IS MONETARY POLICY - STOCK PRICE BEHAVIOUR EFFECT SECTOR-SENSITIVE? EVIDENCE FROM NIGERIA

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Abstract: *Monetary policy variables are theoretically expected to exert significant positive or negative effect on performance of the capital market. Most empirical studies on the relationship between monetary policy and stock prices in Nigeria have not taken cognizance of the fact that the relationship can be sector-sensitive. This study was conducted to examine effect of monetary policy on stock prices of listed firms in Nigeria from a two-sector comparative perspective: banks and manufacturing. Specifically, the study examined effects of seven selected monetary variables on stock prices of 15 banks and 15 manufacturing firms listed on the Nigerian Stock Exchange between Q1 of 2006 and Q4 of 2019. We employed panel dynamic ordinary least squares and panel causality models to analyze average quarterly stock price (STP) and monetary policy variables. We found that for banks, broad money supply (M2), monetary policy rate (MPR), exchange rate (EXCH) and interest on savings (SDR) significantly affect stock price negatively (p =0.0147; p =0.0000; p = 0.0110 and p = 0.0003 for the variables respectively). We also found that Treasury bill rate (TBR) significantly affects stock price positively (p = 0.0000) while cash reserve ratio (CRR) and lending rate (LDR) have insignificant effect on stock prices of banks. For manufacturing firms, MPR negatively and significantly affected stock prices (p=0.0110) but M2, Treasury bill rate, EXCH, LDR, CRR and SDR have insignificant effect on stock prices. All monetary policy variables except broad money supply have causal relationship with stock prices of banks but only exchange rate has causal relationship with with STP for manufacturing firms. We concluded that monetary policy significantly affects stock prices of Nigerian banks and manufacturing firms.. However, the effect is more pronounced in the banking industry than in manufacturing firms. It was also concluded that the effect of monetary policy on stock prices of banks is markedly different from that of manufacturing firms. The study recommended a disaggregated, sector sensitive monetary policy, a monetary policy re-appraisal and a reduction in monetary policy lags.*

Keywords: *Monetary Policy, Banks, Manufacturing Firms, PDOLS, Causality.*
JEL Classification*: E52, G21.*

1. Introduction

In recent years, stocks of the banking firms have done better than manufacturing firms in terms of their prices on the Nigerian Stock Exchange (NSE, 2019). Knowing that these two sectors (as others) are exposed to the same MPs by the CBN, the question arises as to why is the stock of the banking firms doing better than that of the manufacturing firms? For example, NSE (2020) reported that the" financial services sector outperformed other sectors with 68.17% contribution to total volume traded on the Nigerian bourse in 2020 as against 76.07% contribution recorded in 2019. While the sector traded 64.48bn shares in 2020, combined sectors such construction/real estate and conglomerates sectors were second and third with 9.90bn and 5.03bn stocks traded respectively. Out of ten (10) top dealing stocks, banks accounted for nine (9).

Several efforts have been made by the Central Bank of Nigeria through monetary policy (henceforth MP) to ensure that the stock market grows faster and equitably. However, as revealed in empirical evidence from literature, these efforts have not yielded the desired results. Observers posited that policy summersaults, domestic capacity underutilization, international pressures occasioned by global events (e.g oil price changes, terrorism/banditry, political upheavals etc.) and insider dealings in the stock market among others are factors that have consistently impaired these efforts. In Nigeria, Osisanwo and Atanda (2012); Ogbulu and Uruakpa (2011) and Nwakoby and Alajekwu (2016) observed that while tight and relaxed MP have high tendencies of impacting negatively and positively respectively, Abanewe and Undugbu (2012) found no significant relationship exist between MP and price of stock. The inconsistencies in existing literature on the link

between MP and stock prices in Nigeria provides enough motivation and justification for this study, but study opines that more than using inconsistencies in findings as the premise for the research, a better and stronger gap should be identified. Most reviewed empirical literature that addressed the link between stock price and MP variables in Nigeria have viewed the non-financial and the financial sectors of the economy as a whole in their research. The differences in the structural, operational and institutional arrangements between these two sectors should not be overlooked because it may render the results from the latter not to be directly applicable to the former. So, understanding the interconnection between MP and stock prices in a different sector context is useful to both monetary authorities and investors alike. The banking industry is the primary executor of the MP churned out periodically by Central Banks. It is hypothetically (albeit reasonably) assumed that, based on their vantage position, banks can anticipate MP changes and proactively act in anticipation of such changes to their advantage. Hence it is necessary to examine the effect of MP on stock prices of banks and manufacturing firms and whether there exists any significant difference between the effects of MP on the stock prices of the banking and manufacturing firms in Nigeria. Finally, this study provides answer to the question of whether causality exists between MP variables and stock prices of quoted firms in Nigeria on a two-sector basis.

The present study used convenience sampling by taking all the 15 "deposit money banks" (DMBs) and selecting 15 manufacturing firms that are listed on NSE as at December, 2019. The two sectors selected are germane to the growth of any economy, hence their choice for this study. Deposit money banks, on their part, are the intermediaries through monetary policy announcements by the CBN are executed while most monetary policy variables are targeted at growing the real economic sector (manufacturing). The manufacturing firms were selected from food and beverages, health, building and construction, household goods, oil and gas, breweries, conglomerates and agro-allied processing sections out of 100 manufacturing firms (total number of firms listed was 169 out of which computer technology and financial institutions account for 69) listed on NSE. These firms are selected from industries with relatively active stock prices.

2. Literature Review

2.1. Concepts

2.1.1. Trends in MP and Stock Prices in Nigeria

Monetary policies embarked upon by the CBN are set to achieve two-pronged objectives: external and internal economic stability. One indicator of internal economic wellness is a strong stock market consistently improving its capitalization and the ASI. CBN (2019) reports that for years, MP instruments have focused two areas, namely monetary controls during the pre-SAP era and substantive reliance on market forces during the post-SAP era. Figure 2.1 shows the trends in the All-Share Index (ASI) of NSE and selected MP rates (Treasury Bill, broad money supply, CBN MP, exchange, lending and savings deposit) between 1985 and 2019.

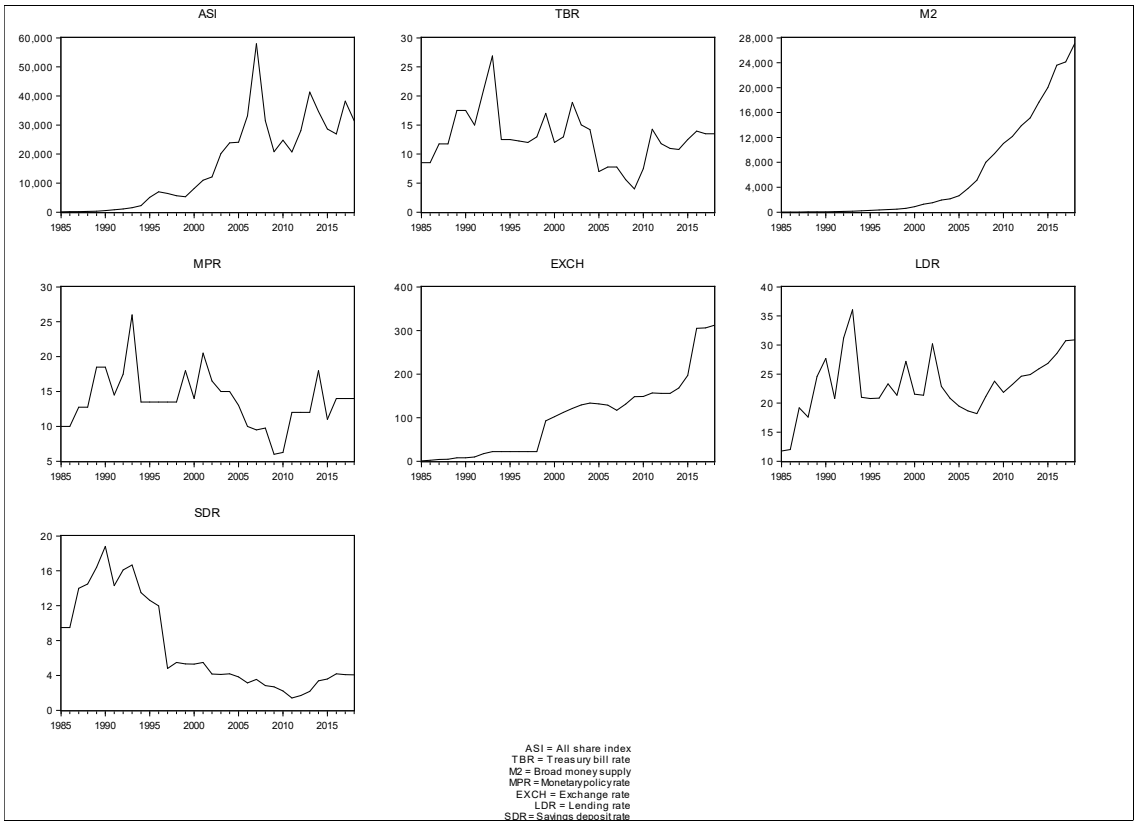

Figure 2.1: Trends in MP and Stock Price in Nigeria (1985-2019)
Source: Author's Design (2022)

On Figure 2.1, (ASI) which measures annual stock price index steadily rose from 1985 and peaked in 2006 (most probably due to banking system recapitalization exercise of 2004/2005) but fell drastically thereafter until around 2013. The consistent fall in ASI during this time can be attributable to the global economic meltdown that adversely affected the NSE. After its sharp rise in 2013, the ASI dropped again till 2017 when it mildly picked up. The Treasury Bill rate (TBR) maintained a steady rise from 1985 to 1990, dropped stylishly in 1991 and increased sharply in 1993. However, the rate pummeled and took a zigzag nature till 2003 when it rose mildly. Thereafter it fell continuously till 2010 when it picked up again but fell and remained stable afterward. Broad money supply (M2) maintained a relatively stable but flat behaviour from 1985 to around 1986/87 after which it consistently rose till 2019.

On its part, the MP rate (MPR) rose during 1985 and 1986 after which it fell till 1991. It then increased sharply in 1993 but became constant from 1994 to 1998. In 1999, the rate increased mildly but fell in 2000. It still fell from 2002 to 2010, picked thereafter in 2014 from when it had remained steady. Exchange rate (EXCH) was relatively stable from 1985 to 1990 but increased mildly from then till 1998. Ever since then, the rate had continued to increase sharply. There was consistency in rise in lending rate (LDR) from 1985 to 1992. The rate however peaked in 1993, remained constant between 1994 and 1996 and increased sharply from 1999 to 2003. It however fell amid 2004 to 2007 after which it had consistently been on the rise. Finally, the savings deposit rate (SDR) rose from 1985 till 1989 before it mildly fell (1990) and rose (1994) respectively. Again, the rate fell after then till 2011 when mild increases set in.

2.1.2 MP Transmission Mechanisms and Stock Prices

For effective MP to exist, regulators must rightly assess the timing and anticipated effects of such policies on the economy. One way is to have requisite understanding of monetary transmission mechanisms and channels through which MP affects economic activities. For instance, effect of changing interest on loans prescribed by the apex bank on other money market rates and financial market conditions will depend on the expectations attached to such changes, how the changes affect expectations regarding future policy and price stability (Claus & Grimes, 2003). Wang, (2020) asserted that in times of unconventional MPs, and its transmission to the stock market, highly liquid firms may enjoy lower interest on borrowing thereby able to repurchase more stocks while highly levered firms may become restraining in stock repurchases. In essence, unconventional MP announcements can spur or reduce investment in stock and prices.

Early study by Tobin (1969; 1978; cited in Erhmann and Fratzscher, 2004)) supported direct transmission of changes in monetary policies to stock prices. According to Tobin (1969), financial policies changes play important roles influencing market value of a company's assets in vis-à-vis the assets' replacement cost. This effect (in ratio), the author termed the Tobin's q. Tobin (1978) argued that a restrictive MP, which is likely a result of increased inflation rate will most probably reduce the PV of expected cash inflow thereby depressing stock markets. However, as noted by Erhmann and Fratzscher (2004), Tobin's position is debatable since MP changes may be endogenous because the financial authority (the Central Bank) may formulate such policies as a form of reaction to events in stock markets.

While Yoshino *et al* (2014) identified three main channels through which MP influence stock prices: interest rates, inflation and exchange rate, However, Nwaogwugwu (2018) listed five possible channels through which MP can influence stock prices: foreign exchange rate, savings, wealth, credit and monetary channels. Pai and Garg (2019) stated that four MP transmission channels (interest, equities, lending and balance sheets) work via investment expenditure. One (exchange rate) works via net exports while two (interest and wealth) influence it through consumption expenditures. Yoshino *et al* posited that broad money affects stock price in four different ways. First, increase in it can induce inflation which can impair stock prices. Secondly, when a change in volume of money in the system, economic activities may increase thereby having a positive effect on stock. Thirdly, according to portfolio theory, when money supply increases, investors may shift their preference to equity and other interest-bearing financial assets. Finally, money supply may cause price increase when changes in it signals potential inflation and investors want to take advantage of the present stock price to acquire more thereby pushing up stock prices.

From Qing and Kusairi (2019) point of view, exchange rate – stock price connection depends largely on how rising rate of interest results in capital inflows plus increase in exchange rate itself. The authors believe exchange rate increase negatively affects equity prices for exporting firms since they will earn more in local currency through exports. On how interest rate channel can influence stock prices, Keynes' (1936) position is particularly relevant. The author evaluates impact of low interest rate on aggregate demand, positing that since easy MP leads to fall in interest fall, investment increases and aggregate demand also increases. Increased aggregate demand will also reflect in a higher demand for stock which will invariably increase stock prices. Avci and Yucel (2017) believed that an evaluation of effectiveness of MP should be premised on degree at which the prevailing interest rate affects other money market rates and financial assets prices.

Again, Yoshino *et al* (2014) argued that a big puzzle ensues on the link of exchange rate and stock prices. The authors believe overall effect of the former on the latter remains undetermined. These authors examine equity price versus exchange rate from two directions. One, decrease in exchange rate of a local currency against a foreign one will lead to increase in exports which will benefit local firms who produce for exports and stock prices may likely increase. Conversely, depreciation in local currency will heighten cost of importing raw materials by local firms and this may impair their stock price.

Ogbulu and Uruakpa (2011) stated that basic a theoretical underpinning of monetary transmission mechanism to asset price holds that an increase in, for instance, the MP rate (MPR) in Nigeria, by the CBN raises the lending rate of banks which, all things being equal, would force business firms to look in direction of capital market to raise funds for their operations and expand their real physical assets. This increases aggregate supply of securities in capital market, thereby leading to reduction in equity price. According to these authors, similarly, increase in money volume (expansionary MP) lowers savings and lending rates, thereby making bank credit more attractive than raising funds from financial market. This reduces aggregate supply of securities in the market leading to surplus demand for securities and hence an increase in prices. Thus, an ease MP which lowers interest rates and spurs stock price.

Alessi and Kerssenfisher (2016) posited that popular macroeconomic theories predict a rapid response of asset prices to MP shocks, which conventional empirical models are unable to reproduce. However, these authors argue that such response results from paucity of information. Accordingly, forward-looking economic agents observe vastly more information than the handful of variables included in standard VAR models hence making results from such models prone to biasness. To prove this, they estimate a structural factor model (SFM) for a large euro area dataset and find quicker and larger effects of tight MP shocks on stock prices.

Grenville (1996), (cited in Gruen, Romalis and Chnadra, 1997) identified six main channels through which interest rates alteration can affect economic activity. These channels are inter-temporal substitution; induced exchange rate changes; interest rate power on security prices; effect of cash flow on the deficit unit (borrowers); effect on supply of credit and effect of MP on future expectations. In essence, interest is a fundamental factor influencing stock prices. Eichenbaum and Evans (1995) stated that, in respect financial markets, economic theory teaches that stock prices rapid response to MP changes should be expected once the changes become apparent, but this hardly occur. Instead, the authors notice that changes in MP on stock prices and entire economy is usually gradual and most times prolonged. Patelis (1997) argued that stocks are claims on projected economic output, hence if MP variables have tangible economic impacts, then stock markets will be impacted by MP actions.

According to Abanewe and Undugbu (2012), the MP/stock market relationship can be tied to the transmission mechanisms of MP, in line with the position of Goodhart and Hofmann (2000) who see stock market itself as a transmission mechanism of MP actions that affect stock price that are connected to actual economy through influences on consumption investment spending. In Bordo, Ducker and Wheelock's (2008) view, policy makers and operators in an economy often attribute changes in market performance to attendant changes in inflation and MP. These authors observe that MP – stock prices link is more evident during rapid increase or declining stock prices. This means stock market also serves as a form of transmission mechanism for MP. Next, we shall review the previous empirical evidence linking MP and stock prices.

2.2 Theoretical Literature

2.2.1 Efficient Market Hypothesis (EMH)

Clarke, Jandik and Mandelker (2001) restated the EMH proposed by Fama (1965). In the words of the authors, "EMH is a proposition that current stock prices fully reflect available information about the value of the firm, but there is no way to earn excess profits, (more than the market overall), by using this information". That is, in efficient markets, averagely, competition cause full effects of fresh news on inherent values to reflect immediately in definite prices. The foregoing are the assumptions behind the whole EMH thoughts. The hypothesis attempts to clarify why and how stock prices vary in security markets. Clarke *et al* stated that the EMH submits that profiting by predicting movements in equity prices, it may be, indeed, very hard and improbable because there are different kinds of information that can influence security values. So, Clarke *et al* (2001) distinguished three forms of efficiency in security markets, depending on available information:

- The "weak form" EMH

The "weak-form" EMH states that the current stock price completely integrates information in historical prices only so that no investor can spot mis-priced securities or outsmart market by assessing historical stock prices. The weak-form EMH assumes security prices are public which its information is easily available. Therefore, it is not possible to gain unduly from using information available to all investors. Clarke *et al* (2001) further stated that the empirical evidence for this form of market efficiency, and therefore against the value of technical analysis, is very strong.

- The "semi-strong" EMH

The "semi-strong" form EMH argues that current price completely incorporates all obtainable information which also companies' financial report information (earnings and dividend announcements, mergers (actual or planned), competitors' financial positions and expectations in respect of macro-variables like unemployment, inflation, exchange) apart from historical stock prices. Actually, the hypothesis holds that public information does not compulsorily imply financial terms. The position of the semi-strong efficiency is equal to that of the weak form: that it may be difficult or impossible making profit from information that is available to all people. The only difference is that this position under the semi-strong efficiency is stronger than in the weak form efficiency.

- The "strong form" EMH

This hypothesis posits that current stock price fully captures all available information, be it public and inside (private). However, the distinguishing feature of strong form EMH is that here, no investor should systematically make profits even if trading on information is not available to everyone at the time. That is, even a company's management (insiders) cannot use his privileged inside information by acquiring his company's stocks a few hours after issue decision (not yet announced to public) to gain inequitably from the issue (Fama, 1965).

The EMH was criticized as Clarke *et al* (2001) stated that four major criticisms trail the position of the hypothesis on price reactions to information. First, the claim of EMH that investors cannot outsmart the market does not translate to investors not able to outperform it. Since constant availability of information can make prices fluctuate, investors can exploit price fluctuations caused by new available information to acquire or dispose more stocks. Critics of EMH believe that its claim that no investor could predictably and consistently outperform the market may not stand the test of time as, according to them, some investors can, by chance, outperform the market consistently even in efficient market. Second, the EMH posits that a no need for technical financial analysis position because it wastes time. However, the services of financial analysts are of great

effect since they are consistently part of market. Selection of optimal portfolio depends much on accurate and reliable predictions through financial analysis which a randomly selected portfolio most probably cannot achieve. Through high technical financial analysis, Lo, Mamaysky and Wang (2000) observed that such analyses, can, at times have elements of predictive power on stock price because it can help to identify mis-priced stocks through new information analysis. Third, the EMH posits that all new information is always absolutely captured in prices of stocks. But, as noted by Malkiel (2003), the daily, hourly or minute by minute dramatic changes in equity price can point to presence of efficient market since new information arrive all the time and they affect stock value and prices.

Finally, an assumption by EMH that every investor is well-informed, skilled with analytical prowess to always analyze information is incorrect. Clarke *et al* (2001) stated that not all investors must be well-informed about the workings of stock market. Efficient market is also possible when only a small, but core number of investors are well-informed and skilled. Despite these criticisms, early empirical studies such as Fama (1965) and Fama, Fisher, Jensen and Roll (1969) agreed with both the weak and semi-strong forms of EMH, while others (such as Jaffe (1974) and Rozeff and Zaman (1988)) disagreed with the strong form.

2.2.2 Capital Assets Pricing Model (CAPM)

French (2003) stated that the CAPM was developed by Markowitz (1952) as a model for evaluating assets returns in given combination of securities (portfolio) but was built upon by later theorists. Tobin (1958), Sharpe (1963), Lintner (1965) and Mossin (1966) made further simplifications and into the model. The CAPM states that expected stock return by investors is usually a function of risk-free rate and risk premium dictated by the market. This indicates that expected returns on asset is the risk-free rate plus market risk-premium. Sharpe's (1964) modification to the model recognizes two components of risks: systematic (uncontrollable, non-diversifiable) and unsystematic (controllable, diversifiable). The systematic risk also affects stock return and price, hence, an important factor to be considered in pricing of stocks. Sharpe (1964) develops concept of efficient frontier on which all investors will hold some portfolio, irrespective of their dispositions to risks. Hence, to have an efficient portfolio, an investor can hold a portfolio of risk-free plus risky assets situated at the point of intersection of capital market line (CML) and efficient frontier. A basic assumption here is that the CML entails all possible combination of risky and risk-free investments that all investors will consider for investment. According to Sharpe (1964), efficient portfolio is when, in capital market, investors cannot expect returns greater than market returns.

The CAPM has been subjected to empirical tests over time. For example, while Black, Jensen and Scholes (1972) and Fama and MacBeth (1973) established evidence that are in agreement with the CAPM, Lakonishok and Shapiro (1986); Roll (1977) and Fama and French (1992, 1993, 1996, 2004) found that results that are not consistent with the position of CAPM. Miller (1999) criticized the CAPM for its use of single risk element which is not sufficient to describe financial market cross-section expected returns. Dempsey (2013), in particular, advocated a total replacement of CAPM considering global financial crises in the last decade. The author posited that the model be substituted with a "*paradigm of markets as vulnerable to capricious behaviour"*. In essence and as noted by Balling and Gnan (2013), CAPM should take cognizance of foreign exchange exposure risks and become International Capital Assets Pricing Model (ICAPM).

2.2.3 The Smart Money and Noise Traders Theory

Campbell and Kyle (1993), in their "smart money and noise trading theory" posit that exponentially de-trended stock prices and dividends are usually normally distributed and they possess constant variance thus utility-maximizing investors are natural risk averters. In the authors' view, this implies that expected return from stock by these investors (called the "smart money" investors) will fall as stock prices rises and that investors will react sharply to dividend news (at equilibrium) because stock prices discount dividends at relatively low riskless rate. Again, the authors hold that some investors invest exogenously, regardless of whether their utility is maximized or not. This group of investors (called "noise traders") also influences stock prices due to risk-averse behaviour of "smart money" investors though such influence is largely dependent on interest rate.

2.3 Empirical Literature

Zhang (2015) did a comparative analysis on China, Japan and the US Stock Markets by analyzing the relationships between macroeconomic variables (real-economy variables and monetary-policy (variables) and stock price volatility in each country. Estimated EGARCH model results reveal that despite China's stock price volatility being far greater than in Japan and US, China was less impacted by global financial recession of 2007/2008 than Japan and USA. Conversely, Japan and US stock prices became rather volatile in the wake of the global economic crisis in 2007, which suggests that Japanese and U.S stock markets were hugely affected by the crisis. For China, stock price volatility was greater in early 1990s, shortly after stock market was established, than in 2007 when global financial meltdown set in. In addition, covariance among China, Japan and US stock prices became fairly greater after the global downturn in 2007, which suggests that linkage of these countries' stock prices increased in this period. Moreover, according to the researcher, causality test reveals the following results: Japan's industrial output affects stock price changes, while China and US's consumer prices affect China and US's stock price volatilities, respectively. In addition, US interest rate affects stock price volatility, while China and Japan's MP variables (M2 and lending rate) do not affect their stock price volatilities, respectively.

Tang, Lou, Xiong, Zhao and Zhang (2013) examined impact of changes in MP on activities in money and stock markets of China. The authors use the Pearson correlation and other techniques to run daily data (stock price and money market rates) for period October 2006 to May 2012 and find a close relationship between changes in MP variable (MP rate) and stock and money market of China. Furthermore, these researchers find that when MP instruments shift forward (increases), the Shanghai Interbank Offering Rate (SHIBOR) fluctuates more than when it shifts backward (falls). On average, the study finds that changes in MP take about three days to have considerable impact stock price.

In a three-country study, Hsing (2013) examined the potential impacts of fiscal and monetary policies on stock market performance in Poland, Germany and the U.S.A. The researcher uses GARCH model to analyze data from Poland Stock Exchange during Q2, 1999. to 2012.Q and finds that Poland's stock index is not affected by ratio of government deficits or debt to GDP but is impaired by money market rate. Stock price and M3/GDP ratio reveal quadratic linkage with critical value that suggests positive effect if M3/GDP ratio is below 46.03% and negative relationship if M3/GDP ratio is above 46.03%. Also, the author finds that Poland's stock index positively correlates with industrial production like what obtains in Germany and U.S. but is impaired by nominal effective exchange and inflation rate in these latter countries.

In an inter-country study, Narayan and Narayan (2012) examined effect of exchange and short-term interest rates of United States on stock returns of China, India,

Philippines, Malaysia and Singapore using OLS and GARCH models to analyze data between 2000 to 2010. The authors find that, on the short-run, the US interest rate has no statistically significant effect on stock returns of India, China and Malaysia. Only result for Philippines was different with significant effect. Additionally, these researchers find that in China, exchange rate has negatively significant effect on stock returns. However, on long-run, the relationships of stock price and MP were weakened by financial crises in studied countries. In yet another cross-country study of European Union equity indexes versus MP measures, Stoica and Diaconasu (2012), using co-integration and Granger tests, find t significant long/short-run relationships between assets prices and interest rates. Specifically, they find co-movements between money market and stock, though the co-movements are lower during economic upheavals than when there is economic stability.

In an elaborate cross-developing countries comparative study by Al-Naif (2017) to examine link which interest rate has with stock market prices in five Arabian countries, the author uses correlation, Johansen cointegration, VAR, Granger causality and Variance Decomposition to find out how interest rate influence stock market indices. Stock indices include Arabian Monetary Fund Indices (AMFIs) for Jordan, Oman, Qatar, Egypt and Kuwait while interest rate is taken as commercial banks' lending rate for each country. The author finds that: interest rate significantly negatively impacts stock price in Egypt; negatively and insignificantly affects it in Qatar and Kuwait; but positively and significantly affects it in Jordan and Oman. In addition, tests of causality reveal no causal linkage between them in Oman, Qatar and Kuwait, a uni-directional causality that runs from stock price to interest rate exist in Egypt and a bi-directional causality between interest rate and stock price exist in Jordan. Finally, the author finds through Variance Decomposition that while interest rate plays a major role in explaining variation in Jordan and Kuwait stock prices, it only plays very little role in Egypt, Oman and Qatar.

In Zambia, Musawa and Mwaanga (2017) attempted to find how interest rate relates to stock index using cointegration analysis. The authors find that on both long-(through cointegration) and short-run (ECM), interest has significant negative influence on stock index. This agrees with findings by Shula (2017) who, using regression analysis, finds that negative association between interest rate and stock index in Zambia. Ndunda, Kingori and Ariemba (2016) examined connection among GDP, exchange rate, broader money supply (M3) and inflation and average market capitalization of Nairobi Stock Exchange. The researchers find a positive and high connection between them using correlation analysis. But with regression analysis, Ndunda *et al* (2016) find that interconnection of exchange rate, GDP and stock capitalization is statistically insignificant. Still in Kenya, Nyongesa and Muchoki (2016) examined effect of volatility in exchange rate on performance of Nairobi Stock Exchange between 1996 and 2011 using correlation and Engle and Granger co-integration analyses. Findings show that, in Kenya, very weak correlation exists between exchange rate volatility and stock price index and no long-run co-integration between them.

Nijam, Ismail and Musthafa (2015) while studying effect of macroeconomic variables (GDP, forex rate, inflation, BOP and interest rate) on the stock price of firms listed on Colombian Stock Exchange found the existence of strong causality between macroeconomic variables and stock prices. In order to ascertain the link between MP and stock price, Nguyen, Do and Nguyen (2016) examine impact of MP on stock prices of firms listed on Vietnam Stock Exchange using ARDL and GARCH models. Specifically, the researchers find that M2, interest rate and reserve ratio exert negative effect on listed firm's stock prices in Vietnam. In Bangladesh, Rifat (2015) studied impact of MP on stock prices of firms listed on Dhaka Stock Exchange from 2003 to 2013. The author uses Johansen Co-integration, VAR and VECM models to examine effects of exchange rate,

index of consumer prices, M2 and discount rate on market indices and finds no significant relationship between stock price and MP in Bangladesh. However, when Saidjada, Hossain and Rahman (2014) studied relationship between MP and stock returns in same Exchange using same Johansen co-integration, they find a negative relationship between price of stock and treasury rate. The difference in findings may be caused by a one-year gap or type of MP variable used. Yoshino, Taghizadeh-Hesary, Hassanzadeh, and Prasetyo (2014) examined the way Asian stock prices respond to MP shocks with the use of VECM basing their analysis on three transmitting channels where MP can affect stock prices: money, exchange and inflation rate. The researchers discover that, in Asia, stock prices increase continuously in response to expansionary or easing MP.

In Jordan, Al-Smadi and Omoush (2019) examined long- and short-run link between six macroeconomic indicators and stock index using ARDL. The authors find that on long run, five of the indicators have positive effect on stock index while one has negative effect on it. The result is same in short-run. Years before, Bekhet and Matar (2013) analyzed long-run relationship between stock price and M2, interest and exchange using ARDL for a data spanning 1978 to 2010. The researchers find that variations in stock prices respond to fluctuations in stated macroeconomic variables with a speed of about 49.3% on long-run. Javed and Akhtar (2012) used the GARCH model to investigate risk-return relationship between broad money, interest rate and term structure with stock prices of fifty (50) firms listed on Karachi Exchange in Pakistan for period July 1998 to December 2008. These researchers find that M2 positively affects prices of listed stock.

To find how Nigerian capital market performed vis-à-vis MP manipulations, Anaele and Umeora (2019) used ARDL to analyze a 22 year-dataset (1986 – 2017). Representing MP instruments by cash ratio (CRR), MPR, loan/deposit ratio (LDE) and liquidity ratio (LR) and ASI as proxy for capital market performance indicator, results show that MPR, CRR, and LDE adversely and significantly affected ASI but LDE has a strong correlation with ASI. Other related studies in Nigeria include Nwaogwugwu (2018), Bala and Hassan (2018), Adeyeye, Aluko and Migiro (2017), Onyeke (2016), and Nwakoby and Alajekwu (2016) among others.

3 Methodology

3.1 Data Sources

For convenience and equal representation purposes, 15 firms were selected from each of the sectors under consideration (banks and manufacturing firms) listed on the NSE as at December 2019 (a total of 15 banks were listed). Also, the choice size of 15 banks and 15 manufacturing firms is premised on the availability of data. The study covers 2006Q1 to 2019Q4. The span of years chosen is determined by data availability on one part and need to restrict the analysis of data obtained to the era of post-consolidation of the Nigeria banking sector, on the other. The dependent variable, stock price, is estimated as the quarterly average of monthly opening and closing stock prices for each firm under study. The variables representing MP are broad money supply (MS2), MP rate (MPR), lending rate (LDR), exchange rate (EXCH), cash reserve ratio (CRR), savings deposit ratio (SDR) and Treasury Bill rate (TBR). The deposit money banks selected include Access Bank, First Bank, Diamond Bank (now merged with Access Bank), First City Monument Bank, United Bank for Africa, Union Bank, Fidelity Bank, GTB, Unity Bank, Wema Bank, Sterling Bank, Stanbic IBTC, Ecobank, Zenith Bank and Skye Bank (now Polaris Bank). The manufacturing firms randomly selected from the NSE list are: Patterzon Zocchonis, Guinness PLC, West African Portland Cement (WAPCO), Flour Mills Nig. PLC, Total Nig PLC, Cadbury Nig PLC, May and Baker PLC, Nestle Nig PLC, Mobil PLC, Beta

Glass, First Aluminum, Julius Berger, Berger Paints, Unilever Plc and Livestock Feeds PLC

3.2 Estimation Process

We carried some preliminary tests that dictated the preferred estimation techniques used in the study. These include the descriptive statistics, correlation coefficients, stationarity and co-integration tests. The tests are applied to the pooled/panel data of selected firms and quarterly data of MP variables.

Based on the dictates of these tests, we proceeded to use the Panel Dynamic Ordinary Least Squares (PDOLS) estimation technique to ascertain the effect of monetary policy on the stock prices of the firms. A general PDOLS model for our estimation is expressed as:

$$logSTP_{Ri} = \alpha_O + \beta_1 logM2 + \beta_2 logTBR + \beta_3 logMPR + \beta_4 logEXCH + \beta_5 logCRR + \beta_6 logLDR + \beta_7 logSDR + \sum_{j=-p}^{q} \beta_{1cj} \Delta logM2_{ct} + \sum_{j=-p}^{q} \beta_{2cj} \Delta logTBR_{c,t+j} + \sum_{j=-p}^{q} \beta_{3cj} \Delta logMPR_{C,t2+J} + \sum_{j=-p}^{p} \beta_{4cj} \Delta logEXCH_{c,t3+j} + \sum_{j=-p}^{p} \beta_{5cj} \Delta logCRR_{c,t4+j} + \sum_{j=-p}^{p} \beta_{6cj} \Delta logLDR_{c,\,t5+j} + \sum_{j=-p}^{p} \beta_{7}cj \Delta logSDR_{C,\,t6+J} + \varepsilon_{ct} \quad (3.9)$$

where "$\beta_1$cj ….$\beta_8$cj = coefficients of lead and lag q and p respectively differences that estimate unbiased estimates of β_1……. β_8 and remove asymptotic endogeneity and incidence of serial correlation or multi-collinearity" (Kao & Chang, 2000). We further examined the causal relationship between the dependent and independent variables using a stacked data test (common coefficients) panel causality test.

All the monetary policy variables except broad money supply (M2 – which can have positive or negative effect) are theoretically expected to inversely affect stock prices.

4. Results and Discussions

4.1 Summary of Preliminary Tests for Banks and Manufacturing Firms

4.1.1 Banks

- **Descriptive Statistics**

Appendix 1 shows that on average STP, M2, TBR, MPR, EXCH, CRR, LDR and SDR is ₦10.16653, 13.60282(trn), 9.446034%, 11.17982%, ₦179.6677, 11.29441%, 16.77441% and 2.642570% for banking firms respectively for period under consideration. While the maximum stock price for the period is ₦53.24300, maximum values for M2, TBR, MPR, EXCH, CRR, LDR and SDR are 24.14, 19.97, 14, 306.7127, 31, 31.18 and 4.22 respectively. Inversely, the minimum values for STP, M2, TBR, MPR, EXCH, CRR, LDR and SDR are 0.5, 2.91, 1.71, 6, 117.7449, 1, 8 and 0 respectively. The coefficient of skewness of study variables reveals that two of the variables, MPR and SDR are skewed to the left of the distribution with coefficients -0.742976 and -0.684886 while STP, M2, TBR, EXCH, CRR and LDR are all skewed to the right with coefficients 1.696434, 0.01724, 0.034275, 1.240926, 0.387085 and 0.765738 respectively. Only STP is leptokurtic with kurtosis above given benchmark of 3 while M2, MPR, EXCH, CRR, LDR and SDR are all platykurtic having kurtosis below 3. TBR and EXCH are approximately 3. Four out of

seven variables (STP, TBR, MPR and SDR) are normally distributed with Jarque-Bera coefficients and probabilities [(537.3729 (0.064405); 11.437135 (0.487450); 77.56572 (0.070032) and 74.04197 (0.8325000)] respectively. The other variables (M2, EXCH, CRR and LDR) are not normally distributed due to their Jarque-Bera coefficients and probabilities [(38.10644 (0.000000); 183.7631 (0.000000); 67.17989 (0.000000) and 84.30377 (0.000000)] respectively.

- **Correlations**

From Appendix 2, it is revealed that the coefficients of correlation between STP and independent variables are negative and weak, implying that the there exists no strong co-movement to the same direction between them. All the coefficients are between 1 (EXCH) and 20% (M2). However, there are considerable positive correlation coefficients among independent variables (between 38% for SDR/TBR and 89% for CRR/M2). This is expected as MP variables tend to move in same direction except for SDR. Nonetheless, Brooks (2008) argues that if correlations coefficients fall below 0.8 among most variables analyzed, multi-collinearity issue could be overlooked.

- **Stationarity Test**

Appendix 3 reveals that no variable is stationary at level and that all employed variables are stationary at first difference, that is, a null hypothesis that used variables have unit root cannot be accepted at order 1. These results provide the premise upon which the choice of estimation technique is made.

- **Co-integration**

The Johansen – Fisher combined (Trace and Max-Eigen) cointegration test is employed in this study to ascertain if there exist at least one cointegrating equation between stock price and MP variables. From Appendix 4 the probabilities of both Trace and Max-Eigen statistics indicate at least 6 (six) co-integrating equations among variables selected for the study which are 0.0000, 0.0007, 0.0025, 0.0000, 0.0000, 0.0000 and 0.0000 for model equations respectively. The null hypothesis of no cointegration cannot be accepted.

4.1.2 Manufacturing Firms

- **Descriptive Statistics**

Appendix 5 shows that on average STP, M2, TBR, MPR, EXCH, CRR, LDR and SDR is ₦94.50028, 13.60282(trn), 9.446034%, 11.17982%, ₦179.6677, 11.29441%, 16.77441% and 2.642570% for manufacturing firms respectively for period under consideration. While maximum stock price for the period is ₦1522.500, maximum values for M2, TBR, MPR, EXCH, CRR, LDR and SDR are 24.14, 19.97, 14, 306.7127, 31, 31.18 and 4.22 respectively. Asides, minimum values for STP, M2, TBR, MPR, EXCH, CRR, LDR and SDR are 0.27, 2.91, 1.71, 6, 117.7449, 1, 8 and 0 respectively. The skewness coefficient of the variables reveals that two variables, MPR and SDR are skewed to the left of the distribution with coefficients -0.742976 and -0.684886 while STP, M2, TBR, EXCH, CRR and LDR are all skewed to the right with coefficients 4.504533, 0.01724, 0.034275, 1.240926, 0.387085 and 0.765738 respectively. Only STP is leptokurtic with kurtosis above a benchmark of 3 while M2, MPR, EXCH, CRR, LDR and SDR are all platykurtic having kurtosis below 3. TBR and EXCH are approximately 3. Four of seven variables (STP, TBR, MPR and SDR) are distributed normally with Jarque-Bera coefficients and probabilities [(20545.19 (0.0550614); 11.437135 (0.487450); 77.56572 (0.070032) and 74.04197 (0.8325000)] respectively. The other variables (M2, EXCH, CRR and LDR) are not normally distributed due to their Jarque-Bera coefficients and probabilities [(38.10644 (0.000000); 183.7631 (0.000000); 67.17989 (0.000000) and 84.30377 (0.000000)] respectively.

ii. Correlations

Appendix 6, it is revealed that among the manufacturing firms, the correlation coefficients between STP and independent variables are all positive and weak contrary to what obtained among the banking firms. This implies a co-movement in same direction between the variables. The correlation coefficients between STP and M2, TBR, MPR, EXCH, CRR, LDR and SDR are 0.115442 (11.54%), 0.083644 (8.36%), 0.084771 (8.48%), 0.088489 (8.88%), 0.116190 (11.62%), 0.077869 (7.79%) and 0.06945 (6.95%) respectively. Again, as noted under banking firms, there are considerable positive correlation coefficients among independent variables (between 38% for SDR/TBR and 89% for CRR/M2).

ii. Stationarity Test

Appendix 7, it is revealed that none of the variables is stationary at level and that all variables are stationary at order 1, that is, null hypothesis that variables have unit root cannot be accepted at first difference.

iii. Co-integration

Results of panel cointegration tests on Appendix 8 reveal that there is long-run relationship between MP variables and stock prices of selected manufacturing firms in Nigeria. As stated previously, the deciding rule in co-integration is to compare both Trace and Max-Eigen statistics probabilities with significance level (5%) to decide whether not to accept or the null hypothesis. From Appendix 7, probabilities of both Trace and Max-Eigen statistics indicate at least 6 (six) co-integrating equations among of selected variables which are 0.0000, 0.0000, 0.0001, 0.0000, 0.0000, 0.0000 and 0.0000 for the equations respectively. The null hypothesis of no cointegration cannot be accepted and alternative hypothesis of at least one (1) cointegration equation cannot be rejected.

4.2 Comparative Analysis of the PDOLS Effect of MP on Stock Prices of Banks and Manufacturing Firms

The objective is to establish whether effect of MP on stock prices of banking firms is significantly different from that of selected manufacturing firms. The relevant null hypothesis to be tested here states that no significant difference exists between effect of MP on stock prices of selected banks and manufacturing firms. Table 4.1 contains the extracts of the results of PDOLS and a comparative analysis between the two firm groups.

Table 4.1: Comparative Analysis of Effect of MP on Stock Prices of Banking and Manufacturing Firms

Dependent Variable: STP. Method: PDOLS							
	Banking Firms			Manufacturing Firms			
Variable	Coefficient	Prob.	Remark	Coefficient	Prob.	Remark	Conclusion
M2	-0.807814	0.0147	Negative, Significant	-3.789570	0.2455	Negative, Insignificant	Different
TBR	0.582522	0.0000	Positive, Significant	0.920690	0.4098	Positive, Insignificant	Different
MPR	-1.488463	0.0000	Negative, Significant	-4.023008	0.0110	Negative, Significant	Not Different
EXCH	-0.041062	0.0110	Negative, Significant	-0.162981	0.3062	Negative, Insignificant	Different
CRR	0.009351	0.9351	Positive, Insignificant	-1.775198	0.1138	Negative, Insignificant	Different
LDR	0.039391	0.7049	Positive, Insignificant	-0.001662	0.9987	Negative, Insignificant	Different
SDR	-1.222058	0.0003	Negative, Significant	-3.642340	0.2813	Negative, Insignificant	Different
Adjusted R-squared	87%			75%			

Source: Author's Compilation (2022)

Results in Table 4.1 reveal that only one of the MP variables, that is, MPR has the same effect (negative and significant) on stock prices of both banking and manufacturing firms studied. Effects of other six out of the seven MP variables examined (M2, TBR, EXCH, CRR, LDR and SDR) differ between banking and manufacturing firms. It is worth noticing that 5 of the 7 MP variables (about 71%) have statistically significant effect (positive and negative) on stock prices of banking firms while only 1 (about 14%) of the 7 variables has a statistically significant effect on stock prices of manufacturing firms selected.

Furthermore, based on number of MP variables that have significant effect on stock prices of banking vis-à-vis that of manufacturing firms, it is safe to infer that MP exerts greater influence on stock price of banking firms than of the manufacturing firms. The foregoing conclusion not-withstanding, only one out of five MP variables has a positive and significant effect on stock prices of banking firms, and this means that the banking sub-sector did not benefit maximally from Nigerian monetary policies during period of study even when it is the main channel where such policies are executed. Instead, MP during this period had exerted more adverse effects than good on stock prices of the banks. This is against the general belief that the banking industry, as chief implementers of MP, would strategically position itself in anticipation of policy changes and possibly reap the advantages associated with some levels of foreknowledge. That MPR affects stock prices of the two sectors in question (negative and significant) clearly shows that it is a major tool that drives other MP tools and a key determinant in the availability of funds to all economic sectors. Adjustment in MPR directly affects loanable funds which also determines what is available for investment purposes.

In the light of the comparative analysis carried out, it is evident there exists marked and clear difference between results for banks and manufacturing firms. The null hypothesis of no significant difference between effect of MP on stock prices of banking and manufacturing firms cannot be accepted. This conclusion has sufficiently addressed the third objective of the present study. Also, the differences in how MP affects stock

prices in these two firm groups bring to the fore the need for monetary authorities to pay attention to sector differentials in monetary policy formulation and execution.

4.3. Analysis of Causality

4.3.1 Banks

The second objective of this study is to ascertain whether any causal relationship exists between MP and stock prices of banking firms in Nigeria. The tests of causality among these variables are done based on data of each bank considered. The decision rule on whether two variables have causal link is to compare the probability of F-Statistic with the LOS (5% here). If the Prob (F-Stat) is greater than 5% LOS for two variables considered, our null hypothesis stating no causal relation cannot be rejected and vice-versa. A uni-directional causality arises when the probability of only one variable considered is less than 5% LOS. Furthermore, where the probabilities of F-Stat of two variables considered is short of 5%, it implies that the variables have bi-directional causality. Table 4.2 contains the summary of the panel causality test for banking firms' data.

Table 4.2: Panel Causality Test Results – Banks

Null Hypothesis	F-Statistics	Prob.	Answer	Comment/Conclusion
"M2 causes STP"	0.88346	0.4139	No	"No causality "
"STP causes M2"	1.15280	0.3165	No	
"TBR causes STP"	0.74376	0.4758	No	"Uni-directional causality
"STP causes TBR"	6.64620	0.0014	Yes	from" STP to TBR
"MPR causes STP"	16.0467	2.E-07	Yes	"Uni-directional causality
"STP causes MPR"	1.91681	0.1480	No	from" MPR to STP
"EXCH causes STP"	1.25933	0.2846	No	"Uni-directional causality
"STP causes EXCH"	4.63291	0.0101	Yes	from" STP to EXCH
"CRR causes STP"	5.94562	0.0028	Yes	"Uni-directional causality
"STP causes CRR"	1.45694	0.2338	No	from" CRR to STP
"LDR causes STP"	8.78977	0.0002	Yes	"Bi-directional causality
"STP causes LDR"	16.0985	2.E-07	Yes	between" LDR and STP
"SDR causes STP"	39.5060	8.E-17	Yes	"Bi-directional causality
"STP causes SDR"	8.35366	0.0003	Yes	between" SDR and STP

Source: Authors' Computation (2022)

Table 4.2 reveals that six (6) out of seven MP variables examined have causal association with stock prices of banking firms selected with probabilities of F-Statistics less than 5% LOS. As shown by their respective probabilities (<5% significance level), changes in TBR is caused by changes in STP; MPR Granger causes STP; EXCH and STP Granger cause each other; CRR Granger causes STP; LDR and STP Granger cause each other and SDR and STP Granger cause each other. However, there exists no causal connection of M2 and STP (probabilities > 5% significance level). The implication of these results is that changes in selected banks stock prices are caused by changes in some MP variables examined (namely, MPR, CRR, LDR and SDR more than previous changes in stock price itself. Furthermore, stock prices cause greater changes in TBR, EXCH, LDR and SDR more than the previous changes in these MP variables themselves. These findings agree with Nwakoby and Alajekwu (2016) and Adeyeye and Migiro (2017). Changes in M2 does not cause an important change in stock prices, neither does the latter cause any significant change in former.

4.3.2 Manufacturing Firms

Table 4.3 contains the abridged results of causality test carried out on manufacturing firms' data.

Table 4.3: Panel Causality Test Results – Manufacturing Firms

Null Hypothesis	F-Statistics	Prob.	Answer	Comment/Conclusion
"M2 causes STP"	0.85054	0.4277	No	"No causal relationship"
"STP causes M2"	0.01418	0.9859	No	
"TBR causes STP"	0.22292	0.8002	No	"No causal relationship"
"STP causes TBR"	0.52329	0.5928	No	
"MPR causes STP"	0.04209	0.9588	No	"No causal relationship"
"STP causes MPR"	0.88448	0.4134	No	
"EXCH causes STP"	0.22550	0.7982	No	"Uni-directional causality
"STP causes EXCH"	7.81991	0.0004	Yes	from" STP to EXCH
"CRR causes STP"	2.11108	0.1219	No	"No causal relationship"
"STP causes CRR"	2.44502	0.0875	No	
"LDR causes STP"	1.62488	0.1977	No	"No causal relationship"
"STP causes LDR"	0.70171	0.4961	No	
"SDR causes STP"	1.98573	0.1381	No	"No causal relationship"
"STP causes SDR"	0.79470	0.4522	No	

Source: Authors' Computation (2022)

Results in Table 4.3 show that among all the MP variables selected, only exchange rate (EXCH) has a uni-directional causality with stock price (STP) and it runs from STP to EXCH. This is revealed in p-value of F-Statistic for that particular relationship (0.0004) and it implies STP causes changes in EXCH more than previous changes in EXCH itself.
In all, it is clear that there exists causal effect between MP variables and stock prices and that the causality is predominant in banking sub-sector than in manufacturing. Therefore, the hypothesis stating no causal linkage between MP and stock prices of Nigerian banks and manufacturing firms cannot be accepted. This conclusion also addresses the fourth study objective sufficiently.

4.4 Implication of Findings

Broadly, this research was undertaken to ascertain effect of MP on stock prices of selected quoted banks and manufacturing firms in Nigeria between 2006 and 2019. Specifically, the study addressed five objectives: to study effect of MP tools on stock prices of selected banks; ascertain effect of MP on stock prices of selected manufacturing firms; compare effect of MP on stock prices of banks and manufacturing firms; investigate existence and direction of causality between MP variables and stock prices of the banks and investigate the existence of causality among MP variables and stock prices of selected manufacturing firms in Nigeria from 2006 to 2019.
Panel Dynamic Least Squares (P-DLS) was employed to analyze panel data of thirty (30) listed firms divided into two equal groups (banking and manufacturing firms) of fifteen firms each. The PDLS results revealed that in banking sector, MP affect stock prices of studied banks for period under study. Precisely, M2, MP rate, exchange rate and savings rate exert negative and significant effect on stock prices of banking firms. Contrariwise, TBR exerts a positive and statistically significant effect on stock prices while cash reserve ratio and lending rate exert positive but weak effect on stock prices of banks. In manufacturing sector, broad money supply, exchange rate, cash reserve ratio, lending rate and savings rate all have statistically weak negative effect on stock prices while TBR has positive but statistically weak effect on stock prices of the selected manufacturing firms. However, MP rate exerts a negative and statistically significant effect on the firms' stock prices.

The outcomes of the analysis carried with Panel Dynamic Least Squares on data of selected firms imply that MP impacts stock prices of banks and manufacturing firms for the period under study. Furthermore, the comparative analysis carried out on results for the two group of firms show that clear differences on how MP affects stock prices of banking

and manufacturing firms. It is evident that, based on significance or otherwise of effects of individual variables, that effect of MP on stock price is more prominent in banking than in manufacturing sector firms. Moreover, results of panel causality conducted for the two firm groups revealed causal relationship between MP variables and stock prices of both firm groups. However, greater MP/stock price causality exists in banking industry than in the manufacturing sector for period under study. Findings here support the position of the quantity theory propounded by Friedman (1956, 1988) that increase in M2 or other money market variables may not necessarily lead to hike in equity price because excess demand for stocks may be neutralized by increase in quest for other assets like household goods. This reflects in negative effect of M2 on stock price. The findings also support the position of Tobin (1969) who states that financial policies changes can play vital role in influencing market value of a company's assets. With his effect ratio, called the Tobin's q, the author posits that restrictive/tight MP may lead to reduction in cash inflow present value which will translate into reduction in demand for stock and decreasing stock prices.

5. Conclusion and Recommendations

Arising from analyses and findings in this work, which was undertaken to examine and compare the effect of MP on banks and manufacturing firms stock prices in Nigeria, this researcher arrived at five major conclusions: One, MP variables significantly affect stock prices of banking firms quoted on the NSE between 2006 and 2019. MP variables, namely M2, MP rate, exchange rate and savings deposit rate positively and significantly affect stock prices of the listed banking firms. Two, this study also concludes that in manufacturing firms' group, MP rate negatively and significantly impacts stock prices of quoted firms. Three, it is concluded that there are significant differences when effect of MP on stock prices is compared between banking and manufacturing firms and that the effect is prevalent in banking firms' group than in manufacturing firms' group from 2006 to 2019. Four, there is causal connection between MP and stock prices of banking firms in Nigeria. Finally, it also concludes that there exists causal relationship between MP and stock prices of manufacturing firms. However, causality is more predominant in banking firms' group with six (6) of seven (7) MP variables examined having causal link with stock prices in banks group whereas only one (1) has causal link with stock prices in the manufacturing firms' group implying that past changes in these variables except one did not cause more changes in stock prices than past changes in the later caused in itself.

On the whole, more MP tools employed by CBN during the years of study did not contribute positively to stock price increases. Apart from OMO (Treasury bill purchase and sale) which has positive and strong impact on stock price of banking firms, others with significant effect adversely affect it. Equally, the only variable with strong effect on prices of stock of manufacturing firms exerts negative effect. It is safe to conclude, based on these outcomes that over these years, one major goal of MP, which is financial market stability and development of manufacturing sector, have not been achieved. Monetary policy authorities need to critically examine their policies to date vis-à-vis the targeted goals. We recommend a disaggregated, sector sensitive monetary policy strategies. Since MP tools affect stock prices of both the banks and manufacturing firms and are sector sensitive, there is need for monetary authorities to disaggregate monetary policies into different economic sectors. For example, the CBN can introduce monetary policies that make stock investment in firms of targeted sectors attractive through prescription of low interest on share loans. This will increase potential investors' access to cheap funds for investment in stocks of the targeted sectors. In essence, the CBN, as much as possible, should avoid prescribing the same monetary policies for all economic sector concurrently. This is apart from the need for monetary authorities to constantly appraise monetary policy tools vis-à-vis stock market expansion goal.

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Appendices

Appendix 1: Descriptive Statistics – Banks

	STP	M2	TBR	MPR	EXCH	CRR	LDR	SDR
Mean	10.16653	13.60282	9.446034	11.17982	179.6677	11.29441	16.77441	2.642570
Median	6.260000	13.30000	9.500000	12.00000	157.2888	8.000000	14.00000	3.210000
Maximum	53.24300	24.14000	19.97000	14.00000	306.7127	31.00000	31.18000	4.220000
Minimum	0.500000	2.910000	1.710000	6.000000	117.7449	1.000000	8.000000	0.000000
Std. Dev.	10.94568	6.369231	3.763067	2.571991	63.91013	8.705996	7.605314	1.361747
Skewness	1.696434	0.017240	0.034275	-0.742976	1.240926	0.387085	0.765738	-0.684886
Kurtosis	5.549696	1.870344	2.791498	2.373971	2.992037	1.714504	2.306885	2.221810
Jarque-Bera	537.3729	38.10644	11.437135	77.56572	183.7631	67.17989	84.30377	74.04197
Probability	0.064405	0.000000	0.487450	0.070032	0.000000	0.000000	0.000000	0.8325000
Sum	7279.232	9739.620	6763.360	8004.750	128642.1	8086.800	12010.48	1892.080
Sum Sq. Dev.	85662.64	29005.48	10124.88	4729.824	2920421.	54192.98	41356.17	1325.864
Observations	840	840	840	840	840	840	840	840

Source: Author's Computation (2022)

Appendix 2: Correlations – Banks

	STP	M2	TBR	MPR	EXCH	CRR	LDR	SDR
STP	1.000000	-0.195124	-0.075658	-0.061495	-0.118496	-0.141545	-0.012466	-0.089095
M2	-0.195124	1.000000	0.563630	0.518106	0.857598	0.890468	0.607908	0.452906
TBR	-0.075658	0.563630	1.000000	0.758351	0.597999	0.631084	0.597232	0.380247
MPR	-0.061495	0.518106	0.758351	1.000000	0.569292	0.735859	0.713809	0.442575
EXCH	-0.118496	0.857598	0.597999	0.569292	1.000000	0.794711	0.835976	0.591256
CRR	-0.141545	0.890468	0.631084	0.735859	0.794711	1.000000	0.713070	0.601558
LDR	-0.012466	0.607908	0.597232	0.713809	0.835976	0.713070	1.000000	0.696037
SDR	-0.089095	0.452906	0.380247	0.442575	0.591256	0.601558	0.696037	1.000000

Source: Author's Computation (2022)

Appendix 3: Abridged Results of Stationarity Tests for Banks

Variable	Level 5%		First Difference 5%		Order of Stationarity
	Fisher-ADF Statistic	Probability	Fisher-ADF Statistic	Probability	
STP	103.812	0.6481	261.112	0.0000	I(I)
M2	113.099	0.6595	266.841	0.0000	I(I)
TBR	117.931	0.5363	213.080	0.0000	I(I)
MPR	67.1104	1.0000	203.711	0.0000	I(I)
EXCH	30.3238	1.0000	234.006	0.0000	I(I)
CRR	75.5351	0.9995	391.237	0.0000	I(I)
LDR	50.8400	1.0000	415.778	0.0000	I(I)
SDR	106.970	0.7968	671.684	0.0000	I(I)

Source: Author's Computation (2022)

Appendix 4: Co-Integration Test – Banks

Johansen Fisher Panel Cointegration Test
Series: STP M2 TBR MPR EXCH CRR LDR SDR
Date: 28/09/21 Time: 20:28
Sample: 2006 2019
Included observations: 840
Trend assumption: Linear deterministic trend
Lags interval (in first differences): 1 1

Unrestricted Cointegration Rank Test (Trace and Maximum Eigenvalue)

Hypothesized No. of CE(s)	Fisher Stat.* (from trace test)	Prob.	Fisher Stat.* (from max-eigen test)	Prob.
None*	379.9	0.0000	360.8	0.0000
At most 1*	163.6	0.0007	163.6	0.0007
At most 2*	156.5	0.0025	156.3	0.0025
At most 3*	217.7	0.0000	217.7	0.0000
At most 4*	211.1	0.0000	211.1	0.0000
At most 5*	181.5	0.0000	181.5	0.0000
At most 6*	194.9	0.0000	194.9	0.0000
At most 7	101.0	0.7185	101.0	0.7185

Trace and Max-eigenvalue test indicate 6 cointegrating eqn(s) at the
* denotes rejection of the hypothesis at the 0.05 level
* Probabilities are computed using asymptotic Chi-square distribution.

Source: Author's Computation (2022)

Appendix 5: Descriptive Statistics – Manufacturing Firms

	STP	M2	TBR	MPR	EXCH	CRR	LDR	SDR
Mean	94.50028	13.60282	9.446034	11.17982	179.6677	11.29441	16.77441	2.642570
Median	31.47333	13.30000	9.500000	12.00000	157.2888	8.000000	14.00000	3.210000
Maximum	1522.500	24.14000	19.97000	14.00000	306.7127	31.00000	31.18000	4.220000
Minimum	0.270000	2.910000	1.710000	6.000000	117.7449	1.000000	8.000000	0.000000
Std. Dev.	191.4599	6.369231	3.763067	2.571991	63.91013	8.705996	7.605314	1.361747
Skewness	4.504533	0.017240	0.034275	-0.742976	1.240926	0.387085	0.765738	-0.684886
Kurtosis	26.47332	1.870344	2.791498	2.373971	2.992037	1.714504	2.306885	2.221810
Jarque-Bera	20545.19	38.10644	1.437135	77.56572	183.7631	67.17989	84.30377	74.04197
Probability	0.000000	0.000000	0.487450	0.000000	0.000000	0.000000	0.000000	0.000000
Sum	73710.22	9739.620	6763.360	8004.750	128642.1	8086.800	12010.48	1892.080
Sum Sq. Dev.	28555727	29005.48	10124.88	4729.824	2920421.	54192.98	41356.17	1325.864
Observations	840	840	840	840	840	840	840	840

Source: Author's Computation (2022)

Appendix 6: Correlations – Manufacturing Firms

	STP	M2	TBR	MPR	EXCH	CRR	LDR	SDR
STP	1.000000	0.115442	0.083644	0.084771	0.088489	0.116190	0.077869	0.068945
M2	0.115442	1.000000	0.563429	0.535004	0.855189	0.891565	0.621457	0.472235
TBR	0.083644	0.563429	1.000000	0.759048	0.595702	0.621985	0.593206	0.382011
MPR	0.084771	0.535004	0.759048	1.000000	0.576003	0.742214	0.713059	0.450319
EXCH	0.088489	0.855189	0.595702	0.576003	1.000000	0.787892	0.843332	0.600615
CRR	0.116190	0.891565	0.621985	0.742214	0.787892	1.000000	0.713020	0.612867
LDR	0.077869	0.621457	0.593206	0.713059	0.843332	0.713020	1.000000	0.695172
SDR	0.068945	0.472235	0.382011	0.450319	0.600615	0.612867	0.695172	1.000000

Source: Author's Computation (2022)

Appendix 7: Abridged Results of Stationarity Tests for Manufacturing Firms' Data

Variable	Level 5%		First Difference 5%		Order of Stationarity
	Fisher-ADF Statistic	Probability	Fisher-ADF Statistic	Probability	
STP	121.825	0.3860	180.353	0.0002	I(I)
M2	113.099	0.6595	266.841	0.0000	I(I)
TBR	117.931	0.5363	213.080	0.0000	I(I)
MPR	67.1104	1.0000	203.711	0.0000	I(I)
EXCH	30.3238	1.0000	234.006	0.0000	I(I)
CRR	75.5351	0.9995	391.237	0.0000	I(I)
LDR	50.8400	1.0000	415.778	0.0000	I(I)
SDR	106.970	0.7968	671.684	0.0000	I(I)

Source: Author's Computation (2022)

Appendix 8: Co-Integration Test – Manufacturing Firms

Johansen Fisher Panel Cointegration Test
Series: STP M2 TBR MPR EXCH CRR LDR SDR
Date: 28/09/21 Time: 20:25
Sample: 2006 2019
Included observations: 840
Trend assumption: Linear deterministic trend
Lags interval (in first differences): 1 1

Unrestricted Cointegration Rank Test (Trace and Maximum Eigenvalue)

Hypothesized No. of CE(s)	Fisher Stat.* (from trace test)	Prob.	Fisher Stat.* (from max-eigen test)	Prob.
None*	410.0	0.0000	387.7	0.0000
At most 1*	184.3	0.0000	184.3	0.0000
At most 2*	220.0	0.0001	220.0	0.0001
At most 3*	218.1	0.0000	218.1	0.0000
At most 4*	247.5	0.0000	247.5	0.0000
At most 5*	225.1	0.0000	225.1	0.0000
At most 6*	194.0	0.0000	194.0	0.0000
At most 7	101.9	0.8538	101.9	0.8538

Trace and Max-eigenvalue test indicate 6 cointegrating eqn(s) at the
* denotes rejection of the hypothesis at the 0.05 level
* Probabilities are computed using asymptotic Chi-square distribution.

Source: Author's Computation (2022)