their customers on loans extended to them. In Nigeria, two of these rates have been most prevalent – the Prime and Maximum Lending Rates.

Prime Lending rate is simply defined as the interest rate which DMBs charge their most credit-worthy customers; which are usually large organizations. For most banks, this rate also represents the minimum rate. It could also form the basis for other lending rates on mortgages, personal loans, and loans to small businesses. The maximum Lending Rate, on the other hand, is the rate charged by DMBs for lending to customers with low credit rating.

3.3 Treasury Bills Rate

Treasury bills are basically government own and guaranteed debt instruments issued by the monetary authority or central bank of a country to control money supply. Treasury bills rate is the interest rate paid by government to investors who purchase government bills or monetary authorities. Since Treasury bills are discount instruments, rather than making interest, they are issued at a discount

to the face value and mature at face value. The interest rate is a function of the purchase price, the face value, and the time remaining till maturity.

3.4 Interbank Rate

Interbank rate is the rate charged on short-term loans made between DMBs. DMBs borrow and lend money among themselves in the interbank market in order to manage liquidity and meet requirements placed on them. The interest rate charged depends on the availability of money in the market, on prevailing rates and on the specific terms of the contract, such as term length.

3.5 Credit Card Rate

The credit card rate is basically the rates financial institutions charge card holders for using their card for payments at point of sale (Point of Sale). The interest charged is mainly for short-term financing that usually begins one month after a purchase is made and the borrowing limits is set according to the individual's credit rating. Credit cards have higher interest rates than most consumer loans and credits. In developed economies almost every retail outlet allows for payment of goods and services through credit cards because of their wide spread acceptance. It has become one of the most popular forms of payment for consumer goods and services.

3.6 Other Interest Rates

Other rates common in banks include:

- *Current Account Rates:* These are rates paid by banks to current account holders. They are low, hovering around 1.0 per cent, because monies in the account can be accessed at any time.
- *Savings Account Rates:* are rates paid to saving account holders by banks based on the balances in the account at the due date. They tend to be higher as banks are willing to pay higher interest rates because they are less likely to have frequent deposit withdrawals.
- *Mortgage Rates:* are rates charged by banks on mortgage loans. They are lower than rates on personal loans but closer to central bank rate.

They are seen as very safe to the borrowers since the title deeds to the landed properties are tendered as securities.

- *Treasury Bond Rate (Coupon Rate)* is the rate on bonds that do not mature within one year, and in most cases are of longer duration of 10 to 30 years. The interest rates on these bonds vary depending on their maturity.

4. Measuring Interest Rate

The most common measures of interest rate are the simple and compound interest rates, discount method, annual percentage rate (APR), and the annual percentage yield(APY).

4.1 Simple Interest

Simple interest is interest paid only on the "principal" or the amount originally borrowed, and not on the interest owed on the loan. A major feature of simple interest rate, therefore, is that interests are not calculated on the amount due. Simple interest is normally specified as a percentage rate of increase, rather than an absolute amount.

Simple interest (*Si*) is given by the following formula

$$Si = P \times T \times R/100$$

Where:

P = the principal

T = Number of years for the loan to mature / repayment period\

R = Rate (%)

The formula could also be used to derive *T* and *R* by substituting the subject of the formula. For example, R could be derived by multiplying the interest amount *Si* by 100 and dividing it by the product of the principal (*P*) and the repayment period (*T*).

$$R = Si(100)/P \times T)$$

4.2 Compound Interest

This calculates interest on the sum of the principal and the interest previously received. Therefore, compound interest is not only based on the principal but also on the accumulated interest at the accounting period. Under this method, interest is paid on the initial amount deposited, as well as additional interest outlays. The compounding period represents the period over which the interest is calculated. Compound rates are normally higher than simple rates.

The period over which interest is calculated is called the compounding period. The standard period for compounding is one year. Compound interest is what DMBs compute on savings account thereby making the accounts to grow faster than accounts under the simple interest method.

4.3 Annual Percentage Rate (APR)

The Annual Percentage Rate (APR) is the yearly costs of credit expressed as a percentage of the loan amount. The APR is usually higher than the normal interest rate payable on a loan, because it includes additional cost or fees for providing the loan, lender's administrative fees, and other costs as well as the annual interest rate. In practice, APR gives a more precise representation of the actual cost of borrowing rather than using the simple interest rate only. The APR therefore, provides a useful gauge for comparing the total cost of funds for any loan. In practical terms, different lenders will have different APRs, thus their calculations may differ. Typically, APR is usually used for credit cards, vehicle financing, and personal loan, amongst others.

4.4 The Discount Rate

The discount rate is the interest rate used to discount a stream of future income to its present value. The discount rate measures the opportunity cost of capital. It indicates how much interest could be earned on funds if the money was put away. In the United States, the interest rate charged to DMBs and other deposit-taking institutions on loans received from the Federal Reserve (Fed) is referred to as discount rate.

Discount rate is given by:

Dr = 1/(1 + interest rate)

For example, an interest rate of 7.0 per cent would attract a discount rate of 1/1.07 = approximately 0.934.

4.5 The Annual Percentage Yield (APY)

The interest rate measure that includes the effect of compounding is called the annual percentage yield (APY). It is considered a superior measure of annualized interest rates. The APY is computed by compounding or multiplying the per-period rates over the year to arrive at the effective annual rate. The APY is the effective interest rate from a lender's perspective. If someone has N1,000 in each of two bank accounts, with the same deposit interest rate, but the interest is credited more often (let's say, every month, rather than once a year) on one of the accounts, that account will have a higher APY, because the interest will build up more rapidly.

5. Transmission Mechanism of Interest Rate in Nigeria

Interest rate serves as a channel for monetary policy transmission mechanism. By so doing, the central bank employs its policy rate (also known as anchor rate, rediscount rate or monetary policy rate in some countries)to influence the direction of other interest rates in the economy and the spending and savings behaviour of economic agents, as well as, affect other macroeconomic variables in the economy like exchange rate, Inflation and aggregate demand.

The interest rate is the main channel of monetary policy transmission. Monetary policy usually affects some macroeconomic aggregates like output, prices, expenditure, amongst others through altering the price and availability of credit in the economy. The Central Bank of Nigeria derives its mandate to administer monetary policy and by extension manage interest

rates from the Central Bank of Nigeria Act of 1958 as amended in 1991, 1993,1997,1998,1999 and 2007.

The CBN can decide to alter the rate at which it lends to the banking system (monetary policy rate); this would have ripple effect on other rates in the economy. Usually, when the banks are cash-strapped, they sell some of their assets to the CBN in return for cash, also when the CBN mop-up liquidity; it sells these financial instruments (assets) to banks in return for cash with the aim of reducing the money supply in the system. These assets include government bonds, bills, and other government securities. By so doing, the CBN influences the structure of interest rates.

The change in the official interest rates affects directly money-market interest rates and, indirectly, lending and deposit rates, which are set by banks to their customers; these would also affect the prices of financial assets, stocks and collaterals through the credit channel. Also, future official interest rate variations would affect intermediate and future interest rates. Similarly, variation in the exchange rate could affect inflation directly through the exchange rate channel; this is especially so if the country's consumption is heavily dependent on imports like Nigeria, as this will ultimately impact on aggregate demand. Also, alteration in policy rates could affect the cost of external borrowing by banks via the exchange rate channel. More so, savings and investment decisions of households and firms are affected by movements in asset prices brought about by changes in interest rates via wealth channel. Rising equity prices could increase the share value of households hence their wealth levels, consequently increasing consumption and eventually aggregate demand.

6. Interest Rate Regime in Nigeria

Nigeria's interest rate regime like any developed country has evolved over the years in consonance with the economic situation of the country. The country

has undergone two different interest rate regimes till date. These are the controlled or fixed regime and deregulated or liberalized regimes.

6.1 Controlled Regime

Before the inception of financial liberalization in 1986, the level and structure of interest rates were fixed by the monetary authority. At that time both deposit and lending rates were controlled by the CBN with the aim of: achieving social optimum resource allocation; engendering a systematic development of the financial sector; curbing inflation and reducing the burden of internal debt servicing by government. The economy was classified into preferred, less preferred and others, for purposes of lending. The monetary authority employed direct tools such as credit ceilings and controls; administration of interest and exchange rates; as well as special deposits and cash reserve requirements to achieve price stability and allocate financial resources to the preferred sectors of the economy such as agriculture and manufacturing at concessionary interest rates. The policy regime produced adverse consequences with nominal interest rates dropping to their lowest level before 1986. The fixed interest rates trailed inflation rate, resulting in negative real interest rate which caused financial disintermediation proven by low level of investment, savings and growth coupled with misallocation of resources. Therefore, the interest rate policy objective of improving investment and growth in the real sector was not achieved.

6.2 Deregulated Regime

The general framework of deregulating the economy under the Structural Adjustment Program (SAP), the CBN introduced a market-based interest rate policy in August 1987. The deregulation of interest rates allowed banks to determine their deposit and lending rates according to market conditions through negotiations with their customers. However, the minimum rediscount rate (MRR) which influences other interest rates continued to be determined by the CBN in line with changes in overall economic conditions.

In December 2006, the CBN introduced a new monetary policy implementation framework- with the MPR as the anchor rate. The aim was to achieve a stable value for the domestic currency through short-term interest rates stability, price stability, and efficient transactions in the inter-bank money market as well as stability of other DMBs interest rates.

7. Factors Affecting Interest Rate

7.1 Demand and Supply of Loanable Funds.

Traditionally, interest rate is determined by the interplay of the supply of and demand for loanable funds. Savings is a major source (supply) of loanable funds while borrowing (investment) constitutes demand for loanable funds. If the supply exceeds the demand for loanable funds, interest rate is bound to fall while the opposite holds if the supply falls short of demand for loanable funds.

7.2 Inflation

Inflation is another factor that affects interest rate. The higher the expected inflation rate, the higher the interest rate is likely to be because of the need to keep real interest rate positive to encourage further savings. If expected inflation falls, other things being equal, interest rate would also fall.

7.3 Monetary Policy

Monetary policy actions affect interest rates is monetary policy. Central banks and monetary authorities change their monetary policy stance to influence the level of money supply as they try to manage the economy and control inflation. For example, if monetary authorities decide to ease monetary policy, then money supply in the economy will increase. Given the demand for money, interest rates would fall as more money is now available to lenders. On the other hand, if the supply of money in the economy is reduced, interest rates would rise.

7.4 Government/Fiscal Policies

Government also borrows if its expenditure is less than the revenue generated from all sources to finance its programs. Generally, high government spending fuels money supply in the economy thereby putting downward pressure on nominal interest rate. The reverse holds when government refuses to borrow and operates a balance or surplus budget.

8. Relationship between Interest Rate and Other Macroeconomic Variables

8.1 Inflation

Rising prices and expectations of escalating inflation would tend to increase interest rates, whereas low levels of inflation and improvement in the expected inflation would usually lead to lower levels of interest rates. Thus, there exist a positive relationship between inflation and interest rate. Interest rates that are higher than the inflation rate would shield savers from the adverse effects of inflation, conversely when the inflation rate exceeds the interest rate, borrowers tend to gain at the expense of savers.

8.2 Exchange Rate

The relationship between the interest rate and exchange rate could be viewed through the demand and supply of foreign exchange in the foreign exchange market. Speculators normally leverage on higher interest rates in other countries to trade in foreign currencies to benefit from higher earnings. For instance investors from Ghana would be attracted by higher interest rate in Nigeria by buying Naira based securities in a bid to earn higher income. This would also lead to an appreciation of the Naira. Thus, a rise in the interest rate is expected to appreciate the value of a currency, in this case the Naira against the Cedi. In contrast, a fall in the interest rate would lead to depreciation in the value of Naira.

8.3 Savings

Higher interest rates usually serve as incentive for people to save more, knowing fully well that their savings would earn them more income. Individuals are normally faced with the decision to either consume at the present or defer current consumption to a future date. The interest rate is a very important impact in making this decision. Receiving higher reward on savings means that more can be consumed in the future. Also, economic agents might choose to save less if the interest rate is low, i.e. they would choose current consumption in place of savings, ceteris paribus

8.4 Investment

High interest rate makes the cost of borrowing funds expensive thereby impacting negatively on the level of investment. This is because households, firms, and governments often borrow money from banks and other lending institutions to finance investment. Similarly, high level of interest rate serves as signal for economic agents to save more money in return for better rewards. Also, low interest rates means funds would be cheaper to borrow, and signals increasing investment.

Firms usually source for funds to venture into investments in new factories, more efficient machines, raw materials, etc. expecting to earn more income from their investments. However, if the interest rate (cost of the loan)is greater than the expected return on investment, then it would not be economically plausible to undertake such investment and vice versa. Thus, when interest rates are lower, firms are more likely to make investment.

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