Proceedings of
the 33rd International Business Information Management Association Conference

(IBIMA)

10-11 April 2019
Granada, Spain

ISBN: 978-0-9998551-2-6

Education Excellence and Innovation Management through Vision 2020

Editor

Khalid S. Soliman

International Business Information Management Association (IBIMA)

Monetary Policy and Stock Market Development: The Nigeria Experience

Alexander Ehimare OMANKHANLEN
Covenant University, Ota, Nigeria, Alexander.omankhanlen@covenantuniversity.edu.ng

Dibia Peter
Covenant University, Ota, Nigeria, peter.dibia@stu.cu.edu.ng

Esther Johnson SENIBI
Covenant University, Ota, Nigeria, aresforyou@yahoo.com

Areghan ISIBOR
Covenant University, Ota, Nigeria, Areghan.isibor@covenantuniversity.edu.ng

Lawrence OKOYE
Covenant University, Ota, Nigeria, lawrence.okoye@covenantuniversity.edu.ng

Abstract

Monetary policy is intended to ensure price stability and adequate employment which in turn will create a stable macroeconomic environment for economic prosperity. It is of great concern to policy makers that monetary policy permeates deeply into the real sector to engender economic growth. The major objective of this study is to explore the monetary policy effects on the Nigerian Stock Market over time.. The Phillip-Perron (PP) unit root test was the method used to test stationarity of the variables while the Johansen Co-integration approach was conducted to test for long run relationship between the variables used. The study found that Monetary Policy Rate, Broad Money Supply and Per Capita Income have significant long run relationship with the development of the Nigerian Stock Market. It therefore recommends among others that the monetary authority in Nigeria (CBN) should as a matter of practice operate a long-term monetary plan that allow the monetary policy rate to be consistent. The constant mop up of money after an expansionary monetary policy by the CBN should be discouraged since it creates instability in the money market making other money rates to be unstable and compounds the volatility rate of the country's stock prices. Finally, the gap between the Central Bank of Nigeria (CBN) targeted broad money and actual broad money growth should be curtailed by reducing the frequency of its mop ups which usually send wrong signals to investors in the stock market.

Keywords: Monetary policies, Broad Money Supply, Per Capita Income,

Introduction

Monetary policy is a measure designed to affect the supply, direction, volume of credit and availability of funds that help to achieve the desired macro -economic objectives. These objectives include price stability (minimal rate of inflation), exchange rate stability (balance of payment equilibrium), full employment (high employment rate and low unemployment), and full output (maximum growth output rate) and so on (Okoye, Erin, Ado, and Isibor, 2017). Monetary policy usually have a lag period (that is it takes time to implement created policy) and expenditure lag which is longer (it takes a longer time for consumers as well as businesses to adapt to the current rate of interest). Depending largely on the state of the economy, the total lag period typically ranges from 9 to 12.months

Nonetheless, monetary authority which is the Central Bank of Nigeria can only achieve macroeconomic objectives through some channels. One of the channels for achieving these objectives is the stock market. Literature has reiterated that a healthy interplay amongst monetary policy and the stock market propelled the banking sector and could enhance economic growth in an economy (Boyd & Prescott, 1986; Levine, 1991; Boyd & Smith, 1998). This could be in the form of a complementary or substitution role for each other based on industrial development level in

a country. The debate on the validity of stock prices to be adequately predicted by changes in macroeconomic variables is a debate which has posed serious concern to both practitioners and academia worldwide over the years, (Omankhanlen, Senibi and Senibi 2016)

There is a remarkable debate on the use of monetary policy with regard to whether or not shorter term monetary rate of interest setting by an optimizing monetary authority (i.e. the central bank) should take into account stock price movement. This argument advanced the context of theories influencing the reason the Central Bank depends on various agreeable rules (rate of nominal interest in reaction to inflation changes, conditions of the economy, output) in their management of monetary policy on a daily basis through open market operations Taylors (1993). Nonetheless, the opportunity is given to examine if monetary authorities has in the past accurately administered monetary policy either in the period of swift and intense decrease in equity prices that took place in 2009 and a phase of speedy as well as increasing growth in prices of equity. According to Omankhanlen, Ilori, and Isibor (2018), financial specialists are less divided in their view of the aims of monetary policy than about what part the central bank should play in accomplishing its objective.

Several studies suggest that monetary policies have substantial influence on stock market (Sack, 2004; Farka, 2009). However, the strength or weakness exhibited by the stock market has a substantial impact on real activities such as consumption through the wealth effect and investment via the credit channel.

It is argued that the central bank through the monetary policy can decrease volatility in the prices of stocks through its reduction in the unpredictability of changes in the future rate, thus the outflow of unpredictability in various financial markets is positively related, then the option value of waiting with investment decisions will decrease (Bean, 2004; Dupor and Conley, 2004; Domanski & Kremer, 1998; European Central Bank, 2002). The commonly accepted wisdom monetary policy measure that is expansionary should exhibit an influence on the stock performance that is positive. Though, the scenario in Nigeria is non-deterministic; with different expansionary money policies in the country, the return of the fortune of stock market back to the periods before the financial crisis of 2009 remain an uphill task (Isibor, Olokoyo, Arogundade, Osuma, and Ndigwe, 2018). Since the late 1980's monetary policy has become a major policy instrument in Nigeria, throughout this period CBN's monetary policies focused on fixing and controlling interest rates and exchange rates, sectorial credit allocation, maneuvering of the discount rate and involving moral suasion (Omankhanlen 2011).

Literature Review

Theoretical Framework

One of the earliest theories of monetary policy on stock market development which includes return on equity is in the quantity theory by Friedman (1956), where he proposed the model below;

$Md = f(Yp, rb, re, rm, \Pi e)$ ……(1)

Where money demand proxied by Md is positively related to permanent income Yp, negatively related to expected interest rates on bonds rb, the expected rate of return on equity re, expected market interest rate rm, and inflation rate proxied by Πe.

The rate of return on bonds and equity represent the opportunity costs of holding money. The rate of return on money is the services provided by holding money as well as any interest payments on money deposits at banks. Expected inflation proxied by Πe from the model represents the return on holding goods. This element is the distinctive relationship that agents hold goods as assets and substitutes them for money if they expect a price to rise that is capital gains on holding goods.

Considering a condition of full equilibrium, if there is an increase in money supply Ms, the left hand equation will be negative, which is a situation of excess money supply, which will make the term on the right to be positive for excess bond demand. Hence the price of bonds or equity will increase and necessarily interest rate will fall – bringing the equity market into equilibrium, and the money market as well will be in equilibrium.

In an expansionary monetary policy, Ms will increase hence the money market that is the term on the left will be negative. In any case because of the goods market there may not necessarily be an excess demand for bonds, since

the disequilibrium in the money market can be offset by an excess demand for goods i.e. Md - Ms < 0, Bd - Bs = 0, and ψd - ψs > 0. By the Keynesian multiplier, as there is excess aggregate demand, then output ψs will rise and money demand Md will rise so that the goods market and money market are brought into equilibrium. Therefore Friedman's proposition is that an increase in money supply does not necessarily imply an excess demand for equity or bonds but may be offset by an increase in the demand for durable household goods such as a house or an automobile. This proposition is one that we wish to prove or rebut in this study, to know whether changes in money supply actually leads to proportionate changes in stock prices or otherwise.

Empirical Framework

This review covers plausible reaction amongst between stock prices, monetary policy and the market with different transmission mechanism from empirical studies in both developed and developing countries. Laopodis (2013) examined the dynamic relationship between monetary policy and stock market in three different monetary policy regimes of Burns, Volcker and Greenspan from 1970s. The study found that there was a very weak association amongst actions of monetary policy via rate of federal funds as well as return on stocks in 1990s. His paper provides evidence of unequal monetary policy on stock in different monetary regimes and state of the stock market.

Belke and Polleit (2004) assessed the possible monetary policy effect on the returns in the stock market of Germany. The study applied the bounds testing approach of co-integration and autoregressive distributed lag models developed by Pesaran and others employing secondary data from 1974 to 2003. Their findings support a long term and short term association amongst stock market returns and monetary policy in Germany. However, their outcomes were constricted to singular return on stock market metric such as growth in dividend.

Kaul (1987) showed that the association amongst inflation, monetary policy and return on stock can either positive or negative depending if the monetary policy is counter-cyclical or pro-cyclical. Du (2006) supported this conclusion and found that changes in money supply and its consequential inflation can have different effects on stock returns during different monetary policy regimes. The results showed a positive association between the supply of money, inflation and return on stock exists in the pro-cyclical regime period of monetary policy, and this relationship became negative in the counter-cyclical monetary policy regime period.

Durham (2003) examined the relationship between stock prices and macroeconomic factors in Cyprus using the Vector Autoregressive model. The variables examined included exchange rate, industrial production, money supply, and consumer prices. The result showed a strong relationship between stock prices and all the macroeconomic factors.

Examining the Tokyo stock market, Mukherjee and Naka (1995) studied the relationship between stock prices and several macroeconomic variables which include exchange rate, money supply, inflation and interest rate using the Vector Error Correction Model. They observed a positive relationship for all other variables except for inflation and interest rates where a mixed relationship was observed.

Ibrahim (2003) examined the long-run relationship between Malaysian Stock Market, various economic variables, and major equity markets in the United States and Japan. He used real output, aggregate price level, money supply, and exchange rate as explanatory variables for the variations in stock price movements. He found out that first, the Malaysian stock price index is positively related to money supply, consumer price index, and industrial production. Second, that stock price index is negatively related to the movement of exchange rates.

Bofinger (2001) studied the relationship between stock prices and several macroeconomic variables which includes, money, bonds and reserves that banks hold with the central bank using a three variable model on an IS-LM framework. He found outHH that the role of banks in the transmission process is insignificant,

Methodology

This study employed secondary time series data covering 1985 to 2016 sourced from the Central Bank of Nigeria Statistical Bulletin (2014) for market capitalization, value of traded shares, gross domestic capital at 1990 constant price, broad money supply (M2) and minimum rediscounted rate (later called monetary policy rate) which all other money market rate hinges on, used to proxy monetary policy in this study. Per capita income was sourced from World Bank Development index (2014).

This study used the Principal Component Analysis (PCA) method to combined market capitalization series and liquidity ratio into one variable to represent stock market development. Econometric techniques employed are Philip Perron (PP) Unit root test, Johansen Co-integration test and fully modified OLS (to assess long run impacts in the model).

The study employed the model used by Balke and Polleit (2004) stated as follows:

$$Rt = f(MRRt) \quad \text{(i)}$$

Rt represent stock price returns in period t

MPRt represent Minimum Discounted Rate (used as monetary policy rate) in period t

Equation (i) becomes equation (ii) after modification to include the broad money supply and per capita income as independent variable while stock returns were replaced with stock market development variable.

$$SMDt = f(MRRt\ \beta1\ , M2t\ \beta2, GNIkt\ \beta3) \quad \text{(ii)}$$

Equation (ii) was logged and presented below,

$$logSMDt = \beta0 + \beta1\ logMRRt, + \beta2\ logM2t + \beta3\ logGNIkt + \gamma t \quad \text{(iii)}$$

Where,

logSMDt represent development in the stock market which is the PCA of the logged form of market capitalization and liquidity ratio in period t.

logMRRt represent logged form of monetary policy rate in period t.

logM2t represent logged form of broad money supply in period t.

logGNIkt represent logged form of per capita income in period t.

$\beta1$, $\beta2$, $\beta3$ are parameter estimates, $\beta0$ represent intercept and γt represent error term.

$\beta1 < 0$: Parameter estimate for monetary policy rate is expected to relate to the stock market development inversely. Since Monetary Policy Rate (MPR) affects other money market interest rates, it also influences stock market investment behavior. For instance, lowering MPR will reduce interest rates and spurs investments subsequently. Firms then respond to increased sales arising from the excess money supply by increasing production and arranging more orders for raw materials. Business activity spread raises labour demand and capital goods demand also. In a booming economy, as firm issues equity and debt the price of stock increases.

$\beta2 > 0$: The broad supply of money parameter estimate is expected to be directly related to capital market development.

$\beta3 > 0$: The parameter estimate of per capita income is expected to be directly related with stock market development using intertemporal analysis in the Life Cycle Hypothesis.

Analysis of Findings

Growth of Monetary Policy and Stock Market Development

Figure 1 shows that as monetary policy increases in most of the periods between 1985 and 2016, the stock market experiences a slight decline which may be due to the rational expectation behavior of the investors in the market.

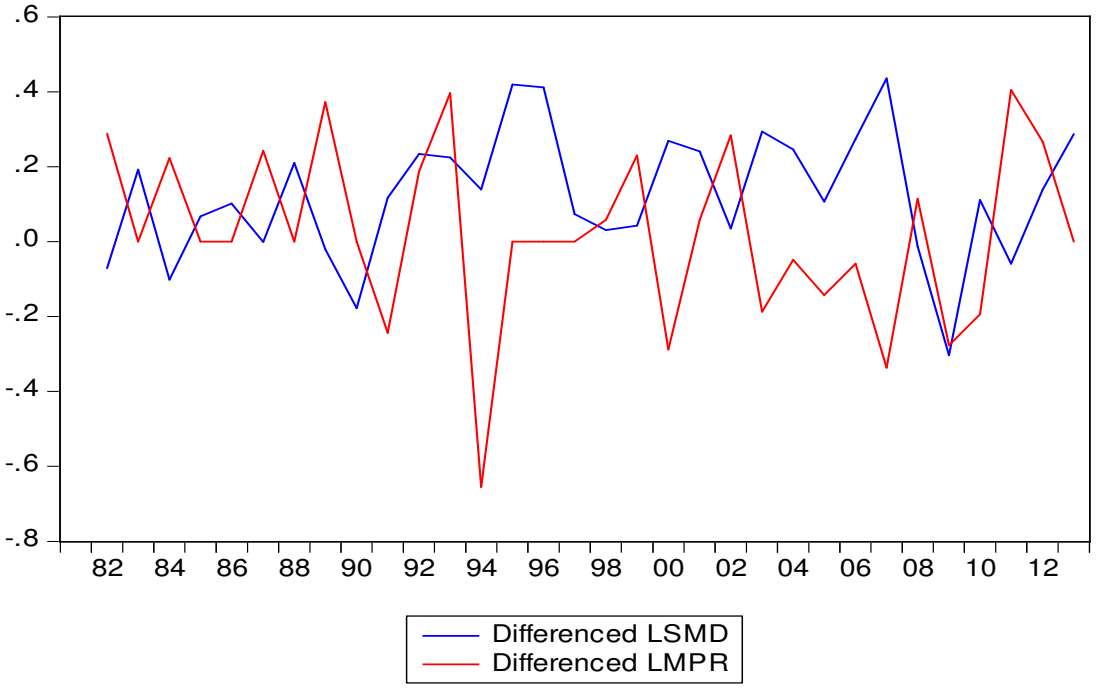

Figure 1: Monetary Policy Rate and Stock Market Development

Table 1: Philip Perron (PP) Unit Root Test and Order of Integration

Variables	PP t-Statistic Value	5% Critical Value	Remark	P-Value	Order of Integration
D(logSMD)	-3.5818	-2.9604	Stationary	0.0121	I(1)
logSMD	1.1999	-3.6537	Non-Stationary	0.9975	I(0)
D(logMPR)	-6.6471	-2.9604	Stationary	0.000	I(1)
logMPR	-2.7982	-2.9571	Non-Stationary	0.0698	I(0)
D(logM2)	-3.2011	-2.9604	Stationary	0.0295	I(1)
logM2	0.2469	-2.95711	Non-Stationary	0.9714	I(0)
D(logGDPk)	-6.2517	-2.9604	Stationary	0.0000	I(1)
logGDPk	0.1439	-2.95711	Non-Stationary	0.9642	I(0)

Source: *Author's Computation from Eviews (2017)*

A variable is stationary when the absolute value of PP t-Statistic value is greater than the absolute value of 5% Critical Value. Since all the variables were non-stationary at level, they were first differenced once, and they become stationary. This implies that all the variables are order I(1) series. Since, all the variables are order 1 series then Johansen Co-integration can be conducted while Ordinary Least Square can't be conducted because it's assumption of constant variance is violated.

Co-integration Test

The co-integration test shows if an equilibrium association exist amongst interest variables in the long run.

Test of co-integration Hypothesis:

H0: $\gamma = 0$ (No Co-integrating equation)

H1: $\gamma \neq 0$ (Co-integrating equations)

Table 2a

The way to check for the presence of co-integration is the use of Unrestricted Co-integration Rank Test (Maximum Eigenvalue). Here, the Max-Eigen statistic (51.461) is greater than 5% critical value (32.118). Hence, reject the null hypothesis of no co-integrating equations and accept the alternate hypothesis of the presence of co-integration. Also, the p-value of the null hypothesis from the Max-Eigen table (0.0001) is less than 0.05. Therefore, reject the null hypothesis and accept the alternate hypothesis. But accept null hypothesis of "At most 1" and conclude that one co-integrated (see Table 2b). Therefore, using the unrestricted co-integrating rank test (Max-Eigen), there is one co-integrating equation.

Therefore, concluded that both unrestricted co-integrating rank test (Trace) and unrestricted co-integrating rank test (Max-Eigen) confirmed the presence of co-integrating equations. Hence, there is a long run relationship between the dependent variable (logSMD) and the independent variables (logMPR, logM2, logGNIk).

Table 2(a & b): Johansen Co-integration test results

2a: Unrestricted Cointegration Rank Test (Trace)

Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.820108	85.45216	63.87610	0.0003
At most 1	0.420952	33.99023	42.91525	0.2889
At most 2	0.293322	17.59915	25.87211	0.3715
At most 3	0.212946	7.183764	12.51798	0.3257

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level

** denotes rejection of the hypothesis at the 0.05 level*

***MacKinnon-Haug-Michelis (1999) p-values*

2b: Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized		Max-Eigen	0.05		
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**	
None *	0.820108	51.46193	32.11832	0.0001	
At most 1	0.420952	16.39108	25.82321	0.5101	
At most 2	0.293322	10.41538	19.38704	0.5745	
At most 3	0.212946	7.183764	12.51798	0.3257	

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
** denotes rejection of the hypothesis at the 0.05 level*
***MacKinnon-Haug-Michelis (1999) p-values*

Fully Modified OLS

Table 3: FMOLS

Dependent Variable: LSMD				
Method: Fully Modified Least Squares (FMOLS)				
Date: 02/11/17 Time: 17:57				
Sample (adjusted): 1985 2016				
Included observations: 32 after adjustments				
Cointegrating equation deterministics: C				
Long-run covariance estimate (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LMPR	-0.491182	0.209003	-2.350116	0.0260
LM2	0.496781	0.172210	2.884743	0.0075
LGDPK	0.088089	0.163209	0.539731	0.5936
C	-2.569265	0.615989	-4.170961	0.0003
R-squared	0.975058	Mean dependent var		0.054547
Adjusted R-squared	0.972386	S.D. dependent var		1.416654
S.E. of regression	0.235412	Sum squared resid		1.551725
Durbin-Watson stat	0.649806	Long-run variance		0.110381

Source: Author's Computation from Eviews (2018)

The adjusted R^2 of 0.975 shows the independent variables in the model jointly explain 97.5 percent variations in the dependent variable (stock market development) whereas other variables not captured in this model explained 2.5 percent variations in the dependent variable.

The P-value of the individual significance test of the independent variable reveals that MPR and M2 are statistically significant while log GNIk is statistically insignificant at 5 percent and all of them signed as expected. Specifically, 1 percent rise in monetary policy rate will induce 0.49 percent reduction in stock market development (and vice

versa) while a broad money supply volume increase by 1 percent will induce 0.50 percent improvement in stock market development in Nigeria.

Recommendation

Even though Nigeria monetary policy rate is usually not allow to run its full gestation period due to frequent changes, it still exhibit significant and fairly sufficient influence on stock market. This is coupled with the rational expectation of the business firms in the country towards frequent changes in monetary policy rate further compound the situation. The monetary authority in Nigeria (CBN) should as a matter of practice operation a long term monetary plan that allow the monetary policy rate to be constant over a long period of time. Also, the constant mobbing up of money after an expansionary monetary policy by the CBN should be discourage since it create instability in the money market making other money rates to be unstable and compound the volatility rate of the country's stock prices. The stability of the monetary policy rate could encourage business firms and investors in the stock market to make long term investment decisions.

Conclusion

On broad money supply, Nigeria recorded its highest growth rate of 57.8 percent in 2008.The gap between The CBN targeted broad money and actual broad money growth should be curtail by reducing the frequency of its mob ups which usually send wrong signals to investors in the stock market. This could view the CBN has showing no clear monetary strategy and policy direction and raise the degree of uncertainty in the economy.

Acknowledgement

This study was supported by Covenant University Ota, Ogun State, Nigeria

References

Belke A and Polleit T. (2004). (How) Do Stock Market Returns React to Monetary Policy? An ARDL Co-integration Analysis for Germany, JEL Classifications, C22,Frankfurt.

Bofinger, P, (2001). Monetary Policy: Goals, Institutions and Instruments, New York, Oxford University Press.

Boyd, J. and Prescott, E. C. (1986). Financial Intermediary-Coalitions. Journal of Economics Theory,38(2), pp. 211–32.

Du, D. (2006). Monetary Policy, Stock Returns and Inflation. Journal of Economics and Business 58,(2006) 36–54.

Durham, J. Benson, (2003), "Should Equity Investors 'Fight the Central Bank'?: The Effect of Monetary Policy on Stock Market Returns," Financial Analysts Journal, Forthcoming.

Farka, M. (2009). The Effect of Monetary Policy Shocks on Stock Prices Accounting for Endogeneity and Omitted Variable Biases. Review of Financial Economics, 18(9), 47-55

Friedman, Milton (1956), "The Quantity Theory of Money – A Restatement," Reprinted from Studies in the Quantity Theory of Money, University of Chicago Press.

Ibrahim, Mansor H. (2003), "Macroeconomic Forces and Capital Market Integration: A VAR Analysis for Malaysia," Journal of the Asian Pacific Economy, 8 (1), 19-40.

Isibor, A., Olokoyo, F. O., Arogundade, M., Osuma, G., and Ndigwe, C. (2018). Exchange rate management and sectoral output performance. Peer-Reviewed Proceedings of the International Business Information Management Association Conference (31st IBIMA) held on 25 –26 April 2018, Milan, Italy.

Okoye, L. U., Erin, O. A., Ado, A., and Isibor A. (2017). Corporate governance and financial sustainability of microfinance institutions in Nigeria. Peer-Reviewed Proceedings of the International Business Information Management Association Conference (30th IBIMA) held on 8 – 9 November 2017, Madrid, Spain.

Kaul, G. (1987). Stock Returns and Inflation: The Role of Monetary Sector. Journal of Financial Economics, 18(7), 253-276.

Laopodis, N.T. (2013). Monetary Policy and Stock Market Dynamics across Monetary Regimes, Journal of International Money and Finance, 33(10), 381–406.

Laopodis, N.T. (2010). Monetary policy and stock market dynamics across monetary regimes, FMA Hamburg conference proceedings.

Lastrapes, W. D. (1998). International evidence on equity prices, interest rates and money. Journal of International Money and Finance, 17(8), pp. 377- 406

Levine, R. (1991). Stock Markets, Growth, and Tax Policy. Journal of Finance, 46(4), pp. 1445–1465.

Mukherjee, Tarun K. and Naka Atsuyuki (1995), "Dynamic Relations between Macroeconomic Variables and the Japanese Stock Market: An Application of Vector Error Correction Model," The Journal of Financial Research, 28(2), 223-237.

Okpara (2010). Monetary Policy and Stock Market returns: Evidence from Nigeria. Journal of Economics, 1(1): 13-21.

Okpara GC 2009. Predictive Power of Interest on the Stock Market Returns and Volatility: Evidence from Nigeria. International Journal of Science, Vocational and Business Studies, 5(1): 15-72.

OmankhanlenA.E, Senibi E.J and Senibi V.K (2016) Macroeconomic Indicators and Stock price movement Nexus: A Study of the Nigeria Stock Market. The Social Sciences 11(13), 3294-3306

Omankhanlen A.E (2011) The Effectiveness of Monetary Policy in Achieving Economic Growth: the Case of Nigeria 1980-2009, Euroeconomica, 29(3), 3 – 12

Omankhanlen, A.E., Ilori N. and Isibor, A. (2018). Monetary Policies and the Achievement of Bank Profit Objective, 32nd IBIMA Conference Proceeding held in Seville, Spain.

Patelis, A.D. (1997). Stock return predictability and the role of monetary policy. Journal of Finance, 52(5), pp. 1951-1971.

Rigobon, R. and Sack, B. (2004). The impact of monetary policy on asset prices. Journal of Monetary Economics, 51(20), pp. 1553-1575.

Taylor, J. B. (1993). Discretion versus Policy rules in practice. Carnegie-Rochester Conference Series on Public Policy, 39: 202.

Thorbecke, W. (1997). On stock market returns and monetary policy. The Journal of Finance, 52(2), pp. 635-654.