The Impact of Monetary Policy on Stock Returns in Vietnamese Stock Market

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INTRODUCTION

As the levels of foreign investments in developing countries have been increasing in recent years, understanding how monetary policy in developing countries affects the economy is important to making investment decisions in these markets. Since the nature of financial markets and economic frameworks in developing countries differs from that of developed countries, our knowledge of how monetary policy works in developed economies may not be accurately applied in the context of developing economies. Consider, for instance, in many developing countries, there exists no organized futures markets or there are a limited number of futures contracts being available in the futures markets; therefore, domestic investors are likely to use different approaches to the estimation of assets’ future prices. Furthermore, publicly available information available to investors in developing countries tends to be in relatively short supply. Given these contextual differences, a key question is then whether we would observe a similar pattern of stock price reactions to a change in monetary policy in small and developing countries as that of developed countries.

Although there has been a huge number of studies focusing on the impact of monetary policy decisions on stock returns, but the evidence of the impact of monetary policy on stock returns in the context of the emerging capital market is limited to a few empirical studies. Vietnam market can be seen as the smallest market in Asian, which has the similar features with the other developing and emerging market. Therefore, we attempt to make a contribution to the literature by examining the effect of monetary policy on stock return in Vietnam, which is one of emerging market countries in Asia.

The relationship between changes in the monetary policy and stock prices attracted increasing attention of many authors during the past three decades. Literature has found empirical evidence suggests that fluctuations in stock prices, from a long-run perspective, merely reflect alterations in some basic economic factors. Many studies declare that changes in the federal funds/discount rates can significantly affect or predict stock market returns by influencing forecasts of some financial variables (Patelis 1997). An increase in the funds/discount rates pushes up market-determined interest rates, then leads to a higher cost of capital and lower profitability, causing a negative response from the stock market.

There is a large body of research on the relationship between monetary policy and stock returns and some studies find that the relationship between monetary policy and stock returns is policy are associated with strong stock performance, whereas periods of restrictive monetary policy generally coincide with weak stock performance, and "the mid-1990s" is the only exception over the period of July 19, 1962 to January 2, 2001. (Durham 2001) reckons that the relationship between monetary policy and stock market returns may be unstable.
or time-varying. Although this instability issue is important, there are no further studies in the literature to analyze how and why the relationship varies over time.

Several papers have examined the impact of monetary policy surprises on stock prices, notably, (Bernanke 2005), (Bredin 2007), (Farka 2009), (Haruna 2012) and (Chuliá 2010). (Bernanke 2005) suggests that the influence of monetary policy on macroeconomic variables is not easily observable, and that the influence of changes in monetary policy on asset prices (e.g., stock prices) is via changes in the cost of capital, subsequent changes in the investment opportunity set faced by firms, and via other mechanisms. We expect that an expansionary monetary policy should result in lower interest rates, which will in turn promote greater investments (e.g., by increasing the number of attractive investment alternatives due to the lower cost of capital), thereby potentially increasing the firms’ expected present value of net cash flows. Hence, stock prices should positively respond to the announcement of a monetary policy easing decision. On the other hand, a tightening monetary policy should lead to higher interest rates, which will subsequently discourage new investments (e.g., by reducing the number of attractive investment opportunities due to the higher cost of capital), thereby decreasing the firms’ expected present value of future net cash flows.

Stock markets are notoriously sensitive to unexpected changes in monetary policy. But this sensitivity may vary across different economies. While studies on the relationship between the monetary policy and stock returns in mature and emerging markets are widely available, so far not many researchers have focused on Vietnam. Although being set up much later than many countries in the world, since the establishment of the first securities trading center of Vietnam Stock Market in Ho Chi Minh City on 28 July 2000, Vietnam stock market has been growing rapidly with improved transaction volume and market capitalization. At the opening trading session, only two stocks with a total market capitalization of VND986 billion (about 0.28% of GDP of Vietnam) were traded at the market. Vietnam stock market was then characterized by the illiquidity of stocks, incomplete legal framework and insufficient corporate governance system. However, over time, along with the development and world integration of Vietnam’s economy, it has gradually become a critical channel in terms of mobilizing and distributing capital for short and long term investments, which contribute to the expansion of business operations as well as development of overall domestic economy. Over 12 years of operation (until the end of 2012), along with equitization itinerary, the number of listed companies has increased to 710 firms with a total market capitalization of VND765 trillion (approximately 36,730 million USD at the exchange rate of 20,828 VND/USD), increased 42.64% in comparing with the year end of 2011. The market capitalization represents about 26% of the country’s GDP in 2012 (equivalent to 2,907,700 billion VND, approximately 139,605 million USD, by the General Statistic Office), much higher than the amount in 2000. Total stock value bought by foreign investors reached over VND1.370 billion. The stocks in Hochiminh Stock Exchange can be represented by VN-Index which is a market-value-weighted index of all common stocks on the Hochiminh stock exchange. The high and rapid growth of Vietnam stock market is, of course, very appealing to domestic and foreign investors.

In this paper we investigate the impact of monetary policy via some instrument policies of the State Bank of Vietnam on stock returns with the approach of managing the fever of the stock market; and the response of stock returns to the monetary policy in both cases of increasing and declining stock prices, in which a prediction of movement of stock returns will be calculated based on other conditions of monetary policy variables.

The remainder of this paper is organized as follows. Section 2 gives a brief literature review. Section 3 describes the data and focus on the econometric methodology. The results and analysis are then reported in section 4. Concluding remarks are presented in the last section.

**Literature Review:**

There is quite an extensive literature documenting the relationship between monetary policy and stock returns both developed countries and developing countries. (Kwapil 2013) find the evidence the expected changes in monetary policy rates influence bank lending rates in the U.S., therefore it implies monetary policy shocks affect firm's investments and stock returns. (Bernanke 2005) find that the stock market is unlikely to respond to anticipated monetary policy actions. Some articles show that stock returns respond strongly to surprise changes in the Federal funds rate (Basistha 2008); (Bernanke 2005); (Ehrmann 2004); (Guo 2004); (Jansen 2010); (Laeven 2012)). (Farka 2009) reports a negative relationship between an unexpected hike in the Federal funds target rate and stock returns in the US. Several studies (e.g., Basistha 2008); (Bernanke 2005); (Chuliá 2010); (Farka 2009) also show that the effect of monetary policy on equity prices is asymmetric. (Farka 2009) finds that an unexpected tightening monetary policy tends to have a smaller effect on equity prices than does an unexpected easing monetary policy. (He 2006) found that monetary policy influences the stock market in different ways in the 1960s, the 1970s.

(Bernanke 1999) employed the new Keynesian model to construct their own model (they called Barnanke, Gertler and Gilchrist model, BGG) and assumed that the central bank will control over the short term real interest rate.

As the baseline, from (Clarida 2000), they showed that the central bank follows the policy rule as:
\[ r_t^n = \bar{r} + \beta E_t \pi_{t+1} \]  

(4.1)

where \( r_t^n \): nominal instrument interest rate, which is controlled by Central bank.
\( \bar{r} \): steady state of nominal interest rate.
\( E_t \pi_{t+1} \): expected inflation in next period.

Assume that \( \beta > 1 \), if the Central bank responds to one percent of increase expectation of inflation will be raised more than one percent in nominal interest rate. The real interest rate will be defined as:

\[ r_t = r_t^n - E_t \pi_{t+1} \]  

(4.2)

In BGG model, (Bernanke 1999) assumed that only the fundamentals drive asset prices, by extending BGG model, (Bernanke 1999) would like to measure the impact of asset prices fluctuation with the monetary policy, the Central bank could respond to any change of stock prices. Hence, the interest rate rule is:

\[ r_t^n = \bar{r} + \beta E_t \pi_{t+1} + \zeta \log\left(\frac{P_t}{P_{t-1}}\right) \]  

(4.3)

where \( \zeta \) is parameter to measure the respond of interest rate rule to the movement of stock prices.

The instrument rate responds only one lag of stock prices since the central bank would like adjust the short term real interest rate to prevent any movement of stock prices, relative to its steady state value.

From above result, assume that the stock returns will be considered by interest rate and inflation. Base on the Arbitrage Pricing Theory, the return function could be formula as:

\[ RET_t = \alpha_0 + \sum_{i=1}^{k} \psi_i \cdot r_{t-i} + \sum_{i=1}^{k} \delta_i \cdot \pi_{t-i} + \epsilon_t \]  

(4.4)

\[ RET_t = \ln\left(\frac{P_t}{P_{t-1}}\right) \] : rate of stock returns

(4.5)

\( \psi_i \) and \( \delta_i \): the autocorrelation of interest rate and inflation with stock returns, respectively.
\( \epsilon_t \): residual with zero mean, white noise process.

At the stock market, any changing in monetary policy could affect directly to investors’ decisions. If the interest rate is high, they could consider to withdrawn from the stock market and invest to other profitable market.

The equations system is designed as following:

\[ RET_t = a_{11} + \sum_{i=1}^{k} a_{12,i} \cdot INT_{t-i} + \sum_{i=1}^{k} a_{13,i} \cdot INF_{t-i} + \sum_{i=1}^{k} a_{14,i} \cdot EXC_{t-i} + \sum_{i=1}^{k} a_{15,i} \cdot RET_{t-i} + \epsilon_{1t} \]  

(4.6)

\[ INT_t = a_{21} + \sum_{i=1}^{k} a_{22,i} \cdot RET_{t-i} + \sum_{i=1}^{k} a_{23,i} \cdot INF_{t-i} + \sum_{i=1}^{k} a_{24,i} \cdot EXC_{t-i} + \sum_{i=1}^{k} a_{25,i} \cdot INT_{t-i} + \epsilon_{2t} \]  

(4.7)

\[ INF_t = a_{31} + \sum_{i=1}^{k} a_{32,i} \cdot RET_{t-i} + \sum_{i=1}^{k} a_{33,i} \cdot INF_{t-i} + \sum_{i=1}^{k} a_{34,i} \cdot EXC_{t-i} + \sum_{i=1}^{k} a_{35,i} \cdot INF_{t-i} + \epsilon_{3t} \]  

(4.8)

\[ EXC_t = a_{41} + \sum_{i=1}^{k} a_{42,i} \cdot RET_{t-i} + \sum_{i=1}^{k} a_{43,i} \cdot INT_{t-i} + \sum_{i=1}^{k} a_{44,i} \cdot INF_{t-i} + \sum_{i=1}^{k} a_{45,i} \cdot EXC_{t-i} + \epsilon_{4t} \]  

(4.9)

where: \( RET_t, INT_t, INF_t \) and \( EXC_t \) are stock returns, interest rate, inflation rate and exchange rate (USD/VND) at period t, respectively.
\( a_{11}, a_{21}, a_{31} \) and \( a_{41} \) are constant parameters of the variables of INT, INF, EXC and RET in each equation
\( \epsilon_t \): error term of each equation.

Based on (Bernanke 1999) and (Chang 2009), investor reaction to the changes of monetary variables as following:

If State Bank of Vietnam (or commercial bank, in case of lending interest rate) increases the interest rate, investor will not afford for the premium of the loan, they try to sell to avoid of the burden from the lending interest rate, that leads the stock returns change to negative (or negative effect of interest rate). Or when the interest rate is lower, investors will borrow money from the banks to invest into the stock market.

If State Bank of Vietnam depreciates VND/USD via exchange rate, this change will affect directly foreign investors, they will sell their securities and withdrawn their money from the stock market, this action will lead the domestic investors as followers and the stock prices will be down. But in other side, when SBV depreciates exchange rate, the listed corporations will have more chances to export (because Vietnam is an exporting
country for agricultural, aquatic productions; and a large part of listed corporations is in exporting agricultural and aquatic productions), investors would like to invest in those shares and they push the share prices up.

If State Bank of Vietnam gives some other monetary policy to higher level (increase of money supply or credit growth) will push the inflation goes up, in parallel, the domestic investors have more capital sources for their speculation, they will push the stock prices up (positive effect to stock returns). But it has other impact to foreign investors, because the depreciation of domestic currency, they will sell their securities and quick the stock market, again the domestic investors will follow them and the supply is excess the demand leads to a drop of stock prices. Furthermore, the increase of stock prices makes a pressure on the inflation in the future; State bank of Vietnam must employ some instrument policy as mentioned above to control the inflation.

Data and Methodology:

Data descriptive:
- **Stock returns (RET):**

  Stock returns are overall changing prices of stocks in the market. This is the proxy for the investor’s profit or loss every period. The data employed in this section comprise 130 observations of monthly closing stock price index, obtained from the website of Hochiminh stock exchange (www.hsx.vn). The sample period is March, 2002 to December, 2012 which is the most updated data to time of this study. Since securities trading transactions have been conducted every working day from March 2002 as today instead of trading only once every two working-days, March 2002 is chosen for this study to create synchronization in data. To represent for Vietnam stock market index in this section, the VN-Index of Hochiminh Stock Exchange (HSX) is chosen since HSX was launched first and has an almost 4 year-longer history than that of Hanoi Stock Exchange (HNX). VN-Index is the capitalization weighted index of all the companies listed on the Vietnam official stock exchange. The monthly stock returns are computed as below:

  $$RET_t = \ln \left( \frac{P_t}{P_{t-1}} \right) ; \text{rate of stock returns}$$

- **Interest rate (INT):**

  The monthly interest rate is basic interest rate which is collected from the website of the State Bank of Vietnam (www.sbv.gov.vn). The lending interest rate for consumption in one year contract which collected from the lowest between four commercial banks: Joint stock Commercial Bank for Foreign Trade of Vietnam, Joint stock Commercial Bank for Investment and Development of Vietnam, Saigon Thuongtin Commercial Bank (Sacombank) and Asia Commercial Bank. This rate is announced and changed based on the basic interest rate of State Bank of Vietnam which allowed the commercial bank to change their lending interest rate in a limited range.

  Since the State Bank of Vietnam would like employ its instrument tools to calm down the fever of investors, the SBV has its own instrument tools, basic interest rate, based on this rate, the commercial banks will adjust their lending interest rate to 150% for the ceiling, since the basic interest rate from SBV can not show any effect to the stock market with unchangeable rate in a long time. The study will employ two kinds of rate: basic interest rate (BINT) and lending interest rate (LINT) which is chosen the minimum lending interest rate from commercial banks as a proxy of interest rate. The lending interest rate affects directly to investor’s decision, since if they intend to speculate in the short term, they must need more financial aid from the banks or other sources. With high interest rate, they can not reach the loan and they must consider finding other monetary instrument such as reserve rate or the broad money supply, for example, although the basic rate is not changed, but the SBV increases broad money supply, the commercial banks could adjust their lending rate to lower in case of increasing the reserve rate or of decrease the broad money supply.

- **Inflation (INF):**

  The data employed in this section comprise 130 observations of monthly Consumer Price Index which will be collected from the website of General Statistic Office of Vietnam (www.gso.gov.vn). Vietnam experienced two years of mild deflation in 2000 and 2001 owing to excess capacity and depressed commodity prices, and both the headline and core inflation rates remained low in 2002 and 2003 (Maliszewski 2010). Inflation rose sharply as growth picked up strongly between 2004 and mid-2008, reflecting sustained increases in international commodity prices and growing excess demand, due in large part to heavy investment by state-owned enterprises and a surge in foreign direct investment in the run-up to Vietnam’s accession to the World Trade Organisation. Headline inflation reached a peak of almost 25 percent in the third quarter of 2008 but then started to decline sharply as a result of weakening domestic demand and lower food and energy prices, falling to 2.4 percent by the third quarter of 2009.

  However, headline inflation then started to pick up again towards the end of 2009, reflecting in part the impact of the economic stimulus package introduced in response to the global crisis. A sizeable fiscal policy
stimulus amounting to around 5 percent of GDP was executed in 2009, while the base (prime) rate was cut by a total of 700 basis points between October 2008 and February 2009 and kept at 7 percent until November 2009. The State Bank of Vietnam has a responsibility to control the inflation rate via its instrument policy. It always has a trade-off among the economic growth and the inflation. The inflation rate will indirectly impact to the fluctuation of VN-Index.

- **Exchange rate (EXC):**

  The official exchange rate will be collected from Global Financial data, the official rate in the trading day at the end of each month, this rate is basic exchange rate which is announced by State Bank of Vietnam, the commercial banks will adjust based on the permitted rate from SBV. The exchange rate could affect directly to the capital source from foreign investors. Any adjustment in exchange rate could change the foreign investors’ decision and belief in Vietnamese economy. Although the foreign investors generally could hold a third share in a listed corporation, but almost domestic investors look at them to make their decision as the followers. If the foreign investors pour more or withdrawn their money, it could be having a strong effect to the stock market and changes the stock returns.

  Table 4.1 shows the descriptive statistics for monthly stock market returns, inflation, exchange rate, interest basic rate and lending interest rate.

<table>
<thead>
<tr>
<th>Indicators</th>
<th>RET</th>
<th>INF</th>
<th>EXC</th>
<th>BINT</th>
<th>LINT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>0.005942</td>
<td>0.754</td>
<td>17178.2</td>
<td>0.007123</td>
<td>1.15696</td>
</tr>
<tr>
<td>Median</td>
<td>-0.002134</td>
<td>0.51</td>
<td>16054</td>
<td>0.006667</td>
<td>1.1</td>
</tr>
<tr>
<td>Maximum</td>
<td>0.325824</td>
<td>3.91</td>
<td>21010</td>
<td>0.011667</td>
<td>1.8</td>
</tr>
<tr>
<td>Minimum</td>
<td>-0.274558</td>
<td>-2.61</td>
<td>15150</td>
<td>0.005833</td>
<td>0.75</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>0.103830</td>
<td>0.940172</td>
<td>1927.629</td>
<td>0.001236</td>
<td>0.27014</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>3.931270</td>
<td>4.96365</td>
<td>20.54607</td>
<td>169.3955</td>
<td>12.0</td>
</tr>
<tr>
<td>Jarque-Bera</td>
<td>5.617086</td>
<td>33.7974</td>
<td>12.03966</td>
<td>3966</td>
<td></td>
</tr>
</tbody>
</table>

The statistics point out that the monthly average returns are positive and very small compared with the standard deviation. In addition, as often found in the literature, monthly return series depart from normality, particularly due to their excess kurtosis and asymmetry. The positive skewness coefficient of 0.205995 indicates that series are skewed towards the right. The kurtosis of the Vietnam stock market’s return is 3.931270, implying leptokurtic or the series have distribution with fatter tail and more peaked at the mean than a normal distribution.

Similarly, under the null hypothesis that Jarque-Bera statistic is normal distribution at value of 0, the Jarque-Bera value of 5.617086 here confirms non-normal distribution of Vietnam stock market’s return as well as another indication of the excess kurtosis as just concluded.

The conclusion that monthly returns series observed in Vietnam stock market have non-normality distribution is reasonable, as it is common phenomenon in emerging markets’ data set.

**Methodology:**

To conduct the research, this section firstly examine the data stationary of Vietnam stock returns, inflation rate, exchange rate and interest rate on the basic of the Augmented Dickey-Fuller (ADF) test statistics. A unit root test must do initially for testing the stationary or non-stationary of economic data.

- **Unit root test:**

  Unit root test is popularly used test to verify whether a time series is stationary or non-stationary. The early and pioneering work on testing for a unit root in time series was done by Dickey and Fuller ((Fuller 1976); (Dickey 1979)). The basic objective of the test is to examine the null hypothesis that $\phi = 1$ in

  \[ y_t = \phi y_{t-1} + u_t \quad (-1 \leq \phi \leq 1) \quad (4.10) \]

  against the one-sided alternative $\phi < 1$. Thus the hypotheses of interest are

  $\text{H}_0$: $\phi = 1$ (series contains a unit root)

  $\text{H}_1$: $\phi < 1$ (series is stationary)

  In practice, the following regression is employed, rather than (4.10), for ease of computation and interpretation.
\[ \Delta y_t = \delta y_{t-1} + u_t \]  \hspace{1cm} (4.11)

so that a test of \( \phi = 1 \) is equivalent to a test of \( \delta = 0 \) (since \( \phi - 1 = \delta \)). And the above hypotheses become:

\[ H_0: \, \delta = 0 \quad \text{(series contains a unit root)} \]
\[ H_1: \, \delta < 0 \quad \text{(series is stationary)} \]

Dickey - Fuller (DF) tests are also known as \( \tau \) - tests, and can be conducted allowing for an intercept, or an intercept and deterministic trend, or neither, in the test regression. The null hypothesis of a unit root is rejected in favour of the stationary alternative in each case if the test statistic is more negative than the critical value.

This next step is to use Vector Autoregressive analysis (VAR), impulse response function, the Granger causality test, and variance decomposition to analyze the effect of monetary policy on stock market returns.

- **Vector Autoregressive analysis (VAR):**

  In the VAR system, all variables are assumed to be endogenous. A vector of variables to forecast are selected, that allows all variables to interact linearly with their own and others’ current and past values, and that uses the historical data to determine the quantitative impact that each variable has on its own and other variables’ future values. Thus, each equation has the same set in each equation. Due to in VAR system, regressions are lagged variables, they can be assumed to be contemporaneously uncorrelated with the disturbance. So each equation could be estimated separately by ordinary least square (OLS) which will yield consistent and efficient estimators.

Consider the simple bivariate system:

\[
\begin{pmatrix}
X_t \\
y_t \\
z_t \\
w_t
\end{pmatrix} =
\begin{pmatrix}
a_{10} \\
a_{20} \\
a_{30} \\
a_{40}
\end{pmatrix} +
\begin{pmatrix}
a_{11} & a_{12} & a_{13} & a_{14} \\
a_{21} & a_{22} & a_{23} & a_{24} \\
a_{31} & a_{32} & a_{33} & a_{34} \\
a_{41} & a_{42} & a_{43} & a_{44}
\end{pmatrix} \begin{pmatrix}
x_{t-1} \\
y_{t-1} \\
z_{t-1} \\
w_{t-1}
\end{pmatrix} +
\begin{pmatrix}
\varepsilon_{1t} \\
\varepsilon_{2t} \\
\varepsilon_{3t} \\
\varepsilon_{4t}
\end{pmatrix}
\]

Where

\[
\begin{pmatrix}
\varepsilon_{1t} \\
\varepsilon_{2t} \\
\varepsilon_{3t} \\
\varepsilon_{4t}
\end{pmatrix} \sim \text{iid } \begin{pmatrix}
0 \\
0 \\
0 \\
0
\end{pmatrix}, \quad \begin{pmatrix}
\sigma_{11}^2 & \sigma_{12} & \sigma_{13} & \sigma_{14} \\
\sigma_{21} & \sigma_{22}^2 & \sigma_{23} & \sigma_{24} \\
\sigma_{31} & \sigma_{32} & \sigma_{33}^2 & \sigma_{34} \\
\sigma_{41} & \sigma_{42} & \sigma_{43} & \sigma_{44}^2
\end{pmatrix}
\]

So it has a standard form as:

\[ X_t = A_0 + A_1 X_{t-1} + \mu_t \]  \hspace{1cm} (4.12)

where \( X_t \) is an (nx1) vector of endogenous variables
\( A_0 \) is an (nx1) vector of intercept term in the original model
\( A_1 \) denotes an (nxn) matrix of coefficients of lags endogenous
\( \mu_t \) states an (nx1) vector of error terms or shock in the structural model with the following properties
\( \text{E}(\mu_t) = 0 \).

**Results and Analysis:**

The Augmented Dickey-Fuller (ADF) is employed to test unit root. The results of unit root test are reported in Table 4.2 below, which the italic lines represented additional tests with or without trend that are not shown in graphs of series. Initially, the graphs in level of all variables which are useful to provide more information about the nature of the series that will be shown, there is only exchange rate (EXC), basic interest rate (BINT) and lending interest rate (LINT), that should be tested the stationary test with trend, the others such as stock returns (RET), inflation (INF) are tested the stationary by performing without trend. Figure 4.1 below provides an overview of volatility clustering of monthly stock returns, monthly inflation, monthly exchange rate and monthly interest rate.

We can be seen Table 4.2, the ADF test is performed with the null hypothesis that the series is non-stationary (HO= non-stationary). The null hypothesis of non-stationary will be rejected if the ADF statistic is less than the 5% critical value. As the results in the Table 4.2, there are stock returns, inflation rate and basic interest rate, which are having the critical value at (0.0000, 0.0000 and 0.0450, respectively), are rejected the null hypothesis of non-stationary, that implies stock returns, inflation rate and basic interest rate are stationary,
the other two variables (i.e., exchange rate and lending interest rate) are failed to reject the null hypothesis with the critical values at 99.19% and 27.61% confidential level, respectively. Those results imply that they are non-stationary series. The VARs need the stationary property of those variables, hence, we need to employ the stationary series those consist of proxies of D(EXC) and D(LINT).

Table 4.2: ADF test for the unit root test.

<table>
<thead>
<tr>
<th>Variables</th>
<th>p-value</th>
<th>t-statistic</th>
<th>p-value</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>RET</td>
<td>No trend</td>
<td>1.7437</td>
<td>0.0000</td>
<td>Stationary</td>
</tr>
<tr>
<td>INF</td>
<td>No trend</td>
<td>2.2551</td>
<td>0.0000</td>
<td>Stationary</td>
</tr>
<tr>
<td>EXC</td>
<td>No trend</td>
<td>13.8139</td>
<td>0.9919</td>
<td>Non-stationary</td>
</tr>
<tr>
<td></td>
<td>Trend</td>
<td>13.8239</td>
<td>0.8628</td>
<td>Non-stationary</td>
</tr>
<tr>
<td>BINT</td>
<td>No trend</td>
<td>13.3447</td>
<td>0.0450</td>
<td>Non-stationary</td>
</tr>
<tr>
<td></td>
<td>Trend</td>
<td>13.3136</td>
<td>0.1207</td>
<td>Non-stationary</td>
</tr>
<tr>
<td>LINT</td>
<td>No trend</td>
<td>-1.8850</td>
<td>0.2761</td>
<td>Non-stationary</td>
</tr>
<tr>
<td></td>
<td>Trend</td>
<td>-1.8601</td>
<td>0.3810</td>
<td>Non-stationary</td>
</tr>
</tbody>
</table>

The results of the ADF for testing stationary in the first difference series are shown in Table 4.3, as it illustrates the series are stationary after first differencing for each variable. However, the original series could be tested to reconsider the VARs system is stability or not, since the aim of VARs analysis is to model the interaction between the variables rather than the coefficients.

Table 4.3: ADF test for first difference series which are non-stationary.

<table>
<thead>
<tr>
<th>Variables</th>
<th>p-value</th>
<th>t-statistic</th>
<th>p-value</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>D(EXC)</td>
<td>1</td>
<td>13.7799</td>
<td>0.0000</td>
<td>Stationary</td>
</tr>
<tr>
<td>D(LINT)</td>
<td>1</td>
<td>-1.8480</td>
<td>0.0000</td>
<td>Stationary</td>
</tr>
</tbody>
</table>

In the following part, the VARs will employ the stationary series. To identify the suitable impact of interest rate to the stock returns, this study would like to compare between two models which are employed the different interest rates, basic interest rate and lending interest rate. The model with basic interest rate is namely model A, and the other is model B with lending interest rate.

Model A: Stock returns (RET), inflation (INF), basic interest rate (BINT) and the change of exchange rate D(EXC).

Model B: Stock returns (RET), inflation (INF), change of exchange rate D(EXC) and the change of lending interest rate D(LINT).

Table 4.4: Granger Causality test for model A.

<table>
<thead>
<tr>
<th>Dependent variables</th>
<th>Excluded</th>
<th>Chi-square</th>
<th>df</th>
<th>Prob</th>
</tr>
</thead>
<tbody>
<tr>
<td>RET</td>
<td>INF</td>
<td>1.4444</td>
<td>2</td>
<td>0.4857</td>
</tr>
<tr>
<td></td>
<td>D(EXC)</td>
<td>3.2310</td>
<td>2</td>
<td>0.0531</td>
</tr>
<tr>
<td></td>
<td>BINT</td>
<td>7.8568</td>
<td>2</td>
<td>0.1297</td>
</tr>
<tr>
<td></td>
<td>All</td>
<td>12.2475</td>
<td>6</td>
<td>0.0567</td>
</tr>
<tr>
<td>INF</td>
<td>RET</td>
<td>1.1699</td>
<td>2</td>
<td>0.5571</td>
</tr>
<tr>
<td></td>
<td>D(EXC)</td>
<td>3.4160</td>
<td>2</td>
<td>0.0890</td>
</tr>
<tr>
<td></td>
<td>BINT</td>
<td>0.1746</td>
<td>2</td>
<td>0.9164</td>
</tr>
<tr>
<td></td>
<td>All</td>
<td>5.8156</td>
<td>6</td>
<td>0.4443</td>
</tr>
<tr>
<td>D(EXC)</td>
<td>RET</td>
<td>3.7929</td>
<td>2</td>
<td>0.0072</td>
</tr>
<tr>
<td></td>
<td>INF</td>
<td>0.8443</td>
<td>2</td>
<td>0.6556</td>
</tr>
<tr>
<td></td>
<td>BINT</td>
<td>0.0012</td>
<td>2</td>
<td>0.9994</td>
</tr>
<tr>
<td></td>
<td>All</td>
<td>5.5737</td>
<td>6</td>
<td>0.0963</td>
</tr>
<tr>
<td>BINT</td>
<td>RET</td>
<td>0.1111</td>
<td>2</td>
<td>0.9460</td>
</tr>
<tr>
<td></td>
<td>INF</td>
<td>12.7474</td>
<td>2</td>
<td>0.0017</td>
</tr>
<tr>
<td></td>
<td>D(EXC)</td>
<td>1.0449</td>
<td>2</td>
<td>0.5930</td>
</tr>
<tr>
<td></td>
<td>All</td>
<td>14.0082</td>
<td>6</td>
<td>0.0295</td>
</tr>
</tbody>
</table>

Note: *, **, ***: Reject the null hypothesis at 1%, 5% or 10%, respectively, of critical value.

The results of Granger causality test of model A are shown in Table 4.4, it shows that the stock returns could be only forecasted based on previous change of exchange rate (the changing adjustment between two periods of exchange rate at 90% of confident level). It also illustrated that to forecast the change of exchange rate, we could employ the information of stock returns, the former is at 99% confident level.

Table 4.5 reports the result in the model B, it has more interesting than the model A, stock returns have Granger caused by other variables, i.e., inflation, the change of exchange rate and the change of lending interest rate. The model B could be fully explained investors’ expectation to the macro variables. It also says that any movement of other variables will affect to the change of stock returns or stock prices.
Although the null hypothesis is failed to reject, it means that the dependent variable is not predictable by other variables, but it does not conclude that there is no relationship among those variables, and there could be some effects among those variables and test of Granger Causality could not capture correctly. The study will employ the above results to analysis the impact among stock returns and monetary policy without concerning to some misspecifications from Granger causality. And results of the model B is suitable to implement a finding of impact between stock returns and monetary policy due to the perfectly forecast of stock returns from other variables in the model.
Table 4.5: Granger Causality test for model B.

<table>
<thead>
<tr>
<th>Dependent variables</th>
<th>Excluded</th>
<th>Chi-square</th>
<th>df</th>
<th>Prob</th>
</tr>
</thead>
<tbody>
<tr>
<td>RET</td>
<td>INF</td>
<td>0.6599</td>
<td>2</td>
<td>0.0962</td>
</tr>
<tr>
<td></td>
<td>D(EXC)</td>
<td>3.0461</td>
<td>2</td>
<td>0.0252</td>
</tr>
<tr>
<td></td>
<td>LINT</td>
<td>6.4180</td>
<td>2</td>
<td>0.0404</td>
</tr>
<tr>
<td></td>
<td>All</td>
<td>10.7855</td>
<td>6</td>
<td>0.0767</td>
</tr>
<tr>
<td>INF</td>
<td>RET</td>
<td>1.0428</td>
<td>2</td>
<td>0.5937</td>
</tr>
<tr>
<td></td>
<td>D(EXC)</td>
<td>4.2118</td>
<td>2</td>
<td>0.0820</td>
</tr>
<tr>
<td></td>
<td>LINT</td>
<td>0.8482</td>
<td>2</td>
<td>0.3969</td>
</tr>
<tr>
<td></td>
<td>All</td>
<td>7.5682</td>
<td>6</td>
<td>0.2715</td>
</tr>
<tr>
<td>D(EXC)</td>
<td>RET</td>
<td>3.7577</td>
<td>2</td>
<td>0.0022</td>
</tr>
<tr>
<td></td>
<td>INF</td>
<td>1.6371</td>
<td>2</td>
<td>0.4411</td>
</tr>
<tr>
<td></td>
<td>LINT</td>
<td>2.2324</td>
<td>2</td>
<td>0.0747</td>
</tr>
<tr>
<td></td>
<td>All</td>
<td>7.9104</td>
<td>6</td>
<td>0.0096</td>
</tr>
<tr>
<td>LINT</td>
<td>RET</td>
<td>0.1331</td>
<td>2</td>
<td>0.9356</td>
</tr>
<tr>
<td></td>
<td>INF</td>
<td>5.2512</td>
<td>2</td>
<td>0.0724</td>
</tr>
<tr>
<td></td>
<td>D(EXC)</td>
<td>0.4639</td>
<td>2</td>
<td>0.7930</td>
</tr>
<tr>
<td></td>
<td>All</td>
<td>6.0335</td>
<td>6</td>
<td>0.4195</td>
</tr>
</tbody>
</table>

Note: *, **, ***: Reject the null hypothesis at 1%, 5% or 10%, respectively, of critical value.

Variance decomposition (Table 4.6) showed that 98.15% of the variation in the stock returns is due to its own innovation while 0.14% is accounted for by the innovations of change of inflation, the change of exchange rate and lending interest rate are 1.10% and 0.60%, respectively. After that, it suddenly drops to 94.08% in the third month, leads the increase rapidly in the change of lending interest rate (to 3.90%), the change of inflation (0.65%) and exchange rate (1.37%). Then the change of variance of stock returns is slowly from third month to tenth month. This result suggested that monetary policy can affect stock returns and the contribution of other innovations of inflation rate, exchange rate and interest rate to the shock of stock returns are increasing in the long term, but the main share is still belonging to its own innovation.

Table 4.6: Variance decomposition of stock returns (RET).

<table>
<thead>
<tr>
<th>Period</th>
<th>S.E.</th>
<th>RET</th>
<th>INF</th>
<th>D(EXC)</th>
<th>D(INTE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.097385</td>
<td>98.15162</td>
<td>0.143711</td>
<td>1.103560</td>
<td>0.601109</td>
</tr>
<tr>
<td>2</td>
<td>0.105579</td>
<td>97.77659</td>
<td>0.255357</td>
<td>1.431193</td>
<td>0.536864</td>
</tr>
<tr>
<td>3</td>
<td>0.107930</td>
<td>94.08193</td>
<td>0.644930</td>
<td>1.369518</td>
<td>3.903620</td>
</tr>
<tr>
<td>4</td>
<td>0.108178</td>
<td>93.69642</td>
<td>0.699538</td>
<td>1.392586</td>
<td>4.211459</td>
</tr>
<tr>
<td>5</td>
<td>0.108340</td>
<td>93.42885</td>
<td>0.951352</td>
<td>1.416840</td>
<td>4.202957</td>
</tr>
<tr>
<td>6</td>
<td>0.108422</td>
<td>93.28640</td>
<td>1.091282</td>
<td>1.421888</td>
<td>4.200429</td>
</tr>
<tr>
<td>7</td>
<td>0.108466</td>
<td>93.21195</td>
<td>1.154634</td>
<td>1.432479</td>
<td>4.200942</td>
</tr>
<tr>
<td>8</td>
<td>0.108488</td>
<td>93.17818</td>
<td>1.189856</td>
<td>1.423333</td>
<td>4.199629</td>
</tr>
<tr>
<td>9</td>
<td>0.108501</td>
<td>93.15866</td>
<td>1.209448</td>
<td>1.425249</td>
<td>4.199346</td>
</tr>
<tr>
<td>10</td>
<td>0.108507</td>
<td>93.14834</td>
<td>1.219180</td>
<td>1.413006</td>
<td>4.199475</td>
</tr>
</tbody>
</table>

As is shown of Table 4.7, the responses of stock returns to its own innovation have large positive magnitude, when compared to the responses of the stock returns from the shocks initiated by other variables. At a one-standard deviation increase in the stock returns induces a contemporaneous increase in the stock returns by 9.34 units, which is the highest positive effect of this shocks. The size of the positive effect of the stock returns that seems to decline sharply period to period, and it changes to negative effect from the forth month by 0.021.

A one standard deviation of inflation rate increases will make a reduction by 0.23 unit in stock returns, and the stock returns reduce deeper in the second month to 1.09 unit. This result suggested that the shock from inflation rate will affect to the stock returns. Similar to the impulse from the inflation rate, a one standard deviation of the change of exchange rate will make a rise of stock returns to 0.73 unit, and it has stronger effect on the shock of stock returns in the second month by 2.72 unit. Similar to the impulse from the change of exchange rate, a one standard deviation of the change of lending interest rate leads to a positive effect to stock returns and makes it a increase of 1.21 unit. After that, the response of stock returns to the shock of lending interest rate increase to 2.42 unit in second month. But there is a sudden change from the third month, due to the negative effect of lending interest rate by 0.019 unit.

Another interesting thing is that the responses of stock returns to the shocks of other variables are stronger on second month. From the third month, the effect of monetary policy innovations on stock returns is higher than it own. That could explain that the delay of investors’ reaction to any movement of monetary policy, most of the domestic investors entered the stock exchange without the knowledge or technical skills to participate in the market. That reason led many arguments that convinced the explosive stock prices were caused by the fads or fooling trades during 2006-2007, an observed bubbles in the stock returns.
Table 4.7: The response of stock returns (RET).

<table>
<thead>
<tr>
<th>Period</th>
<th>RET</th>
<th>INF</th>
<th>D(EXC)</th>
<th>D(INTE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>9.342955</td>
<td>-0.237601</td>
<td>0.733574</td>
<td>1.215635</td>
</tr>
<tr>
<td>2</td>
<td>4.037620</td>
<td>-1.095335</td>
<td>2.721142</td>
<td>3.421356</td>
</tr>
<tr>
<td>3</td>
<td>0.377776</td>
<td>-1.406831</td>
<td>1.44E-05</td>
<td>-0.019872</td>
</tr>
<tr>
<td>4</td>
<td>-0.021283</td>
<td>-0.902595</td>
<td>-0.080921</td>
<td>-0.00676</td>
</tr>
<tr>
<td>5</td>
<td>-0.001209</td>
<td>-0.521459</td>
<td>0.001826</td>
<td>-0.00692</td>
</tr>
<tr>
<td>6</td>
<td>0.000415</td>
<td>-0.002749</td>
<td>-0.00176</td>
<td>-0.00680</td>
</tr>
<tr>
<td>7</td>
<td>0.000672</td>
<td>-0.002049</td>
<td>-0.000225</td>
<td>-0.00212</td>
</tr>
<tr>
<td>8</td>
<td>0.000491</td>
<td>-0.001529</td>
<td>-0.000254</td>
<td>-0.00285</td>
</tr>
<tr>
<td>9</td>
<td>0.000350</td>
<td>-0.001078</td>
<td>-0.000273</td>
<td>-0.00275</td>
</tr>
</tbody>
</table>

Conclusion:

This study has used a vector auto-regression approach (VAR), focusing primarily on the reduced-form relationships between monetary policy and stock returns using a small number of variables such as inflation, exchange rate and interest rate. This study divided into two models with different kinds of interest rate, basic interest rate which is decided by the State Bank of Vietnam and announced monthly; the other is monthly lending interest rate which is adjusted based on the basic interest rate with the ceiling to 150% of basic interest rate. This study shown that the lending interest rate is better explainable for forecasting the stock returns than the basic interest rate as the result of Granger causality test, the test found that stock returns could be forecasted by using the past information of some variables such as inflation rate, exchange rate and lending interest rate. The impact of stock returns to monetary policy appears from the forecast in the change of exchange rate and the stock returns has no Granger causality to inflation and lending interest rate.

The analysis of impulse and response of stock returns illustrate that the monetary policy has a small contribution into the innovations of the stock returns and the shocks from monetary policy to stock returns mostly affect stronger in the second month when the own shock of stock returns reduces. And the misspecification makes the innovations of stock returns which have a small part of contribution from monetary policy variables almost depends on its own innovations, it also proves that the policy has a delay effect on the stock market in Vietnam.

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Guo, H., 2004. Stock prices, firm size, and changes in the federal funds rate target, The Quarterly Review of