CHAPTER 3
LITERATURE REVIEW AND THEORETICAL FRAMEWORK

3.1 Literature review

One of the major functions of the stock market is an allocative capital resource for the whole economy; the stock market presents as a scale of growing economy, the allocation of capital resources plays a critical role in the determination of the rate of growth of that economy's output (f)), the stock market is a channel for the companies making more liquidity for their shareholders and supports the companies to get more capital from the economy to extend their business; if the stock market could serve as good as its function with available capital, the development of companies will support the growing economy, if not, the whole economy will be suffered. The stock market is also an indication for the level of transparency of companies, the regulation for listed companies has to inform and make clear about their business and the wealthy of companies to the public, the regulation stands at the public side to make sure that investors could make suitable decisions for their investments as well as their expected dividend. Ideally, the stock price will measure the value of the company whose ownership which it represents.

3.1.1 Bubble in asset price - rational bubble

The bubble of an asset price exists in a financial market due to the arbitrage in that market or overlapping generations economies. This phenomenon happens since there is an excess of fundamental value and market price of that asset. Blanchard and Watson (1982) discussed the high expectation to the asset price is a partial consequence of bubble, the reasons of existing bubble is not only the expectation, but also come from other sources which have been explained in different theories:

On the one hand, some economists prove that the bubble exists when the asset price is exceeded the fundamental value of asset. Flood and Garber (1980) argued the price-bubble that “the bubble can arise when the actual market price depends positively on its own expected rate of change, hence in arbitrary, the self-fulfilling expectation of price changes may drive actual price independently of market fundamentals”; and Allen and Gale (2000) found that the agency relationship in the banking sector could lead to bubble through the risk shifting for their borrow from the financial institutes (*discuss more detail in next section*); Since the banks relax their policy for borrowers who could invest in a risky asset and try to push up the price to avoid of a lose from the lending interest rate or Tirole (1985) deployed the Dynamic model to examine the existence of bubble, he found that there is no exist a bubble equilibrium for any return on the stocks that is larger than the rate of growing economy, and if that return is less than the rate of growing economy, that steady-state bubble may be positive. And he summarized that there are 3 conditions to create the bubble: durability, scarcity and common belief.

On the other hand, Harrison and Kreps (1978) gave a conclusion based on the finite maturity that does not exists bubbles, as investors have only a finite number of trading and wealth, hence the equilibrium price exactly coincides with the asset’s fundamental value. But the growth of bubbles happens in case of infinite maturity, because investors have more trading opportunities, there are new equilibrium allocations that the fundamental value of asset change overtime due to a new underwriting from investors; or bubble has to grow over time in expectation (Diba (1988)).

With a diversified definition of bubbles, there are some arguments for fundamental value, but most of them are designed regarding to dividend of that security, in Baumol (1965), he said that it could be not clear enough but the stock price is closely the value of future earning, and the past earning is a reference to predict the future return and the common form to predict the future earning is public’s expectation about this earning.

Fundamental value

Many scholars such as Flood and Garber (1980), Hamilton (1986), Harrison and Kreps (1978) and Blanchard and Watson (1982) defined fundamental value (or market fundamental) is expected the present value of all future dividends of that stock:

$$p_t^f = \sum_{i=1}^{\infty} \beta^i E_t d_{t+i} \qquad \text{with } \beta^i = (1+r_{t+1})^{-i} \qquad (3.1.1.1)$$

where p_t^f is fundamental value of stock at time t, rt+1 is risk free rate and $E_t d_{t+i}$ is expectation dividends in the future.

We can see that this definition is not power to explain the fundamental value of a security since investors have opportunities for short trading, although in case of r being not risk free rate, it is the real interest rate (it contain the capital gain from short trading, Dwyer (1989)):

$$r_{t+1} = \frac{E_t p_{t+1} + E_t d_{t+1} - p_t}{p_t}$$

but it also faces more difficult to estimate infinity dividend. Tirole (1985) argued that the fundamental value of a security will change over time and the current fundamental value of this period will depend on the current value of expectation of fundamental value and dividend in next period, the formula (1) will be adjusted to:

$$p_t^f = \frac{p_{t+1}^f + d_{t+1}}{1+r_{t+1}} \qquad (3.1.1.2)$$

3.1.2. Asset pricing bubbles under investors' behaviors

Since the domestic investors are the key players in the Vietnamese stock market. It is important to clarify the investors' behaviors. In the stock market, investors' behaviors play an important role to leading different trends of the market, they join in the market for different purposes, for example: for saving, long-term investments or speculation. In arbitrage condition, if the rate of return from short trading is high, it could hold more attention from other investors to get profit as high as possible. Rebert Schenk stated that speculators are coolly individuals looking at the

fundament value of the shares, buying when prices are too low and try to increase these prices, then selling at high prices and then helping to lower these prices again[1]. They will try to obtain in advance the profit with their ability or asymmetric information which they could know personally, as the prices are transmitted the information of the share and they exploit those opportunities if they have chance, specially, in case of imperfect market, policies are not support all sides of the market and the market could be lead by wealthier investors or happening of principal-agent problem since leaders of companies could take advance of "inside" information of companies for their trading. In a general view, it could explain the speculation is a source of boom of stock prices.

In that situation, for short trading, speculators will try to have more capital for their investment into the market which supports them to gain more and more opportunities in the short trading, they could borrowing from other sources to donor their purchasing (as mentioned above), Sharpe (1964) illustrated that if the interest rate is pure, investors would like to borrow to support their decision to invest more than their wealth; Sharp (1964) also showed that the risk averse investors will prefer borrowing to consuming with their limited budget due to the pure interest rate in comparison to the return rate of their investment. And Koh, M. et al. (2005) found that investors reached the loan easily and the borrowers put their asset for guarantee to the loan, they will walk away from any future payment and interest on the loan if the value of the guarantee will be under the balance of the loan[2], it is a risk transfer and it could be a source of bubble, since investors try to raise the prices to close the gap of borrowing cost with the capital gain in expectation that they could afford the refund. Or the interest of return in the market will be higher the market risk free and investors or always want to get in advance of this situation by optimism about having other people with higher expectation of asset valuation. In other words, expectation has an important part in the formulation and collapse of the market bubble, both the borrowers and lenders will expect that the holding asset will yield higher return at next period and they try to invest or hold a new asset and the bubble occurs in this case: in fact, the borrowers want to maximize their consumption in each period; so to

[1] Speculator and markets- http://ingrimayne.com/econ/Financial/Overview8ma.html
[2] Andrey Pavlov and Susan M.Wachter (2004) (page 147-160)

balance in every period, they must have income each period. In fact, Norris (2000) revised the crash of the stock market in United States in 1920's, investor wanted to buy stock and got risk, and they were borrowing more and more money to support their trading. That happened in the previous year, as share prices had soared. And Wall Street investigated that some of selling came from investors who had borrowed money to buy stock and need to raise cash to pay their loan, and the crash occurred since more and more speculators were forced to sell their holding under the fall of prices. It illustrated that a relaxation in lending policye for speculators will support to rise short trading in the stock market and left the market in a higher risk. That situation was happened during the booming stock prices in Vietnam in 2006-2007, investors could use their available securities or the securities which they want to buy as collaterals for borrowing from banking institutes or securities companies.

Furthermore, in the theory, investors are assumed to be rational investors; but it could not explain enough for their behaviors in the market,namely speculative manias such as noise trading or fooling trading, madness of crowd which make many problems to the market and are foundation of boom in stock prices. As Kindleberger and Aliber (2005) stated the irrational group of individuals as a group of investors or speculators always adjust their expectation forward the development of the market, and they believe that they could prevent any risk from the crash of market, they strongly though that the last one is the "*death*". Especially, there is a crowding trend seeking income from "high risk high return" condition of booming financial market, most of people join in and think that "*the rest of world are mad and the intelligent persons will escape*". It is the same as Schainkman and Xiong (2003) defined that behavior is overconfidence since investors know that the increased price is bubble and their action is "speculative bubble", in this case, Schainkman and Xiong (2003) explained that investors are risk averse, but they strongly believe that they could escape if the bubble is burst, they deploy their ability to gain as much as possible by the short trading.

3.1.3. Relationship between asset price bubbles and monetary policy

The impact of monetary policy is an open discussion for scholars since there are two opposite opinions about involving of monetary policy to asset prices:

One kind of scholars' opinion shows that: monetary policy should not respond to fluctuation of asset prices, in Bernanke and Gertler (2001) the policy makers should not apply their monetary policy to adjust the asset prices, they should concentrate into their job to target better inflation and make more stability for macroeconomics than employ their tools in monetary policy to control the movement of asset prices: Bernanke and Gertler (2001)'s argument is the monetary policy should respond to any shock which affects to the targeting inflation better than the shock from stock prices; Posen (2003) proved that the bubbles in Japan, from 1985 to 1990, was evidence which illustrated that the monetary policy have made more worse to the economy if the monetary policy involves deeply to asset prices, "bubbles will come, bubbles will go, but monetary policy remains the same", this opinion will not discuss more detail in the study since Vietnam has applied monetary policy to control the fluctuation of asset prices, especially in the stock market and the real estate market.

In contradiction, other scholars conclude that the policy maker should involve in the boom of asset prices and relax their monetary policy if bursting. Bean (2004) showed that the policy makers are better to react with the boom of asset prices and must be relaxation their policy to avoid of a credit crunch for the economy. It is easy seen that real interest rate having strong impact to the expectation on the future income of investors, if the rate of return from stock is higher than risk free rate or saving interest rate .etc., investors will invest more money into the stock market. Regarding to the relationship between asset pricing and monetary policy, Kindleberger and Aliber (2005) illustrated that credit and money expansion were a source of increasing in speculative manias for past financial crisis, or in above section, the risk shifting, many scholars proved that the relationship of asset price bubbles and credit expansion as well as Allen and Gale (May 2000) proved in their article that the monetary policy affects to asset pricing in two ways, the first is an agency problem between banks and borrowers as mentioned above for risk shifting, the other is the negative impact of monetary policy and the policy could make a fall in asset price to under its fundamental value., to explain the negative impact of monetary policy to the boom in asset prices. Huynh, Mallik et al. (2006) deployed a cointegration test to prove that the stock prices have a cointegration to interest rate in Australia; the interest rate was supported investors to have more opportunities to buy

the stock and pushed the prices up. Or in other empirical study, Habibullah, Baharom et al. (2009) found in Asian countries[3] that the stock market returns have a significant impact from the movement of inflation rate for those countries. Or regarding to the boom of Japan, Okina, Shirakawa et al. (2001) argued that the reasons of bubble in Japan were from the boom of economy and monetary policy, and the central bank had reacted to those booms in a strong manner was made a recession for the whole economy. Both of them showed that with the relaxed interest rate for investors to get loan easier for, it was a result of booming prices in Japan during 1980's. Interestingly, they also proved that after a boom, Bank of Japan had issued policies which were impacted directly to interest rate, exchange rate and make cool the fever of asset prices, but those policies had negative impact to the economy and led to a crash in financial market. In conclusion, it seems that the central bank should have a tightening monetary policy before and during the boom of stock prices and relax or ease its policy if the stock prices burst.

In conclusion, since there are a variety of theories about asset bubbles, the study would like employ the main idea of Tirole (1985) for testing rational bubble in Vietnam, although the noise trading (irrational behaviors, fooling trading or "crowd psychology") could affect strongly to the stock prices in Vietnam from 2006 to 2007, as Long (2007) illustrated that domestic investors were influenced by some institute investors and foreign investors based on irrational behaviors. But the study would like to concentrate into the economic aspect that examines the existence of bubble due to the excess of the stock market prices and fundamentals through checking the rational bubble in the stock market from the stock market returns, the irrational bubbles could be applied for further study.

In Chang, Su et al. (2009), they found that there existed a relationship between the stock market and the exchange rate market, "when the bad news happens in the stock market and the exchange rate market, the volatility of its own market increases", the exchange rate was decided by the State Bank of Vietnam with fixed exchange rate, the fluctuation rate for the commercial banks is 2% based on the

[3] Five countries: India, Japan, Korea, Malaysia and Phillipne

official rate of SBV; More than that, Tung (2007) and Dr. Tran Ngoc Tho[4] pointed out that the ease of monetary policy was attracted more foreign investors to join in the stock market and caused a fever for domestic investors to hold any securities in the stock market since the foreign investors could get advance from the high exchange rate and they could get extra profit from the stock market. In other discussion, Tho (2007) said that the fever in the stock market was from poor cooperation between SBV, Ministry of Finance and State Commission of Securities for running and supervising the stock market, the SBV has an ease of policy for commercial banks to lend policy for stock trading. The involvement of SBV to the stock market in the post booming stock prices was more serious when the SBV increased the interest rate and forced the commercial banks to cut off their lending policy for stock trading. Based on above studies, this study would like to extend and discuss more detail the impact of monetary policies to stock returns as well as the response of SBV to the changing in stock returns via SBV's instrument policies: interest rate, inflation and exchange rate.

3.2 Theoretical framework

Several empirical articles tested the existence of the stock market bubbles around the world since the crash in 1929 in United States or 1987 in many countries. Each of these articles employed different framework to estimate the appearance of bubbles in the stock market. Generally, they divided into three frameworks to detect the bubbles:

1. Find the existence of bubble directly in the stock market prices or investors' expected return of short trading (West (1986), Shiller (1981) or Hardouvelis (1988)).

2. Define bubbles as unobservable variable in condition of no-arbitrage (Wu (1997)).

3. Detect rational bubbles in aggregate prices (or stock price index) for the long run (Mokhtar, Ms.Nassir et al. (2006) or Chan, McQueen et al. (1998).

[4] Assoc. Prof. Dr. Tran Ngoc Tho- University of Economics in Hochiminh city- has written an article, namely "How to cool the stock market" in 2007.

Besides that, the interaction between asset prices with other variables in financial market mostly identifies through two models: GARCH and VAR; Rigobon and Sack (2003) employed GARCH to find the movement of short-term interest rate, long-term interest rate and stock prices. They found that there are strong contemporaneous interactions between these variables. Accounting for this behavior is critical for interpreting daily changes in asset prices and for predicting the future paths of their variances and correlations. But in the previous paper, Rigobon and Sack (2002) applied other econometric method (VAR) to estimate the response of asset prices to changes in monetary policy. Emphasis is put on the problem of endogeneity of policy decisions (short term interest rate is simultaneously influenced by movements in asset prices and a number of other variables including news about the economic outlook, likely to have an impact on both short-term interest rates and asset prices) the existence of omitted variables.

3.2.1. Examine the existence of bubble

In Blanchard and Watson (1982),Tirole (1985) and Dwyer and Hafer (1989) showed that the real stock price at period t determined as:

$$p_t = \frac{p_{t+1} + d_{t+1}}{1 + r_{t+1}} \qquad (3.2.1.1)$$

where. r_{t+1}: risk free rate or discount rate in period t+1

p_{t+1} is real stock price in period t+1

d_{t+1}: dividend which paid for period t+1

From the equation (3.2.1.1), the fundamental value could be written as:

$$p_t^f = \frac{p_{t+1}^f + d_{t+1}}{1 + r_{t+1}} \qquad (3.2.1.2)$$

Hence, as mentioned above, the real stock price is:

$$p_t = p_t^f + b_t \qquad (3.2.1.3)$$

where b_t is bubble variable.

The equation (3.2.1.3) could be written as:

$$b_t = p_t - p_t^f \tag{3.2.1.4}$$

From the right hand side of (3.2.1.4), combine with (3.2.1.1) and (3.2.1.2),we have:

$$p_t - p_t^f = \frac{p_{t+1} + d_{t+1}}{1 + r_{t+1}} - \frac{p_{t+1}^f + d_{t+1}}{1 + r_{t+1}}$$

$$\Leftrightarrow \; p_t - p_t^f = \frac{p_{t+1} - p_{t+1}^f}{1 + r_{t+1}} \tag{3.2.1.5}$$

Hence, combine (3.2.1.4) and (3.2.1.5), we have the rational bubbles as:

$$b_t = \frac{b_{t+1}}{1 + r_{t+1}} \tag{3.2.1.6}$$

If the bubble exists in the period t, the condition for existence of bubble in period t+1 is probability q, and burst with the probability (1-q):

$$b_{t+1} = \begin{cases} \dfrac{(1 + r_{t+1})b_t}{q} - \dfrac{1-q}{q} a_0 & with \quad probability \quad q \\ a_0 & with \quad probability \, 1-q \end{cases} \tag{3.2.1.7}$$

Blanchard and Watson (1982) defined it as rational bubble. If $1 + r_{t+1} > 1$, the deviation b_t must be expected to grow overtime. We can see that if bubbles exist, investors are known that the stock prices are overvalues, but they do not quit since the bubbles grow exactly the amount compensate to investors if the bubbles crash with the probability (1-q), then the prices will revert to small initial value ($a_0 > 0$). As Blanchard et al (1982), the crash will be a completely disappear of bubbles and $a_0 = 0$, but in general, it maybe not happen in the next period. That process explains investors' rational behavior in the case of existence of bubbles.

In case of no bubbles, the condition of efficient market is:

$$E_t\left(R_{t+1}\right) = r_{t+1} \tag{3.2.1.8}$$

where $R_{t+1} \equiv \frac{p_{t+1} - p_t + d_{t+1}}{p_t}$ is expected rate of return if investors join in the stock market.

r_{t+1} is required rate of return or discount factor as defined above.

Since the bubbles exist, there is an unexpected change in the prices as:

$$\varepsilon_{t+1} \equiv (R_{t+1} - r_{t+1})\, p_t \tag{3.2.1.9}$$

The unexpected change in prices is come from two sources: unexpected change in fundamental values and unexpected change in bubbles:

from fundamental values:

$$\eta_{t+1} = p^f_{t+1} + d_{t+1} - (1 + r_{t+1})\, p^f_t \tag{3.2.1.10}$$

from bubbles:

$$\mu_{t+1} = b_{t+1} - (1 + r_{t+1}) b_t \tag{3.2.1.11}$$

Hence, the observable unexpected change in prices: $\varepsilon_{t+1} = \eta_{t+1} + \mu_{t+1}$ or from the condition (2.2.1.9), the equation (2.2.1.11) could be re-written as:

$$\varepsilon_{t+1} = \begin{cases} \eta_{t+1} + \dfrac{1-q}{q}\left((1 + r_{t+1}) b_t - a_0\right) & with \quad probability\, q \\ \eta_{t+1} - (1 + r_{t+1}) b_t + a_0 & with \quad probability\, 1 - q \end{cases} \tag{3.2.1.12}$$

In Blanchard and Watson (1982), as traditional characteristics of bubbles, the prices could lead to a crash for a long run, then the probability for continuing bubbles, q, must be greater than ½. As same as above argument, McQueen and Thorley (1994) analyzed that “the expected value of the total price innovation is zero” in case of efficient market. Hence, the probability of a positive excess or abnormal return should be more than ½, although the new fundamental values are symmetric around zero. That situation is caused by the inherent skewness of the bubbles in following periods. If the bubble is not burst, the innovation is positive and small in comparison to other, which is infrequently, but large negative innovation in case of bursting. The asymmetry of bubble innovation is from observing excess returns which are positive if the bubble continues growing, leading to autocorrelation and longer

runs of positive excess returns than expectation from a temporal and independent data series.

Additionally, for the skewness, the process in the equation (3.2.1.9) makes the total price innovations to be explosive. The compensation from bubble growing is larger than the risk of potential crash that holds more attention from investors and causes a progressively larger bubble, and the explosive bubble becomes amore dominant part of total price innovation; consequently, there are higher and higher observed returns leading to the crash.

McQueen and Thorley (1994) showed that the probability of a negative observation of innovation with the condition of a sequence of i prior positive innovations:

$$h_i = prob(\varepsilon_t < 0 \left| \varepsilon_{t-1} > 0, \varepsilon_{t-2} > 0, ..., \varepsilon_{t-i} > 0, \varepsilon_{t-i-1} < 0 \right.)$$

decreases in i, and they proved that $h_{i+1} < h_i$ for all i if the bubble present. And since the bubble is not negative, a similar inequality does not hold for runs of negative abnormal returns. Their conclusion is "*bubbles generate duration dependence in runs of positive, but not negative, abnormal returns*".

The null hypothesis is no bubble existed in Vietnam that will be interpreter as no duration dependence in the model.

3.2.2. The relationship between monetary policy and stock returns

Bernanke and Gertler (2000) 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 et al (1999), they showed that the central bank follows the policy rule as:

$$r_t^n = \overline{r^n} + \beta E_t \pi_{t+1} \qquad (3.2.2.1)$$

where r_t^n: nominal instrument interest rate, which is controlled by Central Bank.

$\overline{r^n}$ is steady state of nominal interest rate.

$E_t\pi_{t+1}$: expected inflation in next period.

Assume that β >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:

$$r_t = r_t^n - E_t\pi_{t+1} \qquad (3.2.2.2)$$

In BGG model, Bernanke and Gertler (2000) assumed that only the fundamentals drive asset prices, by extending BGG model, Bernanke et al (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:

$$r_t^n = \overline{r^n} + \beta E_t\pi_{t+1} + \zeta \log(\frac{P_{t-1}}{P_t}) \qquad (3.2.2.3)$$

where ζ 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. Based on the Arbitrage Pricing Theory, the return function could be formula as:

$$RET_t = a_0 + \sum_{i=1}^{k} \psi_i * r_{t-i} + \sum_{i=1}^{k} \delta_i * \pi_{t-i} + \varepsilon_t \qquad (3.2.2.4)$$

where $RET_t = 100\% * \frac{P_t - P_{t-1}}{P_{t-1}}$: rate of stock returns.

ψ_i and δ_i: the autocorrelation of interest rate and inflation with stock returns, respectively.

ε_t: residual with zero mean, white noise process.

Based on the equation (3.2.2.3), (3.2.2.4) and the result from Chang, Su et al. (2009), we could see that the influence of each variable to others could be happened. These could be stated as:

If the stock prices increase rapidly, the central bank would to slow down the boom with its instrument tools. The central bank will raise the interest rate to reduce the short-term trading from domestic investors (as in section 3.1.2); in parallel, the central bank will adjust the exchange rate, it will prevent the foreign investors to continue pour their money in the stock market. But it unofficially pays more attention from domestic investors to move currency exchange.

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:

$$RET_t = a_{11} + \sum_{i=1}^{k} a_{12,i} * INT_{t-i} + \sum_{i=1}^{k} a_{13,i} * INF_{t-i} + \sum_{i=1}^{k} a_{14,i} * EXC_{t-i} + \sum_{i=1}^{k} a_{15,i} * RET_{t-i} + e_{1t} \quad (3.2.2.5)$$

$$INT_t = a_{21} + \sum_{i=1}^{k} a_{22,i} * RET_{t-i} + \sum_{i=1}^{k} a_{23,i} * INF_{t-i} + \sum_{i=1}^{k} a_{24,i} * EXC_{t-i} + \sum_{i=1}^{k} a_{25,i} * INT_{t-i} + e_{2t} \quad (3.2.2.6)$$

$$INF_t = a_{31} + \sum_{i=1}^{k} a_{32,i} * RET_{t-i} + \sum_{i=1}^{k} a_{33,i} * INT_{t-i} + \sum_{i=1}^{k} a_{34,i} * EXC_{t-i} + \sum_{i=1}^{k} a_{35,i} * INF_{t-i} + e_{3t} \quad (3.2.2.7)$$

$$EXC_t = a_{41} + \sum_{i=1}^{k} a_{42,i} * RET_{t-i} + \sum_{i=1}^{k} a_{43,i} * INT_{t-i} + \sum_{i=1}^{k} a_{44,i} * INF_{t-i} + \sum_{i=1}^{k} a_{45,i} * EXC_{t-i} + e_{4t} \quad (3.2.2.8)$$

where: RET_t, INT_t,INF_t and EXC_t are stock returns, interest rate, inflation rate and Exchange rate (VND/USD) at period t, respectively.

a_{11}, a_{21}, a_{31},a_{41}: constant

$a_{mn,i}$: parameters of the variables of INT, INF, EXC and EXC in each equation, respectively (mn=12, 13 …45).

e_{it}: error term of each equation from (3.2.2.5) to (3.2.2.8) (i=1,2..4)

Based on Bernanke and Gertler (2000) and Chang, Su et al. (2009), investors' 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, investors 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 changes 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 Vietnamdong/USD via exchange rate, this change will affect directly to 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 (negative effect). 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 (positive effect).

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.

To sum up, the function of stock returns will have the followings expected:

(-) (+) or (-) (+) or (-)

Stock returns (RET)= F(interest rate, Exchange rate, Inflation)