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A REVIEW OF THE PENDULUM SWING IN STOCK PRICES AND INTEREST RATE

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ABSTRACT

Stock prices tend to grow aggressively during periods of falling interest rates. Economists opine that stock price boom are triggered by excessive supply of money and low interest rate. This paper takes a reverse look at the effect of asset price boom on interest rate. The study analyzed secondary data from World Bank World Development Indicators 2016 and CBN Statistical Bulletin 2015 between 1985 and 2015. Using Granger causality test, the study found that there is a bidirectional Granger causality running from ASI to MPR with a continuous feedback effect. The Bayesian Vector Autoregressive model was used in testing the impulse response function and variance decomposition analysis, the study found that one standard deviation innovations in ASI has a negative impact on MPR, although shocks to ASI does not significantly explain long term forecast error variance in MPR. The study recommends that Central Banks ensure that interest rates fully reflect broad economic conditions at all times and are not pressured downwards by unsustainable growth in stock prices in the financial markets.

Keywords: Stock price boom, asset bubble, monetary policy, interest rate

JEL Classification: E32, E44

1. INTRODUCTION

Monetary policy is the control of the supply of money by the Central Bank to achieve specific mandates of the apex bank. Malkiel (2010) opined that there exist a positive link between a credit boom and the development of speculative bubbles in financial markets. That is, as credit becomes increasingly available, financial market participants tend to indulge in dangerous speculative activity which may cause security prices to misalign with their fundamental value.

According to Moya-Martinez, Ferrer-Lapena and Escribano-Sotos (2015), the fundamental value of a security is equal to the present value of all expected future cash flows discounted by an

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appropriate discount rate. Therefore a change in the discount factor, typically the long term interest rate can lead to an instant change in the value of an asset. If interest rates were to fall precipitously, it will increase the present value of the asset and vice versa. As a result, monetary policy strongly influence asset prices and could drive an asset price boom or bust if not managed properly. But this does not suggest that asset prices may not rise for non-fundamental reasons or reasons unrelated to interest rate.

Detken and Smets (2004) specifically defined an asset price boom or bubble as an upward shift in the nominal value of a stock (or other financial and real assets) by at least 10 percent above its normal market value. Once prices rise beyond 10 percent above the fundamental value of the security, it can be considered to be an asset bubble. Tirole (1985), Deev, Kajurova and Stavarek (2012), as well as Scherbina (2013) described an asset bubble as a situation where the market price of an asset trades well beyond the intrinsic value of the asset simply because the owners believe they can resell the stock at an even higher price at a later date.

Economists have long blamed Central Banks for causing speculative bubbles by creating "easy" money through lax collateral obligations of borrowers and ridiculously low interest rates (Allen & Gale, 1999). This assertion is informed by observation of long periods of increases in stock market gains which are usually accompanied by periods of excessive monetary policy easing which reduces interest rate (whether stock prices influence interest rate or the reverse will be addressed much later in this paper). However, we opine that interest rates fall naturally, independent of Central Bank actions as the stock market develops. Increases in stock prices signals growth in available capital stock in the country, thus naturally driving down interest rates as money supply rises in excess of its demand. This paper seeks to empirically prove that stock market booms cause interest rates to fall naturally and that stock market busts cause interest rates to fall only artificially. The later argument can be immediately supported with past occurrences.

Hoffman (2012) observed that monetary policy of the Federal Reserve Bank USA changed over time, dependent on the chairman of the Fed. During the Greenspan era (1987 – 2006) stock markets mattered for the Fed. In this period, the Fed lowered interest rates when stock prices fell, but did not raise interest rates in the boom. This asymmetry potentially put a downward pressure on interest rates. Similarly in Nigeria, the monetary policy rate was cut to historical lows in 2008 and 2009 following the stock market meltdown of 2008 (CBN, 2015). In fact, we opine that the only reason Central Bankers occasionally reduce interest rates after a stock market bust is simply for the purpose of supporting stock prices and the economy during times of great pessimism in the investment world until optimism in finally restored. To justify the former assertion of stock price booms causing interest rates to fall naturally, this papers seeks to examine the effect of innovations to the All Share Index on Monetary Policy Rate in Nigeria using available data from 1985 to 2015.

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2. LITERATURE REVIEW

The complexity of detecting asset bubbles with interest rate sensitivity has become a popular study concern in financial and economic literature. Goodhart and Hofmann (2001) highlights that there exist an ongoing argument in literature between academics in favour of a direct response of monetary policy to asset price movements which are not in line with perceived fundamentals, and skeptics who disagree with such conclusion.

Cogley (1999) following the argument of Hamilton and Whiteman (1985) that stock bubbles may be hard to identify since asset price boom not backed by an improvement in the observable market fundamentals may simply be explained by changes in the unobservable market fundamental. He explains unobservable market fundamental to mean information that is private to investors and unavailable to Central Banks. Therefore, if Central Banks were to react to price changes they assumed to be irrational, the reality may be that price change was in fact rational and only reacting to some changes in the hidden fundamentals. As such, the monetary policy change will not only be painfully wrong but could also unintentionally destabilize an already stable economy.

Blanchard (2000) argued that monetary policy should be used in bursting bubbles and preventing their emergence in so far as Central Banks can effectively use monetary policy tools to influence market expectations. Since price changes in financial markets are driven mostly by changes in market expectations on corporate profits, interest rates and inflationary pressures, it makes perfect sense for Central Bankers not to focus heavily on the current levels of macroeconomic variables but focus more on using monetary policy tools to align the market expectations of these variables in the future with the monetary policy targets to achieve their mandate.

Bernanke and Gertler (2001) argued that the Central Bank need not raise interest rates to pop speculative bubbles in the capital market insofar as the rapid growth in the asset prices do not cause inflation to deviate from the monetary target. In other words, since asset prices are typically inefficient predictors of future inflation prospects, an aggressive monetary policy response to asset price movement may cause macroeconomic instability in the economy. They recommend that inflation targeting Central Banks should only raise interest rates when future inflation expectations exceeds the monetary targets.

Mishkin (2001) argued that it will be ineffective for Central Bank to attempt to control asset prices during periods of rapid price boom by tightening monetary policy since the connection between interest rates and stock prices is weak. Also, since the Central Bank has no informational advantage over the average investor, it cannot know better than the market of the existence of a bubble. That is, it becomes anybody's best guess if a bubble exists or not.

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Okina, Shirakawa and Shiratsuka (2001) evaluated the asset price bubble and monetary policy in Japan during the late 1980s. They argued that an increase in interest rates could have crushed the asset bubble in Japan before the bubble size became large enough to trigger a prolonged period of economic recession. However, the Central Bank was unable to justify an increase in interest rate in a very low inflation economy, hence the apex bank failed to act. They blamed the exaggerated expectations of investors for fueling the bubble and was unsure if the herding behavior in the financial market would have diminished even if interest rates rose a few percentage points higher. This means that other monetary policy instruments should have been deployed along with the interest rate increase to rid the Japanese financial market of the hazardous speculative bubble.

Bordo and Jeanne (2002) argued that regardless of the uncertainty of the existence of a bubble in the stock market, monetary policy must act pre-emptively to bust the bubble or prevent the emergence of one. This is because the potential decline in output when bubbles burst naturally could have a far greater economic cost than if the bubble had been pricked at an earlier date. The losses incurred by busting bubbles before they get too big can then be seen as an insurance payment for preventing an even greater economic disaster when a massive bubble finally deflates.

Bean (2004) posited that although a preemptive monetary policy response to prick bubbles immediately they emerge seems reasonable on paper, the best monetary action to achieve this end without threatening economic and financial stability is still largely unknown. Bean contended that since some asset price growth may be fueled by higher level of investments financed by debt buildup, if such price growth proved to be unsustainable, a collapse in asset prices will likely erode the value of collateral upon which debts were issued triggering widespread defaults and a banking crisis. In fact, if interest rates were to be raised high enough to sufficiently deflate a bubble, the double deflationary pressure of a market crash and credit crunch could launch a prolonged economic recession.

Detken and Smets (2004) investigated the relationship between asset price booms and monetary policy. The paper aimed at deriving some stylized facts for financial, real, and monetary policy developments during asset price booms. They analyzed the differences between high cost and low-cost booms. High-cost booms are clearly those in which real estate prices and investment crash in the post-boom periods. In general it is difficult to distinguish a high-cost from a low-cost boom at an early stage. However, high-cost booms seem to follow very rapid growth in the real money and real credit stocks just before the boom and at the early stages of a boom. They found evidence that high-cost booms are associated with significantly looser monetary policy conditions over the boom period, especially towards the late stage of a boom.

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Filardo (2004) explained how monetary policy should respond to asset price bubbles. He opined that the appropriate strategy for policymakers faced with an asset-price bubble depends strongly on the peculiar characteristics of the bubble itself. This means that monetary policy can only be effectively used to control asset bubbles if the factors driving the bubble show interest rate sensitivity. If the bubbles is instigated by factors excluding interest rates, then an interest rate increase will only have negative effects on the economy and relatively very minor negative effect on the stock market bubble.

O'Driscoll Jr (2008) argued that monetary policy intervention to provide safe landing for risky investments during a market bust undermines the free market mechanisms and increases investors' excesses in risk taking since they believe that the government will always bail the banks out of a market crash. By refusing to control asset prices when they rise irrationally and instead choosing to put a floor on asset prices when they fall, Central Banks are encouraging reckless investment in risky assets which have far reaching consequences.

The European Central Bank (ECB) in a 2010 report opine that since the potential fallouts of market bust pose great danger to economic growth and price stability, it is necessary for Central Banks to take the impact of monetary policy on asset prices into context when deliberating on monetary policy actions to achieve their mandate. By adopting a "leaning against the wind" approach to monetary policy and asset prices, the ECB successfully incorporated a monetary policy strategy that does not target asset prices directly but analyses the risk of market upswings and downswings to medium term to long term price stability and act take adequate steps to ensure that the possibility of a deviation of actual future inflation from expected inflation is eliminated.

Mishkin (2011) posits that monetary policy should focus on ensuring financial stability by popping credit bubbles that accumulate through financial imbalances rather than controlling asset prices directly. If banks can be urged to resist from lending to highly risky investments through a tightening of the lending rules or raising the risk free rate. Research shows that numerous boom bust cycles are heavily influenced by credit conditions, a better control of credit growth can prevent the occurrence of bubbles in financial markets. Mishkin opinion seems to be right in principle, however, there is no assurance that a tighter macro prudential policy will achieve the desired effect to eliminate bubbles in financial markets.

Bordo and Landon-Lane (2013) examined the relationship between loose monetary policy, low inflation, and easy bank credit with asset price booms. Using a panel of up to 18 OECD countries from 1920 to 2011, the study investigated the impact that loose monetary policy, low inflation, and bank credit has on house, stock and commodity prices. The study employed a deterministic procedure to identify asset price booms for the sample countries. They found that that "loose"

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monetary policy – that is having an interest rate below the target rate or having a growth rate of money above the target growth rate – had a positive impact on asset prices and this correspondence heightened during periods when asset prices grew quickly and then subsequently suffered a significant correction.

Bivens and Baker (2016) opined that raising interest rate to burst bubbles is an ineffective and reckless policy as it then creates the very economic disaster it sought out to prevent by discouraging investments and widening output gaps. They believe that Central Banks should utilize policies such as improved communication, encourage deleveraging and ensure stricter supervision rules. However the Central Bank has attempted to use all three policies in America without obtaining the result promised by Bivens and Baker.

3. METHODOLOGY AND DATA

The paper focuses on the effect of an asset price boom on monetary policy decisions. To achieve this objective, we adopt a Bayesian Vector autoregression (BVAR) model framework to analyze the effects of innovations to stock prices on monetary policy rate. The study makes use of secondary data obtained from the Central Bank Statistical Bulletin 2015 and World Bank World Development Indicators 2016. The annual time series data begins in 1985 which is the first year the All Share Index was reported and ends in 2015 which is the last time was reported. We then specify our model and employ a variety of estimation techniques such as pairwise Granger causality test, impulse response function and variance decomposition analysis using the EViews 9 software to analyze the relationship between stock price booms and monetary policy.

3.1 Model Specification

According to Thorbecke (1997), the Vector autoregression (VAR) model has been very useful framework in examining the effects of shocks on stock prices and other economic variables. We state the typical vector autoregressive model (VAR) as:

$$Y_t = \beta + \sum_{j=1}^{p} A_j Y_{t-j} + \mu_t \qquad t = 1,\ldots, T, \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(3)$$

Where Y_t represents a (4 x 1) vector of dependent variables

β represents an (4 x 1) vector of the intercept

A represents an (4 x 4) square matrix of the coefficients

μ_t is an (4 x 1) vector of error terms

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The underlying assumption is that the error term has a normal distribution with the mean being a vector of zeros and a covariance matrix $\sum$. This is given as:

$$\mu \sim N(0, \Sigma)\ldots\ldots(4)$$

The general framework of the VAR model for this study can be written as:

Where $Y_t = \begin{bmatrix} MPR_t \\ INFL_t \\ LnRGDP_t \\ LnASI_t \end{bmatrix}$; $\beta = \begin{bmatrix} \alpha_{MPR} \\ \alpha_{INFL} \\ \alpha_{RGDP} \\ \alpha_{ASI} \end{bmatrix}$; $\mu_t = \begin{bmatrix} \mu_{MPR} \\ \mu_{INFL} \\ \mu_{RGDP} \\ \mu_{ASI} \end{bmatrix}$

The equations of the VAR system in the logarithm form for this study are thus presented as follows:

$$MPR_t = \alpha_{10} + \sum_{j=1}^{P} \alpha_{11}^{j} \mathrm{INFL}_{t-j} + \sum_{j=1}^{P} \alpha_{12}^{j} RGDP_{t-j} + \sum_{j=1}^{P} \alpha_{13}^{j} \mathrm{ASI}_{t-j} + \sum_{j=1}^{P} \alpha_{18}^{j} \mathrm{MPR}_{t-j} + \mu_t^{\mathrm{MPR}} \ldots\ldots(5)$$

$$\mathrm{INFL}_t = \beta_{10} + \sum_{j=1}^{P} \beta_{11}^{j} \mathrm{MPR}_{t-j} + \sum_{j=1}^{P} \beta_{12}^{j} \mathrm{RGDP}_{t-j} + \sum_{j=1}^{P} \beta_{13}^{j} \mathrm{ASI}_{t-j} + \sum_{j=1}^{P} \beta_{18}^{j} \mathrm{INFL}_{t-j} + \mu_t^{\mathrm{INFL}} \ldots\ldots(6)$$

$$\mathrm{RGDP}_t = \Omega_{10} + \sum_{j=1}^{P} \Omega_{11}^{j} \mathrm{MPR}_{t-j} + \sum_{j=1}^{P} \Omega_{12}^{j} \mathrm{INFL}_{t-j} + \sum_{j=1}^{P} \Omega_{13}^{j} \mathrm{ASI}_{t-j} + \sum_{j=1}^{P} \Omega_{18}^{j} \mathrm{RGDP}_{t-j} + \mu_t^{\mathrm{RGDP}} \ldots\ldots(7)$$

$$\mathrm{ASI}_t = \psi_{10} + \sum_{j=1}^{P} \psi_{11}^{j} \mathrm{MPR}_{t-j} + \sum_{j=1}^{P} \psi_{12}^{j} \mathrm{INFL}_{t-j} + \sum_{j=1}^{P} \psi_{13}^{j} \mathrm{RGDP}_{t-j} + \sum_{j=1}^{P} \psi_{18}^{j} \mathrm{ASI}_{t-j} + \mu_t^{\mathrm{ASI}} \ldots\ldots(8)$$

Given the equations above, the unknown parameters in the model are α, β, Ω, ψ and Σ. Equations (5) to (8) represent the reduced form of the VAR model of the study. However, in order to present the BVAR estimate of the model, equation (3) is used which is the general framework. This is done in order to keep the notations as simple as possible.

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4. DATA PRESENTATION AND ANALYSIS

4.1 Unit Root Test

Table 1: Augmented Dickey-Fuller Unit Root Test for Stationarity of Series

Variables	ADF (First Difference)	ID	Remarks
ASI	-5.395	I(1)	Stationary
LASI	-4.737	I(1)	Stationary
MPR	-3.034	I(1)	Stationary
RGDP	-4.865	I(1)	Stationary
LRGDP	-4.392	I(1)	Stationary
INFL	-3.561	I(1)	Stationary

Source: Authors' Compilation Using Eviews 9

Note: ASI, MPR, RGDP and INFL represents All Share Index, Monetary Policy Rate, Real Gross Domestic Product and Inflation, respectively. LASI represents the logged values of All Share Index and LRGDP represents the logged values of Real Gross Domestic Product. We took the log of the variables to smoothen the data for ease of processing in VAR analysis. The logarithm of MPR and Inflation were not taken since both data are already in reported in percentage. ID represents the order of integration: I(0) stationary at levels, I(1) stationary after first difference and I(2) stationary after second difference.

4.2 Pairwise Granger Causality Test

Table 2: Pairwise Granger Causality Test Result

Pairwise Granger Causality Tests			
Date: 03/09/17 Time: 13:53			
Sample: 1985 2015			
Lags: 2			
Null Hypothesis:	Obs	F-Statistic	Prob.

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MPR does not Granger Cause LASI	29	4.62444	0.02
LASI does not Granger Cause MPR		3.63954	0.0416
LRGDP does not Granger Cause LASI	29	0.07239	0.9304
LASI does not Granger Cause LRGDP		1.29689	0.2919
INFL does not Granger Cause LASI	29	0.81584	0.4542
LASI does not Granger Cause INFL		3.06601	0.0652
LRGDP does not Granger Cause MPR	29	2.87323	0.0761
MPR does not Granger Cause LRGDP		0.03012	0.9704
INFL does not Granger Cause MPR	29	1.51105	0.2409
MPR does not Granger Cause INFL		3.68607	0.0402
INFL does not Granger Cause LRGDP	29	0.24363	0.7857
LRGDP does not Granger Cause INFL		2.59074	0.0958

Source: Authors' Compilation Using Eviews 9

Table 2 above shows that at 5 percent level of significance, there exist a bidirectional Granger causality running from MPR and ASI after two lags. In other words, interest rate influences stock prices and there is a feedback effect from the change in stock prices to interest rate. Also it was found that at 5 percent level of significance, MPR Granger causes INFL and there is no feedback reaction after two lags. In other words, although interest rates is influential in predicting future values of inflation rate, the reverse is not economically feasible.

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4.3 Autoregressive Roots Analysis

Table 3: AR Roots Analysis

Roots of Characteristic Polynomial	
Endogenous variables: MPR INFL LRGDP LASI	
Exogenous variables: C	
Lag specification: 1 2	
Date: 03/16/17 Time: 16:43	
Root	Modulus
0.952866	0.952866
0.709707	0.709707
0.173210 - 0.091597i	0.195938
0.173210 + 0.091597i	0.195938
-0.169240 - 0.020388i	0.170463
-0.169240 + 0.020388i	0.170463
-0.074758 - 0.090176i	0.117135
-0.074758 + 0.090176i	0.117135
No root lies outside the unit circle.	
VAR satisfies the stability condition.	

Source: Authors' Compilation using EViews 9

From Table 3, the study found that no root lies outside the unit circle. We therefore conclude that the VAR is stable and its results are reliable for forecasting.

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4.4 Impulse Response of Monetary Policy Rate to One Standard Deviation Shock in All Share Index

Table 4: Effect of a Cholesky (d.f. adjusted) One S.D. LASI Innovation

Period	MPR	INFL	LRGDP	LASI
1	0	0	0	0.330704
2	-0.00716	-0.95103	0.012247	0.209925
3	-0.1133	-1.12922	0.019367	0.182855
4	-0.12479	-0.98058	0.024035	0.151379
5	-0.14009	-0.87214	0.026921	0.129509
6	-0.14749	-0.77684	0.028486	0.112719
7	-0.15079	-0.70208	0.029159	0.099855
8	-0.15095	-0.64183	0.029214	0.089786
9	-0.149	-0.59233	0.028852	0.081749
10	-0.14564	-0.55075	0.028212	0.075195
Cholesky Ordering: MPR INFL LRGDP LASI				

Source: Authors' Compilation using EViews 9

Table 3 indicates that in the first period, a one standard deviation positive innovation in All Share Index will lead to no change in MPR. In subsequent periods however, one standard deviation positive innovation will lead to a 0.7 percent, 11 percent, 12.5 percent decrease in MPR in the second, third and fourth period. Between the fifth and tenth period, a one standard deviation positive innovation in ASI will reduce MPR by an average of 15 percent annually. Positive shocks to ASI had positive impact on RGDP but negative impacts on MPR and INFL after the second period. Thus, a stock price boom can significantly drive down interest rates and inflation while boosting output growth in the economy.

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4.5 Variance Decomposition

Table 5: Variance Decomposition of MPR

Period	S.E.	MPR	INFL	LRGDP	LASI
1	3.27187	100	0	0	0
2	3.283951	99.65111	0.033624	0.31479	0.000475
3	3.293982	99.04984	0.062975	0.76841	0.118779
4	3.302334	98.55307	0.068091	1.117873	0.260971
5	3.310444	98.0798	0.071714	1.409732	0.438758
6	3.3181	97.63783	0.075735	1.652122	0.634311
7	3.325321	97.22511	0.080205	1.857511	0.837176
8	3.332081	96.84209	0.084932	2.033982	1.038996
9	3.338367	96.48865	0.089703	2.187357	1.234286
10	3.344179	96.1641	0.094366	2.321869	1.419666
Cholesky Ordering: MPR INFL LRGDP LASI					

Source: Authors' Compilation using EViews 9

Table 4 presents the forecast error variance (FEV) of monetary policy rate over the next 10 years that is explained by positive innovations in the other variables of the model including ASI. The table above indicates that on average, 0.6 percent of FEV in MPR is explained by innovations in ASI. The standard error shows that the FEVs attributable to ASI on MPR are not statistically significant. Thus, innovations to ASI do not explain a significant fraction of changes to monetary policy rate.

4.6 Discussion of Findings

From table 3, the study found that just as interest rate is influential in determining the direction and pace of stock price growth, so also does variations in stock prices affect the interest rate decisions of the Central Bank in Nigeria. This is in line with empirical findings that interest rate affect stock prices since long term interest rates are used to discount the future earnings of

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corporations to obtain the present value of their stock price. The higher the rate of interest, the lower the stock price. The table also shows that interest rate is also influential in determining the prices of goods and services in the economy. The study found a uni-directional granger causality between interest rate and inflation, such that today's interest rate can influence inflation rate over a two year period but today's inflation rate is unable to influence interest rate during same period.

From table 4, the study also found that as stock prices increase during a stock price boom signaling improvements in the economic fundamental, such appreciation in the stock price will cause interest rate and inflation to decrease naturally. This is because as stock prices appreciate, more capital will be raised in the stock market instead of the money market which will cause interest rate in the money market to decrease and capital to flow out of the money market into the capital market, thus further increasing returns in the stock market. Inflation tends to trend downwards during this period as investors tend to forgo spending for investing in the stock market, which also leads to further increases in stock prices. This shows that rather than stock price appreciation leading to growth in inflation, stock price growth encourages further investing which reduces consumer price inflation as excess money supply is mopped up by the capital market.

In table 5, we found that real GDP leads to higher forecast error variation in Monetary Policy Rate than All Share Index. This is in line with theory since interest rate is expected to respond more to changes in the economic fundamental than variations in stock prices. Although stock prices should be integrated into interest rate decision framework of Central Banks, the most important factor in deciding the rate of interest must be the state of the economy.

5. SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATION

5.1 Summary of Findings

From the empirical results displayed in table 1-5, we recap the following findings on the relationship between stock prices and monetary policy rate:

1. Using the ADF unit root test, we found that all variables were stationary after first difference.
2. Using the pairwise Granger causality test, we found that there exist a bidirectional causality relationship between ASI and MPR after two lags at 5 percent level of significance.
3. Using the AR Roots analysis, we found that the VAR model is stable and reliable.
4. Using the Impulse Response Function, we found that on average, innovations to ASI will reduce the MPR by 11 percent annually over a 10 year period.

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5. Using the Forecast Error Variance Decomposition, we found that on average, innovations to ASI explain only 0.6 percent of FEV in MPR over a 10 year period. The standard errors showed that ASI does not explain a significant fraction of changes to MPR.

5.2 CONCLUSION

This paper studied the effect of innovations in All Share Index on monetary policy rate to understand how stock price growth may affect interest rate in the long run. Prior to this paper, economists typically discuss the effect of monetary policy on asset prices without reflecting much on how asset prices may affect monetary policy. Using the Granger causality tests, we observed that there exist a bidirectional Granger causality existing between ASI and MPR after two lags at 5 percent level of significance. This means that there is a continuous interaction occurring between asset prices and interest rates within just two years. That is as monetary policy influence stock prices, so also do stock prices influence monetary policy. Using the Impulse Response Function, we found that on average one standard deviation innovations to ASI will reduce the MPR by 11 percent annually over a 10 year period. We also found using the Forecast Error Variance Decomposition, that on average, one standard deviation innovations to ASI explain only 0.6 percent of FEV in MPR over a 10 year period. The standard errors showed that ASI does not explain a significant fraction of changes to MPR. Therefore, although shocks to ASI could reduce MPR significantly, over the long run, variance in interest rate will be caused by innovations to monetary policy and real GDP.

5.3 RECOMMENDATIONS

From the above listed findings, we propose the following recommendations for monetary policy and investors:

1. Central Banks must ensure that as stock market development continues to drive down interest rates that the price of credit reflect the underlying conditions in the real economy and not simply react to short term speculative behaviours in the stock market.
2. Investors should carefully price stocks in relation to interest rate to ensure that stock prices do not rise to levels of overvalued territory which increases the risk of capital loss.

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APPENDIX ONE

RESULT OF BVAR ANALYSIS

Bayesian VAR Estimates			
Date: 03/16/17 Time: 16:49			
Sample (adjusted): 1987 2015			
Included observations: 29 after adjustments			
Prior type: Litterman/Minnesota			
Initial residual covariance: Univariate AR			
Hyper-parameters: Mu: 0, L1: 0.1, L2: 0.99, L3: 1			
Standard errors in ( ) & t-statistics in [ ]			

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	MPR	INFL	LRGDP	LASI
MPR(-1)	0.065928	0.066588	-0.000578	0.00513
	-0.08885	-0.36565	-0.00154	-0.00711
	[0.74199]	[0.18211]	[-0.37531]	[0.72117]
MPR(-2)	0.010627	0.110562	-0.000307	0.003855
	-0.0484	-0.19887	-0.00084	-0.00387
	[0.21958]	[0.55595]	[-0.36712]	[0.99634]
INFL(-1)	0.00393	0.133186	-8.12E-06	0.001017
	-0.02046	-0.08551	-0.00036	-0.00165
	[0.19207]	[1.55764]	[-0.02273]	[0.61619]
INFL(-2)	-0.00375	-0.005989	-5.87E-05	0.000373
	-0.01143	-0.04784	-0.0002	-0.00092
	[-0.32819]	[-0.12519]	[-0.29426]	[0.40451]
LRGDP(-1)	-2.682251	-4.969271	0.6871	0.41559
	-3.11038	-12.9011	-0.05467	-0.2511
	[-0.86235]	[-0.38518]	[12.5674]	[1.65510]
LRGDP(-2)	-1.220924	0.719041	0.148078	0.039132
	-2.52267	-10.464	-0.04447	-0.20356
	[-0.48398]	[0.06872]	[3.32985]	[0.19224]
LASI(-1)	-0.021651	-2.875761	0.037032	0.634783

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	-0.71334	-2.95891	-0.01246	-0.05791
	[-0.03035]	[-0.97190]	[2.97133]	[10.9607]
LASI(-2)	-0.216798	-1.020636	0.009576	0.137623
	-0.54908	-2.27767	-0.00959	-0.04472
	[-0.39484]	[-0.44810]	[0.99846]	[3.07760]
C	135.7817	181.1362	4.777115	-12.07502
	-70.5254	-292.443	-1.23291	-5.69421
	[1.92529]	[0.61939]	[3.87466]	[-2.12058]
R-squared	0.408842	0.410697	0.981907	0.963727
Adj. R-squared	0.172379	0.174976	0.97467	0.949218
Sum sq. resids	278.3334	6120.367	0.123627	2.909585
S.E. equation	3.730505	17.49338	0.078622	0.381417
F-statistic	1.72899	1.7423	135.6766	66.42139
Mean dependent	13.87931	20.94196	31.04879	8.825011
S.D. dependent	4.100643	19.25929	0.493997	1.692558

Source: Authors' Compilation using EViews 9