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**UNDERSTANDING  
MONETARY POLICY SERIES  
NO 22**

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**THE EFFICIENT MARKET  
HYPOTHESIS**

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# Central Bank of Nigeria

## Mandate

- Ensure monetary and price stability
- Issue legal tender currency in Nigeria
- Maintain external reserves to safeguard the international value of the legal tender currency
- Promote a sound financial system in Nigeria
- Act as banker and provide economic and financial advice to the Federal Government

## Vision

“By 2015, be the model Central Bank delivering Price and Financial System Stability and promoting Sustainable Economic Development”

## Mission Statement

“To be proactive in providing a stable framework for the economic development of Nigeria through the effective, efficient and transparent implementation of monetary and exchange rate policy and management of the financial sector”

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- Meritocracy
- Leadership
- Learning
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To Facilitate the Conceptualization and Design of  
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Analytical Framework for the Formulation and  
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Optimal Economic Growth

## FOREWORD

The understanding monetary policy series is designed to support the communication of monetary policy by the Central Bank of Nigeria (CBN). The series therefore, provides a platform for explaining the basic concepts/operations, required to effectively understand the monetary policy of the Bank.

Monetary policy remains a very vague subject area to the vast majority of people; in spite of the abundance of literature available on the subject matter, most of which tend to adopt a formal and rigorous professional approach, typical of macroeconomic analysis. However, most public analysts tend to pontificate on what direction monetary policy should be, and are quick to identify when in their opinion, the Central Bank has taken a wrong turn in its monetary policy, often however, wrongly because they do not have the data for such back of the envelope analysis.

In this series, public policy makers, policy analysts, businessmen, politicians, public sector administrators and other professionals, who are keen to learn the basic concepts of monetary policy and some technical aspects of central banking and their applications, would be treated to a menu of key monetary policy subject areas and may also have an opportunity to enrich their knowledge base of the key issues. In order to achieve the primary objective of the series therefore, our target audience include people with little or no knowledge of macroeconomics and the science of central banking and yet are keen to follow the debate on monetary policy issues, and have a vision to extract beneficial information from the process, and the audience for whom decisions of the central bank makes them crucial stakeholders. The series will therefore, be useful not only to policy makers, businessmen, academicians and investors, but to a wide range of people from all walks of life.

As a central bank, we hope that this series will help improve the level of literacy in monetary policy as well as demystify the general idea surrounding monetary policy formulation. We welcome insights from the public as we look forward to delivering content that directly address the requirements of our readers and to ensure that the series are constantly updated as well as being widely and readily available to the stakeholders.

**Moses K. Tule**

*Director, Monetary Policy Department  
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# THE EFFICIENT MARKET HYPOTHESIS<sup>1</sup>

Godfrey Uzonwanne<sup>2</sup>

## SECTION ONE

### Introduction

Market efficiency is the central principle that underpins the current stock of academic knowledge of market behavior, output, demand, commodity and asset prices. According to classical economic theory, market participants, monetary and fiscal authorities base their output, demand and pricing decisions on perfect knowledge, thus asset and commodity price mechanisms reacts perfectly to the forces of demand and supply.

#### 1.1 Efficient Markets from an Economist's Point of View

Economists view market efficiency from the point of view of the interaction between price, supply and demand. When consumers become aware of an increase in supply of a commodity, they begin to seek a bargain; such a bargain is reflected in a price drop (by way of discounts), which stimulates an increase in demand. As soon as retailers become aware of the increased thrust in demand, they gradually withdraw discounts in order to recoup potential profits, leading to a slack in demand over time. In order words, prices move around an equilibrium bracket to accommodate changes in supply and demand. Economists, are therefore, not primarily concerned with the pricing mechanism, but how the pricing mechanism maximises the output of commodities.

#### 1.2 Efficient Markets from a Finance Point of View

Contemporary Finance Theory views market efficiency from the point of view of the '*Efficient Market Hypothesis*' (EMH). The EMH clearly states that asset prices reflect all available information on them. As a consequence of this view, asset prices follow a random walk through time, given that today's price is based on currently available information on the asset. The implication of this, is that markets

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<sup>1</sup>This publication is not a product of vigorous empirical research. It is designed specifically as an educational material for enlightenment on the monetary policy of the Bank. Consequently, the Central Bank of Nigeria (CBN) does not take responsibility for the accuracy of the contents of this publication as it does not represent the official views or position of the Bank on the subject matter.

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are futuristic and do not have a memory, therefore, investors do not base their decisions on any past experience of the market they may have had. The EMH from the perspective of finance theory, therefore, focuses attention on the pricing mechanism of assets rather than on the output end of the market, as is observed in the commodities markets.

## SECTION TWO

### Conceptual Issues

In this section, the article shed lights on key conceptual issues governing the views around market efficiency and inefficiency.

#### 2.1 The Efficient Market Hypothesis (EMH)

The simple view of the EMH is that all asset prices are currently at their equilibrium level, such that investors are unable to make an exceptional profit by attempting to predict future asset prices. If investors were able to correctly predict future asset prices, then markets will be deemed not to be efficient and assets wrongly priced. For markets to be efficient, therefore, asset prices must be unpredictable and must follow a random pattern, based on publicly and privately held information.

The hypothesis identifies three levels of market efficiency viz: weak, semi-strong and strong form efficiency. The weak form of efficiency states that publicly traded asset prices reflect all publicly available past information on the asset. Under the semi-strong form of market efficiency, prices on publicly traded assets reflect both past and current publicly available information on the asset. In other words, asset prices adjust instantly to all current information relating to the asset. Under the strong form of market efficiency, the hypothesis asserts that publicly traded asset prices reflect past and present publicly available information as well as privately held information. The strong form of efficiency is largely theoretical, due to the fact that privately held information can be used for insider trading, thus, allowing the holder of such private information to earn abnormal profits from holding a position in the asset. In practice however, insider trading is discouraged by criminalizing the act. An asset market can only therefore identify with one form or the other of efficiency at a time, depending on the rate of adjustment of prices to publicly available information, which is a function of how matured the market is.

According to the free market school of thought, the efficient market hypothesis implies that as long as markets are left to their own mechanisms, the interaction between supply and demand will push asset prices to equilibrium highs or lows as the case may be. The equilibrium will only be altered in favour of another equilibrium level with the imposition of an external shock on the markets. This bears a similarity to Newton's third law of motion, which states that '*everybody will continue in its state of rest or uniform motion in a straight line unless disturbed by an external force*'. Finance theory states that investors will buy and sell the asset until its price returns to equilibrium, while economic theory states that the

external event will impact positively or negatively on demand reinforcing price movements towards equilibrium. The EMH, invariably assumes that market equilibrium is achieved by a natural process.

## 2.2 The Financial Instability Hypothesis

Hyman Minsky has proposed an alternative hypothesis for modelling the behaviour of financial markets, which he called '*The Financial Instability Hypothesis*' (FIH). The fundamental difference between the Efficient Market Hypothesis and the Financial Instability Hypothesis, is the question of what makes prices change, within financial markets? Minsky argues that markets generate their own internal forces, causing waves of credit expansion and asset price inflation, followed by waves of credit contraction and asset price deflation. The Financial Instability Hypothesis is of the view that the strengthening of demand is as a result of an increased supply of credit (and not as a result of price drops), and that as credit contraction begins to take effect as a result of contractionary monetary policy, asset prices and hence demand will experience a deflation irrespective of the volume of supply of assets. The point where prices begin to reverse due to the deflation is popularly known as the '*Minsky Moment*'. In Minsky's view (which he credited to John Maynard Keynes), markets are unstable and cannot reach a natural equilibrium as a result of this instability, thereby attacking the very foundation of the Efficient Market Hypothesis, the foundation of today's free market school of thought. Minsky is of the view that markets do have a memory, the memory being the balance sheets of companies who have either suffered a sharp downturn in their asset values in the past, or have experienced a boost in the value of assets on their balance sheet. These memories remain with the management of such companies, and ultimately guide their future investment decisions. From this argument therefore, in asset markets, increases in price inadvertently lead to increased demand as opposed to commodity markets where price increases lead to a decline in demand.

## 2.3 Asset Price Bubbles

Asset prices according to the finance and economist view, are therefore, in constant flux varying with supply and demand. An asset price bubble is said to occur when demand outstrips supply to the extent that assets become extremely overvalued. Too much money chasing a relatively fixed number of assets. A good example, is the United States housing market bubble of 2007, where an expansion of credit leads to increased demand for real estate assets, pushing up the price of real estate with the increased price further strengthening demand, as investors see the opportunity to earn a premium. Other examples of asset price bubbles include the dot com bubble of the 90s and the Asian financial crisis of 1997. A huge bubble is currently building up in Nigeria's capital city, Abuja as investor's demand for real estate assets continues to strengthen, amidst a gradual increase

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in supply of residential properties. An average three bedroom bungalow with a two room boy's quarters in a middle class suburb of the city currently attracts a rental income of between ~~₦2.0~~ - ~~₦2.5~~ million per annum. The same property on sale is priced for between ~~₦45~~ - ~~₦50~~ million. If we consider the cost of credit to purchase such a property (mortgage) in the current market climate, (Monetary Policy Rate, MPR = 13%, Prime Lending Rate, PLR = 16% and Maximum Lending Rate, MLR = 27%) such an asset with a maximum annual yield will be worth:

~~₦2,500,000.00~~/0.16 = ~~₦15,625,000.00~~ (using the prime lending rate applicable to prime borrowers)

~~₦2,500,000.00~~/0.27 = ~~₦9,259,259.00~~ (using the maximum lending rate applicable sub-prime borrowers)

We can argue that borrowers will not be able to access credit at the prime lending rate but rather in the region of the maximum lending rate.

On average therefore, this property's intrinsic value can be placed around the average benchmark for a rough analysis:

$$(\del{₦9,259,259} + \del{₦15,625,000})/2 = (\del{₦24,884,259}/2) = \del{₦12,442,125}$$

If we consider the top end of the market price for this property, we have a bubble of:

$$(\del{₦50,000,000} - \del{₦12,442,125}) = \del{₦37,557,870}$$

This amounts to a percentage increase in price of:

$$[(\del{₦50,000,000} - \del{₦12,442,125}) / \del{₦12,442,125}] * 100\% = 301.9\%$$

The difference in asking price of ~~₦37,557,870~~ thus represents an asset price bubble around the intrinsic value of the asset. The asset price has been inflated by 301.9% and is thus selling at 4 x times its intrinsic value.

### 2.4 Debt Financed Consumer or Asset Price Bubbles?

According to classical economic theory, demand and supply directly affect the price of commodities. This is illustrated by the scenario whereby an increase in supply of a commodity leads to a reduction in the price of the commodity in the face of unchanging demand. On the other hand, if the demand of a commodity outstrips its supply, the price of the commodity shoots up as there are more buyers than sellers. As supply increases to match up the rising demand, prices are forced down to bring the market back to equilibrium. In debt financed asset markets, the demand-supply-price mechanism works differently. In the event of

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expanding credit, demand for assets (real estate, stocks and bonds) increase substantially, thus pushing prices up, in the face of constant supply. As prices rise, investors perceive that the asset is currently undervalued and thus demand strengthens, pushing prices yet further up. As supply increases to match up the rising demand, demand further increases, pushing prices further up. The key difference therefore between debt financed commodities markets and debt financed asset markets is that in the face of rising price levels, increased supply in the commodities markets tends to force prices down as demand weakens, thus returning markets to equilibrium, while in debt financed asset markets, increased supply tends to fuel price increases as demand strengthens.

## SECTION THREE

### Analysis

In this section, the article looks at the analytical implication of the conceptual issues raised in the previous section, with a view to shedding some light on the practicality of how policy reacts to shocks in both commodity and asset markets, but with major emphasis on asset markets as this is where the controversy of efficient versus inefficient markets is located.

#### 3.1 The Central Bank and Monetary Policy

Poole presents an analysis of the choice of policy instruments for monetary policy between money supply and interest rates. Modern macroeconomic policy is concerned with the central bank pursuing a monetary policy objective of price stability such that consumer prices are allowed to fluctuate within an acceptable limit with a lower and upper band of say 2-3% bracket. When bubbles therefore develop around asset prices, central banks move to prick these bubbles with a view to maintaining price stability and moderating inflation. An alternative way of regulating asset price bubbles is by placing a cap on credit to the private sector in order to slowdown access to credit deployed in fuelling asset prices. By regulating credit to the private sector, the central bank is able to moderate the demand for assets, thus forcing asset prices down.

#### 3.2 Government Spending and Monetization of Debt

While central banks on one hand control the debt burden (private and public) through a manipulation of the cost of capital, the government applies its fiscal policy to manage economic activity by directly lowering or increasing tax levels, borrowing to spend or even going to the printing press to print fresh bank notes to undermine the existing stock of debt by creating structural inflation. In modern economies, the central bank serves as a watchdog over the supply of money, thus controlling the desire of governments to undermine the debt stock through monetization. Governments, however, can use debt monetization to lower the burden of debt on its citizens during a recession, by pumping extra liquidity into the economy to ease the debt burden, until normal economic activity is restored (quantitative easing).

#### 3.3 The Role of Central Banks in Managing Asset Price Bubbles

In a modern economy, the central bank performs a multitude of functions with the pivotal objective of maintaining price and financial system stability. Under the price stability role, the central bank is primarily concerned with monitoring inflation creep with a mandate to keep inflation within an agreed corridor. Under the financial system stability objective, the central bank plays the lender of last

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resort role by underwriting credit markets and the banking system to ensure that no bank is put in a situation where it is unable to meet its short term obligations. In conjunction with government, central banks conduct a process called *demand management* to ensure that the peaks and troughs in the business cycle are dampened to such an extent that the economy does not overheat excessively at the peak, and that the troughs do not drop into recessions. In effect, the injection and withdrawal of both fiscal and monetary stimulus ensure that economic activity is appropriately managed in such a way as to keep economic growth fairly stable (not too rapid and not too slow). Credit expansion due to low or affordable cost of capital promotes increased acquisition of assets. As we have seen earlier, in asset markets, as asset prices increase, so does the demand for the assets as investors believe that the assets are currently undervalued and thus seek to earn a premium by taking a position in such assets. Similarly, investors (in an asset market) will sell an asset as the price declines in order to rapidly exit their positions in the asset. On the part of central banks, the excessive growth of credit growth is an indicator of an asset price bubble build up, due to the fact that the increased pace of credit is used to fuel additional asset purchases, thus leading to a steady rise in asset prices (inflationary growth). In order to stabilize such markets, the central bank will move to '*prick the bubble*' and halt the inflationary trend by hiking interest rates, thus increasing the cost of capital and discouraging further borrowing. This slowdown in the uptake of credit will lead to a slowdown in demand for assets in the face of constant or growing supply, thus forcing prices into a downward trend. The hiking of interest rates thus generates a self-reinforcing crash in asset prices, as investors rapidly offload their portfolios. When the price drop gets to a certain unacceptable level, the central bank will lower rates in response, in order to encourage a new round of credit uptake to push asset prices back up to a new equilibrium or acceptable level. This cycle continues indefinitely. Central banks must therefore, always react in time to arrest the peak and troughs of asset prices with a view to smoothing the transition of the business cycle.

On the part of government, deficit spending as a source of demand management implies increased government spending without increasing tax revenue, in order to help lift an economy out of recession. Governments, therefore, borrow to spend on productive tasks and public infrastructure in order to help businesses get more people into work, reduce unemployment, and increase consumer spending so that economic activity and welfare picks up again.

### 3.4 Friedman's View of Central Banks and Efficient Markets

The efficient market hypothesis is applied in economics to both commodities and asset markets. Minsky argues that in asset markets, an increase in supply which



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should ordinarily cause a price decline may not stimulate demand as investors may refrain from purchasing the asset, due to the prior knowledge they hold of the behaviour of the asset; in other words, markets have a memory. On the basis of the rational behaviour of debt financed commodities markets and the irrational behaviour of debt financed asset markets, the focus of price movements should be on debt financed asset markets since they appear to defy the current accepted financial and macroeconomic school of efficient market thinking. In Milton Friedman's view, central banks and government interventions tend to distort market equilibrium, thereby, pushing markets further away from equilibrium; Friedman argues that central banks are not required in an economy as their role is obstructive to free markets and price equilibrium. He further argues that central banks play a distorting role in market equilibrium, and should therefore be abolished to mitigate against the external shocks they generate. Market participants should, therefore, be allowed to set their own interest rates when they buy and sell as asset prices will reflect their inherent value in a self-optimizing market.

### 3.5 Keynes-Minsky View of Central Banks and Efficient Markets

From a macroeconomic point of view, credit is a cohort of fiat money; for economic growth to occur, there must therefore be a corresponding expansion of credit such that with a withdrawal of the supply of credit, economic growth will tend to slowdown. The role of the central bank, therefore, is to monitor the expansion of credit relative to inflated asset prices. It monitors this expansion by raising interest rates when asset prices have become inflated above an acceptable level, and lowers interest rates when asset prices appear deflated below an acceptable level. This upward and downward movement of interest rates directly monitors the availability of credit and hence aggregate demand. The efficient market school, however, views the inflation or deflation of asset prices as a natural drive towards price equilibrium, while the financial instability school (Keynes-Minsky) considers the actions of central banks in managing the supply of credit as a confirmation of the inherent instability of financial markets. Keynes and Minsky on the other hand, believe that central banks play a vital role in stabilizing inherently unstable financial markets, which if left to their own devices as proposed by the free market school, will inadvertently collapse.



## SECTION FOUR

### Conclusion

In view of the foregoing analysis, there is a pressing need to explore the possibility of a new paradigm for the pricing of assets in financial markets, as evidence suggests that financial markets exhibit different fundamental pricing mechanisms from commodity markets. A few options can be towed from the above argument as follows:

#### 4.1 The Free Market Route

The free market route implies allowing asset price deflation and credit contraction to play itself out, when the economy is in a recession, while asset price expansion should be allowed to play itself out without intervention from the central bank or the government when the economy is overheating due to excess supply of credit in the hope that market forces will eventually pull the market to a self-optimizing equilibrium. The direct outcome of allowing credit contraction to exhaust itself without monetary or fiscal stimulus, may however, be a repeat occurrence of the 1929 depression.

#### 4.2 Increase the Debt Burden and Monitor the Growth of Credit

Economic growth requires capital to finance economic activity. One way to provide finance is to increase access to credit. The central bank and the government can be instrumental to jumpstarting a credit expansion using monetary and fiscal stimulus to invest in a new asset price build up. Although this strategy will bring about rapid economic growth and reduced unemployment, however, if unmonitored, it will most certainly lead the economy down an aggressive recession if the bubble is allowed to bust (boom-bust cycle). Careful monitoring of the price build up by the central bank will, however, ensure that it is effectively managed in such a manner as to eliminate high peaks and deep troughs.

#### 4.3 Summary

The role of the central bank in demand management and economic growth is arguable indispensable. The growth rate of credit to the private sector can, therefore, serve as an indicator of an expanding asset price bubble as the credit goes to fuel the purchase of assets. The central bank is in a position to monitor the acquisition of assets such as bonds, stock and real estate in order to determine in which market the asset bubble is building up. From the foregoing, we can conclude that while commodity markets respond effectively to the fundamentals of the efficient market hypothesis, debt financed asset market price mechanisms do not clearly follow the fundamentals of the efficient market hypothesis but tend

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to obey the financial instability hypothesis as these markets tend towards disequilibrium (boom-bust cycle) in the absence of central bank intervention.

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