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**THE INFLUENCE OF MACROECONOMIC ANNOUNCEMENTS INTO  
VIETNAMESE STOCK MARKET VOLATILITY**

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**ABSTRACT**

Market volatility is influenced by many different factors and researchers are discovering and proving impact of those factors in their studies. Macroeconomic announcement is an important factor to market's volatility, proxied by the famous GARCH model. Inspired by this proven statement, this paper applies the same methodology with the extension of different variables and estimates those factors against the Vietnamese market's uncertainty. During the observed period of six years, Vietnamese Central Bank governs many monetary policies aiming to stabilise the market and encourage trading. By applying GARCH model, this paper addresses the volatility in Vietnamese market as affected by said announcements.

Empirical part of this thesis shows that in general, the market is influenced by U.S.'s significant news announcements, namely CPI and GDP. Otherwise, this study reports that other news announcements from Vietnam and US do not create significant impact into the market. Interestingly, interest rate changing decision has no impact into the said market despite being the commonly influential tool for policy makers to govern the economy.

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**KEYWORDS:** Macroeconomic news announcements, Vietnamese stock market, volatility.

## 1. INTRODUCTION

Vietnam is a developing country with 6.96% GDP growth in fiscal year 2015. Rapid expand in Vietnam economy is subject to extreme volatility and influences by various forces. Figure 1 reports the economy hitting its highest peak in early 2006 and ending 2007, equivalently the booming stage of Stock market in Vietnam (market capitalisation rate in 2005 reaches 1.21%, accounted for VND 44.6 billion or USD 2.7 million). The trend quickly and significantly declines to 3.14% in 2009 following the crash of Vietnamese stock market. Aiming to revive the declining mode of the market and economy, various action packages are suggested and implemented.



**Figure 1:** Vietnam GDP growth rate 2004 to 2015. Source: tradingeconomics.

State Bank of Vietnam remains an important force that watches over the whole Vietnamese economic strength and growth. Various macroeconomic news release and decisions have affected market both positively and negatively. Vietnam, like any other developing nation, considers banking, real estate and trading securities its main economic activities. In this thesis, the influence of Vietnamese Central Bank's action to the corresponding stock market will be taken into consideration. Central Bank's action in this paper refers to the act of altering interest rate, exchange rate and publishing macroeconomic announcements that aim to influence stock market's reactions. Ophoven (2009) has discussed governmental incentive to maintain effective control of macroeconomic factor. Three most important motives are discussed as follow: 1.

Increase interest rate, hence, saving value; 2. Increase value of domiciled currency, helping to reduce inflation; 3. Restore customers' confidence in banks.

Macroeconomic new release from Central Bank has triggered stock market to fluctuate. Various studies have provided empirical result to back up the mentioned statement: Wong, Khan, and Du (2005), Basistha and Kurov (2008), Alam, and Uddin, (2009). Macroeconomic factors and interest rate announcement have affected stock price significantly. Different researchers have confirmed this relationship. Hamrita and Trifi (2011) conducted a Wavelet analysis regarding the association between interest – exchange rate and stock price to conclude that movements in interest rates are leading stock index returns. Alam et al (2009) also confirm that interest rates and changes in interest rate have strong negative relationship with stock prices.

Besides national Central Banks, international factors also place significant influences on a country's trading ability. Upon the news of European Central Bank ("ECB") promising for "unlimited" actions to intervene into European market such as to "buy unlimited amounts of bonds of troubled euro-zone countries"; and the Federal Reserve who pledged to buy an indefinite amount of mortgage-backed securities ("MBS"); in September, the Dow Jones industrial average and the SandP 500 rose for 0.5%, the NASDAQ gained approximately 0.9%. All three indices were reported to be at their highest peak since early May 2012. The similar rise in stock market was also noted in Euro Stoxx 50 index (8.4%) and Honkong's Hang Seng index (7.2%) in September 2012. The trend has been continued for an additional four months, keeping investors highly motivated by the global central bank's actions to support market.

The purpose of the study is to examine how various forms of macroeconomic news announcements affect the Vietnamese Stock Market. By following the random walk theory, it is suggested that price changes over time are not correlated to historical trends, and that past index values cannot be utilised to place forecast on current or future value of the index.

Structure of this paper includes theoretical review and empirical analysis, follow by interpretation of the said empirical part. Theoretical part is to review various relevant studies, researches and their findings that help explaining the scope of this thesis.

Reviewing these literature shreds light on the knowledge, expectation and methodology that relates to macroeconomic news releases and its influence to corresponding markets. Empirical part is to define and customise regression models used, in this paper, GARCH models to address the hypotheses about announcements and market volatility.

The first chapter is to introduce information, situation, and economy background that Vietnam is operating in. Purpose, expectation and structure of the study is also envisioned in this part. The second chapter reviews various literature studies and results from said studies about the central bank of Vietnam, which govern monetary policies and thus directly affects its economy. This chapter also reviews the main functions, importance of well-structured Central Banks and its importance to the economy. Literature review part will discuss behaviour finance, since human reaction contributes largely to the market fluctuations. This part also discusses other factors that will be co-influencing the market which implies that, investors' irrationalities empowered by the questionable efficiency of Central Banks, can and will result in market volatility. Next chapter discusses stock return volatility and how using GARCH allows the paper to address market volatility as performed by other papers. Data description is included to introduce the time frame and method to estimate the models. Finally, empirical results interpret findings and discuss the real economic factors that may possibly address the results. Last chapter is to discuss contributory value of this paper, to acknowledge limitations of this paper and to suggest methods that will bypass said limitations.



## 2. LITERATURE REVIEW

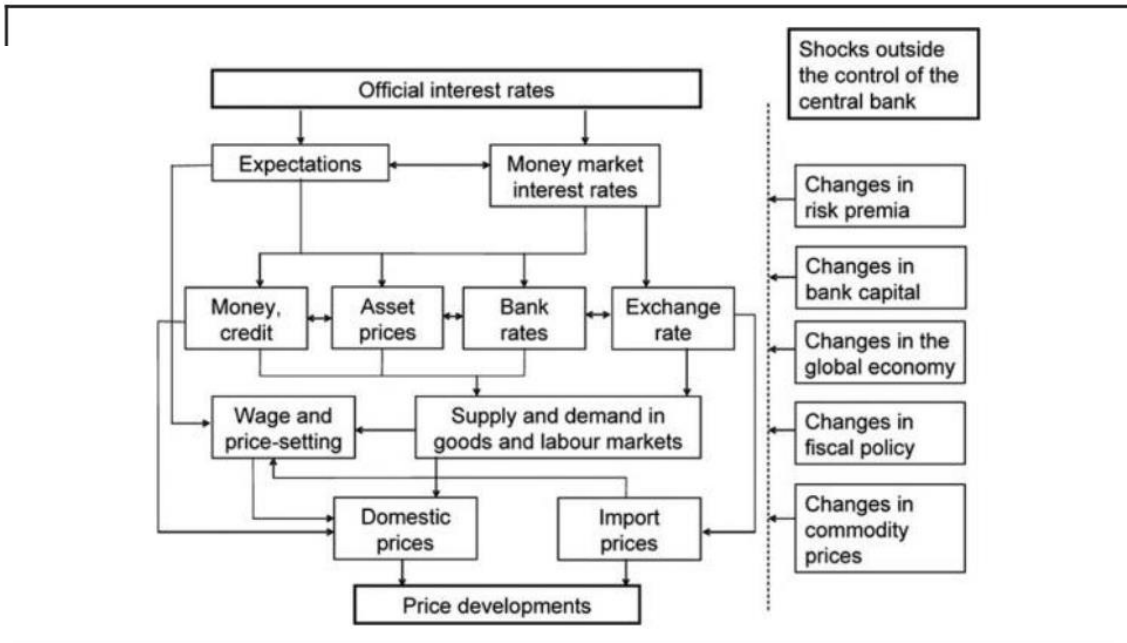
### 2.1. Central Bank: Primary functions and its characteristics

In addition to providing traditional functions of being a bank (to other banks), Central Bank is also expected to govern national economic position. In developing countries, the existence of Central Bank is enhanced as a necessity to develop financial system nation-wide. Central Bank is also expected to perform several activities to maintain economic sustainable growth, of which, most important acts including:

- Issuing notes, coins and regulating national currency volume;
- Traditional Functions: financing arrangements to other banks, be the Government's banker, be the lender-of-last-resort;
- Economic Growth Function: providing funds for economic/financial stimulus package;
- Domestic Price Stability: requiring the Bank to have control over inflation and price stability; and
- Appropriate Interest Rate Structure: Governing interest rate structure and hence, influencing the investment direction of a whole nation.

Monitoring is not the only function of Central Bank, but also the acts towards national development. Several researchers conclude the necessity of Central Bank in macroeconomic governing mechanism, e.g. the association between independent Central Bank and the low levels of inflation (See also Bade and Parkin, 1982, Alesina 1988, 1989, and Grilli, Masciandaro and Tabellini, 1991).

According to Khan and Batteau (2011), Governments are less likely to influence stock market than in exchange market, though if necessary, intervention is inevitable. Most common reasons are to bring price stability and to restore investors' confidence. Also stated by Khan et al (2011), Central Bank may influence national economy and hence, directly or indirectly affect stock market prices by adjusting interest rates, devaluing currency, reducing other banks' obligatory deposit margins to Central Bank, price support and managing circuit breakers (see also Subrahmanyam, 1994).



**Figure 2:** European Central Bank’s approach to transmission mechanism. Source: ECB.

Blinder (1998) announces that there is a significantly positive relationship between Central Banks’ public policies disclosure and the level of market efficiency, from which triggers many more papers. Tomljanovich (2004) shares the same conclusion when identifying a reduction in forecast error in conjunction with public disclosures and announcements by Central Banks. Figure 2 shows the ideal and currently employed system transparency in ECB. According to Cruijsen and Eijffinger (2007), the regime switching from secretive (1980’s) to a more transparent one (starting 1990’s) marks important changes in governmental and investor-wide’s expectation, policymaking and inflation management. Issing (2005) states various benefits from “successfully steering” market expectations, including uncertainty reduction, enhancing investor’s preparation, reduction of interest rate volatility, and more effective monetary policy. Blinder and Reis (2005) study this “phenomenon” and suggest that, the Reserve Bank of New Zealand was the leading Central Bank that pioneered this trend since 1998.

Transparency and independence from any individual driving force is crucial to the developing of a country’s economic stability specifically, and development in general. The need for communication is now a far more important tool for Central Banks to

pursue monetary policy goals (De Haan et al., 2007; Blinder et al., 2008; Woodford, 2005).

Hughes and Kesting (2014) insist that, as communication is fluid and transparency is ensured, on a theoretical framework, monetary policy of a Central Bank can be effective and directly adjustable to different dynamic problems. In reality, monetary policies operate in a lagged environment, which are different variable of interest (Archer, 2005). This long reaction time, or lags, defies the efficiency of Central Bank policy makers while suggesting a speculative approach to problems.

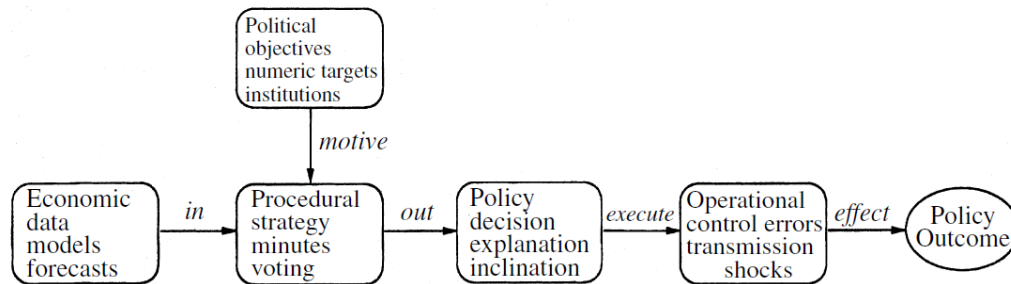
Among these links, communication and transparency are an implicit factor to ensure the flow and reaction's efficiency in terms of addressing the changes and issuing intervention types. The changes are uncertain and thus, subject to certain degree of volatility, giving "an avenue for speech acts to influence the economy" (Hughes et al, 2014).

Another important characteristic of Central Bank is transparency. In fact, it is deemed one of the key features of monetary policy. The availability of Central Bank's transparency reduces uncertainty among monetary policy makers and other economic agents (Geraats, 2002). Also as suggested in the same economic research, Geraats studies the ideal theory behind the most effective policies, which are backed by five steps, in which transparency is the key factor.

According to him, the success of policies and policy makers' macroeconomic influence abilities require a strict flow of transparency as shown in figure 3:

- Political transparency: The openness of political objectives and readiness to clarify the motives of policy makers.
- Economic transparency: Concentrate on economic information which inspires the needs for policy.
- Procedural transparency: Arrangements for monetary decisions to be taken, including monetary policy strategies.
- Policy transparency: Announcement and explanation of policy decisions, including indication of possible future policy actions after the implementation of the policy

- Operational transparency: Implementation of policy actions, including descriptions of control errors for the operating instruments and macroeconomic reactions.



**Figure 3:** Conceptual framework for transparency in policy making, Geraats, 2002.

As concluded by many researchers, be the primary governmental body in policy making, Central Banks needs to fulfil various functions while ensuring certain measures to increase effectiveness of policy outcomes. Transparency is not the only factor. As suggested in his study, Maier (2010) focuses on the importance of Monetary Policy Meetings and certain checklists to perform. Nevertheless, transparency and effective communication represents the most crucial characteristics throughout the whole process in order to create policies that govern the economy well. In later part of this research, Vietnamese Central Bank will be taken into account and compared against the general criteria where ideal Central Banks operate accordingly.

## 2.2. Vietnamese Central Bank and the economy

Central Bank of Vietnam stays an important position, for its ability to influence macro-economy in general, and stock price, specifically. However, little discussions, comments or official studies have been conducted regarding this matter. Due to national benefit and government point of views, Vietnamese Central Bank actions are less transparent, and there are almost no justifications for its macroeconomic news releases than “aiming to push the economy to a stable and better position”. Though ambiguous and lacking in transparency, all of the interest rate alternation release is disclosed in the official website of State Bank of Vietnam. Wide ranges of interest rate movements are publicly announced in press conferences. It is observed that small

changes of interest rates are not widely discussed; hence, investors need to pay close attention to daily interest rate fluctuation in Vietnam before entering into transactions.

Throughout the course of this research paper, there are a few example of ineffective management done by Vietnamese State Banks. Decisions were quick and the five steps as suggested by Geraats (2002) were not employed. This leads to several bad effects that pack on the already unhealthy economy of Vietnam. In the two following examples, the effects are predictable. Supposedly, a more careful plan motivated from transparent work flow and effective communication will be able to address the pros and cons of each policy, allowing room for discussions and considerations.

#### Example 1: Reaction to 2011 alarming inflation rate

According to a research article published by Asiamoney in 2013, in mid-2011, Vietnamese Central Bank raised interest rate significantly in response to inflation increased to 23%. The decision was made and announced quickly, followed by a series of bad debts blooming as companies and banks struggled to repay their loans, either to companies' payables, or banks. By the end of the year, Vietnamese Central Bank decided to merge several small banks together to facilitate management of non-performing loans, which swelled up to 3.4% total gross loans. However, the Bank was left with a "steadily rising" level of non-performing assets in the system. By 2013, this figure is at 8.8%.

By changing interest rate, Vietnamese policy markers intended to contain and manage their first and foremost target (climbing inflation rate). While the inflation rate was finally stabilised at 9.3% at the end of 2012, the effect of such short-term decisions, followed by no complimentary plans caused the economic to suffer. Central Bank's influence is believed to create and manage a well-structured and stabilized economy. The goals the governmental body aims for should not just simply to solve the temporary problems and compromised other aspect of the economy.

#### Example 2: Interest rate cap and the national currency's liquidity issue

By the end of 2012, Vietnamese's liquidity of national currency (Dong) drops sharply due to increasing demand for US Dollar and gold. Because of this, there are also negative impacts on short duration government bonds as reported by Standard Chartered.

Aiming to revert the situation, Vietnamese Central Bank introduce interest rate cap on short-term Dong deposits and loans. By doing so, the Bank hopes to accelerate economic growth and increase the Dong's liquidity. However, as reported by Standard Chartered and observed by Flatt (2011), the situation remains unaffected and Central Bank's action leads to unwanted results. As analysed by Vietnamnews in 2012, the loans are prioritised to big customers with high prestige. This means that SMEs will have little to none access to these low interest rate loans. In addition, as loan and deposit rates are almost similar, major banks are chosen for these transactions, thus, leaving out the smaller banks with their struggles to follow the rates.

### 2.3. Shortage of transparency and its influence to stock market

Limited transparency in Central Bank procedure is not the only factors, however it is one of the most influential causes that lead Vietnamese stock market to be considered inefficient. This statement is consistent with the findings concluded by Tabellini (1987) who suggests that secrecy of Central Bank procedures will "hinder the function" of financial markets. Evidences from survey conducted by Blinder, Ehrmann, Fratzscher, Haan and Jansen (2008) concludes that compliance with transparency will greatly assist Central Bank in moving financial markets, enhancing predictability of monetary policy and reaching Central Bank's macroeconomic objectives. Vietnamese Central Bank actions are, on the other hand, ambiguous. There are no clear definition of objectives (other than aiming to enhance macro-economy, managing financial market and stability in national development, as defined from its official website and national conferences). It can be stated, though not officially confirmed by any studies in Vietnam, stock market responses are highly volatile in as influenced by any various news released, financial or non-financial, public or not. On the other hand, Beck et al (2013) study and confirm the correlation between Central Bank's communication and announcement to the financial markets within Canada and between Canada and the United States.



**Figure 4:** Vietnam Stock Index three year's period (March 2012 – March 2016).  
Source: Bloomberg Online Stock quotation.

Figure 4 shows the fluctuation in Vietnamese Stock Index in five year's period. Vietnamese Government establishes political circular 13 in the middle of Fiscal Year 2010; requiring Credit Unions to increase obligatory financial provision. Investors' opinions are wavered about Credit Unions' ability to follow this obligation and hence, worried about the declaration of bankruptcy of smaller financial institutes. Back in 2010, this results in a huge drop from approximately 600 points downward to less than 450 points in ending 2010. The market struggles to remain 400 points until November 2013 when Vietnam Central Bank established amendment that lower standard for Credit Unions. Market experiences a short drop, then bounced back and from June onwards, stock market was about to keep 500 benchmark.

From the three-year overview of market index translation, it can be concluded that stock price index is volatile and the market is highly sensitive to various types of news, no matter if those are financial or not. Moreover, regulatory is rather unstable and appears to be reacting to stock market's situations while it should have been a clear structural and obligate framework for stock market practitioners and participants to follow. It needs flexibility to sufficiently manage financial market, however, three circulars

established for a single issue, in which newer circulars are meant to be replacing or amending the older ones, suggests an inefficient and weak control mechanism in place.

Realising loopholes in managing stock market; Central Bank increases its governmental process and establishes various obligatory compliance procedures for stock market participants to follow. Although more cases are unveiled in Fiscal year 2011 (three manipulative cases and several incompliances with obligatory financial provisions), investors are still doubtful about the manipulating ability of certain unidentified forces behind the index. In another press release, an analyst measures that a group of high capital investors (consist of approximately 5-11) can certainly and legally manipulate prices of certain stocks by buying or selling massive amount. This news gravely troubles other small individual investors, who appear to account for more than 70% of stock market participants. Apparently, since the market is extremely volatile and easily manipulated, efficiency of Vietnamese stock market is expected to be rather low.

A group of analysts in University of Economics Ho Chi Minh (2010) concludes that Vietnamese stock market barely reaches the lowest level of market efficiency, and this conclusion is only suggested by sampling certain type of stocks which undergo the test by this group. It is also suggested that Vietnamese index failed to reach informative efficiency due to uneven in government's capital expenditure, the inability to forecast and guide the macroeconomic market as well as lack of information transparency and high insider trading amounts without proper solutions for control mechanism.



### 3. POTENTIAL FACTORS THAT AFFECT FINANCIAL MARKET

Potentially there are countless factors that can influence financial market, for the scope of this thesis, Behavioural finance and macroeconomic news announcements are closely examined in literature review and through empirical study, respectively. According to Wolski (2015), stock markets are volatile and are easily affected directly or indirectly by these macroeconomic factors:

“..Internal development: Inter-company news and development that give way to different speculations and expectation. This is closely related to the next factor:

Speculations and expectations: “hype” built up from various sources no matter if they are confirmed or not, such as press release, company’s development, performance and actions will increase or decrease investors’ foundation of expectation.

World Events: Both financial and non-financial news will place direct or indirect influences on stock prices.

Inflation and interest rates: these two rates are closely related to each other. As Governmental body adjusts interest rates to combat inflation, less risky securities with higher interest rate will become more favourable in investors’ eyes. Thus affecting prices of higher risk stocks.

Exchange rates: Foreign exchange rates have direct influence on stocks in foreign countries. Changes in these rates will increase or decrease cost of operating in a country. Sizes of the companies will determine the magnitude of changes in that foreign stock market..”

(Wolski, C., Five Factors or Events that Affect the Stock Market, 2015)

This research paper mainly focuses on one factor that may potentially drive the Vietnamese Stock Market, which is the announcement of macroeconomic news. As additional research possibility, international monetary policy announcements will also be taken into account for their influences into the said stock market.

Interest rate has been an interesting factor to investors. There are many research papers about the connection between interest rates and stock markets. Fama and Schwert (1977), Campbell (1987), Breen, Glosten, and Jagannathan (1989), Ferson (1989) finish their studies and conclude that short-term stock returns can be forecasted by studying short-term interest rates. In his dissertation, Mohamed A (2000) concludes that the relationship between interest rates and stock prices are both ways. Increases in stock returns place a positive change in economic activities, which are in turn measured by GDP. These increases may lead to a “restrictive monetary policy” and thus, a higher interest rate. However, changes in interest rates affect stock prices negatively, though the magnitude of responding is not equal and linear, also as suggested by Mohamed A (2000). Subsequently, this is the self-balancing economic mechanism to stabilise the market and its related factor. Despite this structure, there are times where effects scale significantly, which require intervention from governmental body. Vietnamese Central Bank’s interest rate adjustment is a common tool to manage the economic structure of the country, whether it is to manage inflation rate, stock market volatilities or other economic purposes.

#### **4. BEHAVIOURAL FINANCE**

The following part emphasises on the importance of behavioural finance and how human nature is easily influenced by several factors. Macroeconomic news is undoubtedly a big influence and the announcements will affect investors' behaviour.

Human mind and investors' type proxy for human behaviour and it either directly or indirectly contributes to the fluctuations of market. On this matter, Fu (2006) studied the Taiwanese stock market and the impact of information transparency into investors' behaviour. He reports that increasing information transparency leads to investors' activities in the stock market. According to Holzner and Holzner (2002), good management and providing of information transparency is heavily relied on corporate governance, investors' (good and ethical) behaviours and policy maker's determination for transparency. Clearance of information in the market also eliminates, or at least minimises the chance of asymmetric information. Signalling Theory (studied, created and named by Spence, 1973) suggests that information asymmetry exists in every company and between investors. Chen (1999), Chiang (2005) research and confirm a typical behaviour by managers, who often have better access to information than outsider investors. Their actions will be the bases for these investors, hence, give ways and chances for market manipulations. Also according to Chiang (2005), any selling actions by managers, regardless of volumes, are read negatively. As concluded by several researches, information asymmetry carries a potentially higher risk for outside investors, who are unable to understand and read company's performance outlook (Leland & Pyle, 1977; Bhattacharya, 1979; Poitevin, 1990; Ravid & Saring, 1991).

Transparency and clear flow of information also suggest market efficiency, which may help explaining investors' confidence. Nevertheless, each company's corporate finance also represents an important factor in the capital market. As the need for information transparency increases, a firm's policy surely influences the way information perceived towards the firm. Cormier, Ledoux, Magnan and Aerts (2010) suggest that, firms always estimate and consider the ultimate costs and benefits to their shareholders when "determining the extent of disclosure" of the said firm's corporate finance policies and framework. Because of this, the necessity for information transparency significantly increases, as researched by Ho and Wong (2001). Ho et al (2001) also investigate the

correlation between corporate finance policies and disclosure level. As firms' directions and performances are heavily directed by Directors and Board Members, the voluntary disclosure of corporate information is highly affected by corporate governance policies. Larger firms apply much stricter disclosure policies than smaller firms, and those with better disclosure rules tend to successfully employ highly skilled and competent management (Hermalin and Weisbach, 2012).

The countries where the firms operate in also play an important role in this matter. Previous studies suggest that a firm's corporate governance is highly influenced by the operating country's economic, social, political, legal and historical background (Wu and Lee, 2014; Ball, Kothari and Robin, 2000)

While bearing in mind the significance of information transparency and firm's corporate governance, investors' behaviours are also portrayed and studied by previous researches since these behaviours are what actually drive investors to their decisions. Human's behaviours are complicated and irrational. Kahneman and Tversky (1979) analyse and categorise those irrations under human's beliefs and habitual behaviours

#### 4.1. Beliefs

Investors form their beliefs through as many sources of information as they can: media, publications, announcements, word of mouths, etc. Prechter (2001) concludes that actions taken are mostly driven by emotions or motivated by the thoughts or actions of others, which are far from independent knowledge and thoughts. In explaining as to how beliefs are formed quickly, Prechter analyses and points out that, with the lack of knowledge and confirmation, there increases the tendency for the crowd to (blindly) follow each other. In his research, Prechter observes experimental real-time decisions only to see that, a majority of the crowd increases the investment as markets rise and does less as markets fall, regardless of information. Qawi (2010), studying the same experience carried out by Prechter, explains that, there is a need for experienced investors to have explanation for their opposite opinions should they decided to speculate as markets rise and fall. Also according to Qawi (2010), investors have

tendencies to act accordingly to the group they are in, because it is human's primary behaviour to feel the need for "self-preserve" and thus, seek positive reinforcement rather than being different. This is especially true when taking account of financial investments, where the backbone of investors' decisions are unconfirmed, coping with the necessity for quick, timely actions.

Furthermore, Qawi (2010) mentions the discomfort one will mostly receive when being alone or against the common's decisions. Interestingly, evidences show that individuals chose to not make buying or selling decisions that contradict their peers' verdicts, despite having rational evidence to support their original decisions. Eventually, this explains the reasons for markets to expand their lives and last longer while in theory, they would cease to exist as soon as investors recognise the evidences of collapsing. Ultimately, Qawi (2010) links this phenomenon and suggests that this results in "bubble proliferation" or market crashing. As a result, he concludes that, the beliefs human investors forming when entering markets are important and unify in the same objective (to make profit). However, they are highly unproductive and harmful to the existence of financial markets. These markets comprise of close groups sharing similar sources of information and their decisions are mostly mirrored against one another. As information cycles through these groups, "irrational" (trend of) actions become more convincing as "the groups' cohesiveness grows" (Qawi, 2010)

#### 4.2. Confidence and Overconfidence

Being confident has its pros and cons. As an investor, an effective market boosts general confidence significantly. Information is transparent, flow of information is quick firms' decisions are published and announced on a timely manner that facilitates investing decisions. However, confidence is not what mainly contributes to the irrationalities in investors' behaviour. Overconfidence is.

Over confidence is generally human's easiest mistake during decision making process. Not only investors have high expectation in dividend payment, they also hope for the

chance of dividend payment. Overconfidence is the result of strong beliefs that usually defy market's common acts, sometimes they are also the combined product of lacking knowledge, lacking access to news and pure luck. Surprisingly, Griffin and Tversky (1992) observe and show that experienced traders, experts and highly professional traders can be more overconfident than amateurs when performing in the financial markets. Overly positive thinking leads to actual misconception that such events will have absolutely high chance of occurring. Kahneman et al. (1979) also suggest that over confidence and positive thought process always lead human to (think that s/he actually) outperforms others. In supporting this point, Dixit (1979) suggests that individual profits gained by overconfident traders are generally positive and higher than their rationally thinking fellow traders. He mentions an example where rational traders when facing market's sharp turns will scale down their trading activities. Overconfidence in these cases will make the traders market leaders, having an "unconscious" first-move advantage. This is an entry barrier to rational traders with strong herding mentality who try to mimic these traders' success. Benos (1998) suggests that these market leaders will already be benefit from their actions, thus help pushing the trend to equilibrium. This "irrational" decision will only be profitable if the size of investors is small. As the number rises, expected individual profit that benefit from deviating away from "mainstream" actions start falling. According to Benos (1998), this result is close to the "bandwagon behaviour" and is linked to a "unimodal result" on total expected profits of rational traders. When irrational actions are taken (under the account of being overconfident), values increase with small size, but decrease as the size (of following investors) increases. As a conclusion, Benos states that competition between traders will reduce the shared pie. Overconfident trading activities, as a group, will benefit from such competition. However he clarifies that his results are from observing those with first-mover advantage, not from excessive risk taking behaviours.

"...Since an equilibrium is a pair of best response strategies, it is easy to see why traders of both types cannot deviate from their Nash prescription and increase their profits if their rivals stick to their own..."

(Benos, A.V., Aggressiveness and survival of overconfident traders, 1998)

### 4.3. Sampling bias

By estimating result from a small sample size, human tends to extrapolate findings to a whole population size. Naïve Vietnamese investors with limited information tend to place hope in future stock movement based on historical events. According to the analysing performed by Nghia (2012), a common dilemma of investors is whether they should sell their stock after continuous price incremental events, predicting that price has reached its top and will not increase anymore; or should they hold their position after a series of price reduction, hoping that price will reach its bottom and be bounced back soon. Unsophisticated investors also tend to rely on smallest trend and glimpse of unconfirmed news about their holding stock to predict future stock movement. In fact, there is no evidence that prices will stop increasing or decreasing after reaching investor's "point of peak" (akin to highest or lowest peak, according to individual investor's translation). This bias leads to several "novice mistakes" (Seasholes and Zhu, 2010) and sinks investor's expectations in June 2004 ("Investor Optimism Surges in June, According to UBS Index, 2004").

A similar phenomenon is studied by Baker and Nofsinger (2002). They name this Representativeness bias where investors' brains assume things sharing similar attributes are alike. Akin to grouping stereotypes, this bias causes investors to buy/sell stocks based solely on their desired qualities (Shefrin and Statman, 2000). A classic example is where investor mistakes good company with good investment. As also classified by Solt and Statman (1989), a good firm will generate good earnings, high sales growth and good management with policies; a good (stock) investment will experience more price increase than other (stocks). Baker et al (2002) states that, a good investment does not necessarily arise from a good firm, but is more of timing and subjected to personal goals. In agreement with this theory, Lakonishok, Shleifer and Vishny (1994) study "high-valued" stocks' performance and "bad firms" low to minimum chance to be deemed "high-valued" stocks. Analysing results show that the "high-valued" stocks yield 11.4% return during the year, opposed to 18.7% of the other "bad firms' stocks". Average return of five years run was 81.8% and 143.4% for the "high-valued" stocks

and “bad firms’ stocks”, respectively. “Good companies do not always make good investments” (Lakonishok et al, 2000)

As concluded by Baker et al (2002), investors most likely make this mistake when they are (too focused or not) analysing historical stock returns. Also as pointed out by Baker et al (2002), stock with high (low) performance in the past three to five years will be considered a good (bad) investment by most investors. It is important to note how little the past performance is representing the case of investments. De Bondt and Thaler (1985) show their evidence that the “bad” investments tend to outperform the “good” ones over the next three years by 30%.

Another source of this bias initiates from investors’ beliefs that stock market is not random. As a result, it highly suggests that there exists a stock price trend and this trend will continue. Agreeing to this theory, Rabin (2002) concludes that this belief leads to faulty predictions and speculations of stock markets. The American Association of Individual Investors conducts survey and asks its 125 members direction of stock market in the next six months (whether it will be bullish, bearish or neutral). De Bondt (1993) reviews and finds that the speculated answers resemble market movements one to two weeks before the members are asked the question. Baker et al (2002) further explains this as, if investors experience a booming market trading week, they will expect market to be bullish for the next six months. However, if market is declining, investor will have beliefs to forecast a bear market instead. In other word, investors do predict that the current trend will represent the (short-term) future and thus, will continue the recent trend.

#### 4.4. Familiarity bias

Familiarity bias, or home bias as defined by French and Poterba (1991), investors tend to buy a considerably large amount of stocks that trigger the sense of familiarity. For e.g. stocks from their own countries despite the well-documented gains from diversifying their portfolio internationally. Investors have tendency to put too much



faith in familiar stocks. As a misconception suggested by Baker et al (2002), the sense of familiarity compromises and thus, helps (familiar) stocks appear to be less risky than others. This is broken down to the states, cities level. Coval and Moskowitz (1999) show evidence that US investors possess strong preference for local firms or headquarters.

Investors who used to work for, or be partner with certain brand names, companies also have the sense of familiarity. Benartzi (2001) states in his research that 32% of the investors chose to invest in their previous companies. Within these samples, he finds out one of the contributing reasons is that companies tend to “match” their employees’ contribution by giving companies’ stocks. This numbers accounts to 7% of total population.

Familiarity bias throws investors off guard, and is closely related to sampling bias (also defined as representativeness bias). According to Benartzi (2001), investors keep on buying their companies’ stocks even after the prices increase since they associate the increase with good performance.

#### 4.5. Disposition effect

Investors’ mental states and goals are taken into consideration because they can influence investors’ decisions greatly. As studied by Shefrin and Statman (1985), investors decide on actions that will give them pride and the satisfaction of maintaining their pride while avoiding actions that will make them feel regret. Shefrin et al (1985) also show supporting evidence where pride seeking investors tend to sell losing (winning) stocks too late (early). In explaining for disposition effect, Baker et al (2002) explain that when investors make good investment decision and obtain winning stocks, by nature, they feel good about this result. Thus, when their stocks decline after the purchase, investors tend to hold the stock longer instead of selling them. Investors want to avoid the feeling of having made a poor decision that leads to the need for selling the stocks. Shefrin et al (1985) suggest that, this emotion often results in keeping poor performing stocks while selling good performing stocks.

Interestingly, disposition effect also helps investors to perform well in certain situations. Selling good performing stocks too soon suggests that these stocks will continue to perform well in the future, while holding poor performing stocks too long suggests that their price will continue to decline (De Bondt et al, 1985). According to their study, poor performing stocks that have held extreme past selling point (approximately three years) do much better than good performing stocks in the subsequent three years. Conservatism (anchoring and expectation adjustment) helps explaining the relationship between these biases.

#### 4.6. Anchoring bias

Shefrin (2000) concludes that the “winner-loser” effect in investors’ behaviour and performance can be “stemming from conservatism” (anchoring and expectation adjustment). As human estimate about a certain event, they have tendency to adjust their estimations accordingly to a certain original point of interest (anchor), and no matter if this is relate to the event, this anchor will always influence a human’s mind. In practical financial view, if an investor buys certain stocks and benefits from their high growth, they will tend to remember the highest peak those stocks once reach. In the future, if those stock prices decrease, they can relate this as a chance to invest in the stocks, since they will bounce back to the original high peak (anchoring point) without considering if the stocks’ reduction are temporal or are due to decrease in fundamental values.

Benartzi and Thaler (1995) define the “reference point” of these “anchors” to be the stock price to which investors will compare to the current stock price. According to Benartzi et al (1995), determining this reference point is crucial in the investment decisions because it governs investors’ emotions. These suggest the pleasure or pain when gaining profit or experiencing a loss. Most common reference point is the purchase price of the stock, although more recent stock prices can be used as reference point if the securities have been purchased long ago. Another frequently used reference point is the highest price investors have seen with the stock. Usually, investors will

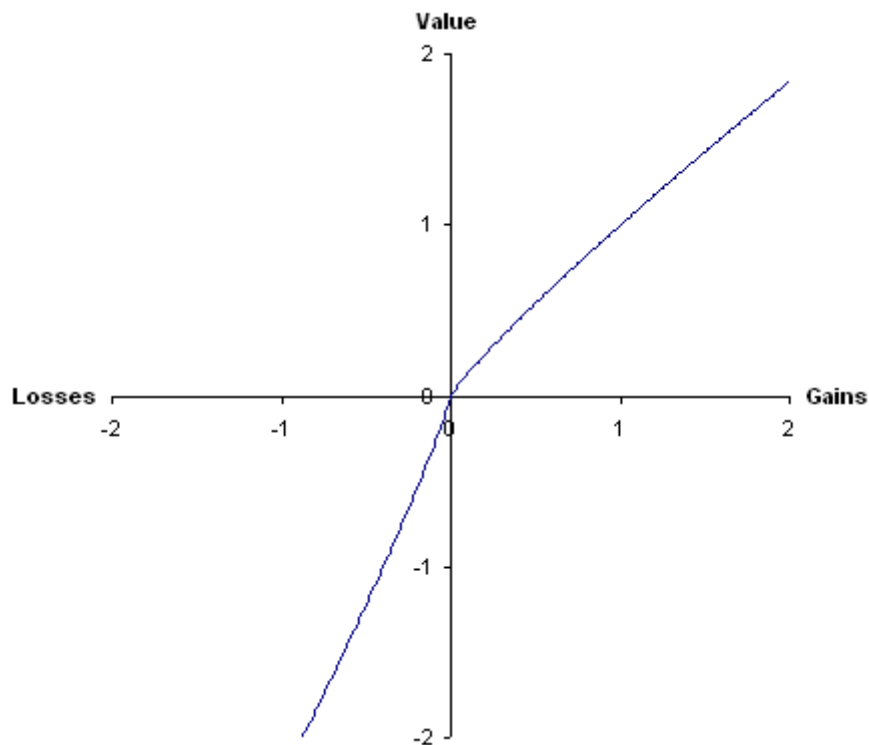
wait until the prices to reach these reference points before making a sell or buy command.

Heath, Huddart and Lang (1999) examine the reference point in relation to stock options exercising. There are companies who pay employees with company's stocks. Employees are entitled to exercise the options after a certain amount of time and earn the difference. Heath et al (1999) report that the most common reference points used are the highest stock price in that fiscal year. In their observation, the rate of options being exercised nearly doubles when the stock prices move above these points. In this case, reference points determine investors' position a profit or loss recognition, although a small amount of investors do update their reference points to reflect unrealised profits.

#### 4.7. Habitual behaviours

According to Prospect Theory developed by Kahneman et al (1979), decision making process is significantly influenced by the futuristic value of gains or losses rather than the actual final asset value.

Under prospect theory, decision weights are more valuable than probabilities of outcomes. The value function is identified to be more concave for gains (risk aversion) and more convex for losses (implying risk seeking). In general, the function is flatter for gains than losses, referring to loss aversion (See Figure 5). Tvede (1999) summarises the finding that, human tends to be "less willing to gamble with profits than losses". Investors are deemed to be selling their positions quickly when earning profits, but not turn quickly for selling if they are on a losing streak. Ellberg (1961) suggests that, it is against human nature to be in a position where the probability distribution of events is unknown.



**Figure 5:** A hypothetical value function of gains and losses. Source: Behavioural Finance.

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#### 4.8. Herd mentality

If the irrational investors are insignificant, the market will still be efficient, however, as Nghia (2010) suggests in his findings, if the risks that affect investors' minds are systematic risks, Vietnamese investors are then hesitate to make arbitration, hence the abnormal trend in stock prices is not adjusted, the gap between transacted vale and fundamental value remains unchanged. The Herd (Mob, or Crowd) mentality can explain for these types of reactions.

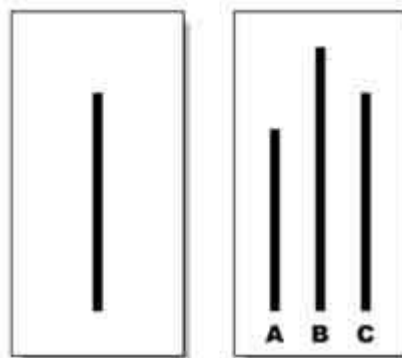
Herd behaviour dominates the global markets from 2003 to 2003, however its affect to the market has been significantly lessened after 2006 (Lakshman, Basu and Vaidyanathan, 2008). On the contrary, Farber, Nguyen and Vuong (2006) confirm the very substantial existence of herd trading and mentality in Vietnamese Stock Market. In the same report, Farber et al (2006) study and conclude the significant impact on "huge positive returns" on Vietnamese market portfolio.

Sarpong and Sibanda (2014) investigate the herding behaviours from equity mutual fund managers and conclude that the herd mentality has a significant impact on the stability and volatility of stock markets. Lakonishok, Shleifer and Vishney (1991) also suggest the same conclusion in their report. Overtime, funds with opposite decisions to herd funds are able to register superior performance over time. Although Sarpong et al (2014) disclaim the suggestion that investors should invest less in under-performing funds and more in those that show superior performance recently. Interestingly, stressing market by herd behaviour can help bringing market to equilibrium. Overall, opposite directions of investments stabilise markets and lessen the severity of impact herd trading can make (Lakonishok, 1991; Quigley & Siquefield, 2000; Kutan & Chen, 2006; Prosad, Kapoor and Sengupta 2012; Sarpong et al, 2014).The mentality suggests that the investors are no longer individual entity, but move as a pack and watch each other's actions. Overall, there are two reasons to explain this human mentality.

#### 4.8.1. Social influence and interaction

An individual's actions are under pressure from the generally accepted society's actions, and when a single person reacts differently to the pack, that single person is isolated. Not too many people can stand isolation in a market with less transparent information and so fragile it can be easily manipulated. Solomon Asch (1950) conducts a series of laboratory studies about human mentality, famously known as the Asch Paradigm, or the Asch conformity experiments, in which clearly shows the big impact of social influence on a single individual.

Moreover, peer groups usually develop similar tastes, interests and desire towards same types of stocks and investment portfolio. Elision and Fudenberg (1993) show that picking a popular decision with incomplete knowledge or information has high chance to lead to efficient results. As described by Blakeslee (2008), a group of students participates in a "vision test", where in fact only one person is the test subject; the remaining students are instructed to give certain answers as to influence the test subject's answer.



**Figure 6:** The Asch conformity experiment. Source: SimplyPsychology.

Each student is provided with two papers in Figure 6, and is asked if the single line's length in the left paper matches with any line's length in the other paper. The obvious correct answer is C. The test subject is placed at the end of the line, and all "participants" state their answers publicly.

The first two answers (two trials) by two first students are correct, whilst the remaining sixteen trials are incorrect. The test subject states his/her answer last. Asch observes that, under no pressure to confront the whole population with his/her different answer, since there are two other answer that similar to his/her, only one out of 35 test subjects provide wrong answer.

In the second phrase, with another set of test subjects, all eighteen predecessors provide one single wrong answer. In this phrase, the pressure is placed in the test subject to provide either an unbiased answer, or to follow the pack. As a result, about one-third (32%) of the participant overlooks the obviously correct answer and states the crowd's answer. In a later individual interview, a few of the subjects states that they did believe the group's answer was the correct one, and those who conforms with the group mentions they did not want to be so isolated from the general crowd's opinion.

#### 4.8.2. Wisdom of the crowd

Partially similar to the Asch Paradigm experiment, Milgram, Bickman and Berkowitz (1968) announce that, it is human nature to follow the majority's actions, because there may be unknown information to the others.

In the experiment, one person is asked to mix in the crowd, and stare at the sky for sixty seconds. A few people looked at the sky for a while before leaving. The next time, a group of five people stares at the sky together; this attracts attention and mimicking of a bigger crowd. The experiment is repeated with different amount of initial people. Milgram et al (1968) concludes that there is a significant positive relationship between the amount of people who initiate and the size of the crowd whose attention is attracted.

Investment-wide, naïve investors will make their own buy-sell decision based on the general activities of the crowds and fellow investors. This mentality even affects professional investment funds in Vietnam. Instead of being independent and benefit from arbitrage opportunities in Vietnam index, the funds also follow the crowd's actions in their buy-sell decisions. On their defence, the fund's loss "reflects" the market's generally "unpredicted" movements, and that, was out of the fund's manageable

responsibility, while in fact, the market should have been balanced by arbitrage activities performed by outstanding independent individuals. Sticking to the crowd's behaviour also means market participants are not looking for new investment strategies; rather they maintain their usual tactics and hence, no evolvments to market are contributed.

#### 4.9. Changing of risk preferences

According to Thaler and Johnson (1990), after experiencing a considerably big or small winning streak, investors tend to change their own risk preferences without noticing. Winning a huge gain “rewards” investors with a feeling of playing with “the house's money”. This feeling of playing someone else's money allows investors to accept too much risk. This trend can be experienced from the bubbling which leads to the financial crisis in 1997 and then 1999.

On contrary, long exposure to losing streaks causes investors' emotional pain and fear. Two extreme ways of reactions are reported by Kahneman and Tversky (1979). Either investors experience a “heightened sense of fear” for more losses, which causes them to avoid taking risk by stopping or pausing to participate in the market for a while. Kahneman et al (1979) also refer to this phenomenon as “loss aversion”. On the other hand, investors are tempted to take on a bigger amount of risks in return for bigger returns in order to even out the losses. As referred to by Shefrin (2000), the “get eventitis” phenomenon also helps explaining investors' choices when facing risks and uncertainty and thus, is the centre of attention in prospect theory. Under which, investors' reactions to winnings and losings are more important than their positions after the winning or losing (their overall financial health).



## 5. MACROECONOMIC NEWS AND STOCK RETURN VOLATILITY

### 5.1. Influence of macroeconomic news announcement to stock market

Macroeconomic news has been proven to have significant influences on stock price movement as shown in different research papers: Basistha and Kurov (2008), Vähämaa (2009). Basistha et al (2008) identify a significantly strong response of stock returns to the unexpected changes in the federal funds monetary policies. The paper also suggests that, those unexpected changes highly depend on certain stage of the economy's business cycle. Similarly, there are also suggestions that the paper's observed policies changing aims to intervene the "declining trend" or asset prices as stated in the study of Su et al (2000). Basistha et al (2008) also stated that the impact of stock returns in recessional time is significantly higher than those in better economic times.

Being a dependent variable, stock prices are studied to have almost direct and statistically significant impact from its presumed explanatory variable, being monetary policy "shocks". By studying evidence from Canadian and US stock market in their paper, Li, Iscan and Xu (2010) discuss the immediate responses of stock price to monetary policy shocks to be relatively small in Canada and considerably large in the US.

Rosa (2011) stated that stock market's reactions speed to Central Bank communication appear to have "statistically significant and economically relevant effects on equity indices", that is, under the assumption and acknowledgement of US's market being efficient.

It is important to have appropriate adjustments made to markets, it is also crucial that the markets are efficient in order to have the stock returns' reaction controlled and influenced by those adjustments. Lim (2009) announces the positive relationship between stock price adjustment speed and market efficiency. Similar to the above idea, the study from Hong Kong stock market by Chen and Rhee (2010) also provides empirical evidence of how speed of assets prices adjustments is considered one of the contributing factors to determine market efficiency.

## 5.2. Stock return volatility

Stock return volatility and its characteristics have always been an interesting topic for researchers. There are many studies examining volatility using ARCH/GARCH model (Engle, 1982; Bollerslev, 1986) by including the lagged conditional variance. According to Vuong (2007), stock returns shocks to volatility is highly persistent, especially in developing markets.

Pagan and Schwert (1989) compare various measures of stock volatility and suggest that, volatility can be distinguished into “predictable and unpredictable” parts. Sharing similar interest in this area, many research papers are conducted on the predictable parts (See also French, Schwert and Stambaugh, 1986 and Deng, 2008). Pagan et al (1989) focus their attention on the conditional variance of a financial time-series. A commonly known stylized fact of a financial time-series is that, most of them are non-stationary.

*“... Most of them (financial time-series) exhibit phases of relative tranquility followed by periods of high volatility. These different phases of volatility imply a time-varying variance in the data”*

(Vuong, empirical analysis of stock return volatility with Regime change, 2007)

Curiosity for return volatilities attracts attentions and studies by many researchers. Fama, 1963; Mandelbrot, 1963; Fama, 1965; Mittnik and Rachev, 1993; McCulloch, 1997; Mittnik, Paoletta and Rachev, 2000) research the suitability of stable Paretian distribution so as to model the unconditional distribution of assets' returns. Stable Paretian distribution (comprises normal distribution as special case) will allow heavily skewed distribution for GARCH innovations while also allows for skewness “compared with the Student's  $t$ ” (Oral, 2012). Above all, stable Paretian distribution is the only suitable distribution that serves as limiting distribution of random variables that are independently, identically distributed. According to Oral (2012), this feature is extremely attractive to researchers since random variables (error terms in economic models) comprise of external effects that are “not described by the model”.

As the first researchers to apply GARCH models, Lamoureux and Lastrapes (1990) conclude that, simultaneously, there exist many factors that influence the volatility of stock returns. Some of the most highlighted and researched ones are trading volumes, investors' behaviour and releasing of macroeconomic news. Previous papers' results also share this conclusion (Fong, 2003; Darrat, Rahman and Zhong 2003; Chuang, Kuan and Lin, 2009). Also, when studying trading volume's influence, Suominen (2001) develops a theoretical model based off on GARCH which, conditional variance (as a function of trading volume) and the stock return volatility can be positively or negatively correlated, depends on stock, market types and market situations. Pagan and Schwert (1989) compare various measures of stock volatility and suggest that, volatility can be distinguished into "predictable and unpredictable" parts. Sharing similar interest

### 5.3. Stock volatility characteristic

19 October 1987 marks the largest one-day stock price drop in the history of Down Jones, ever since, stock return volatility starts gaining a vast amount of attention. It is noticed by Schwert (1990) and Shiller (1991) who suggest that, (US) market, as a whole, does not volatile as much as individual stock. It is also concluded by Shiller (1991) that individual stock prices are "far too volatile" to be explained by "fundamental" influential factors like earnings and dividend separately. According to Malkiel and Yu (1999), many researches are conducted on this matter, proposing different factors to stabilise price such as transaction taxes, increase required margins and limited automated trading systems to "deal with a perceived problem" of increase volatility. There should be more attention to individual stocks instead of market as a whole.

*"...On theoretical grounds it is possible that the volatility of individual stocks has increased while the volatility of the market as a whole has remained stable..."*

(Malkiel et al, The structure of Stock Market Volatility, 1999)

### 5.3.1. Overall stock market volatility

As suggested through empirical result conducted by Malkiel et al (1999), utilising updated figure from the similar estimation by Schwert (1991), overall stock market shows little tendency to volatile in their periods (19<sup>th</sup> century). There appears to have little of increase volatility in 1999, but is documented to be not persistent.

Shiller (1979) considers a model in which “stock prices are the present discount value”, and “using a constant discount rate of expected dividend”. His study compares variability of stock price with dividend received by shareholders (i.e. dividends) and observes whether these shareholders cash inflow can explain movements on certain sampling portfolios formed from NYSE. Generally, his research concludes that, dividends and other factors are unable to explain market volatility as a whole, and that overall, stock market volatility does not volatile as much. Summer (1982) also shares similar conclusion about the characteristic of market volatility. As an unbiased attempt to explain this matter, Mankiw, Romer and Shapiro (1985) state three reasons:

- a. The undeniable null hypothesis of market efficiency, and that the “violation of inequalities predicted by the theory are not statistically significant”
- b. Stock market vast movements can also be influenced by changes in discount rates, which are either influenced by changes in real interest rate, or in “risk premium of equity”; and
- c. Stock market simply does not reflect truly the underlying fundamentals enough to be considered significantly volatile.

### 5.3.2. Individual stock volatility

In contrast to the overall stock market volatility, individual stock price usually moves in extremely large percentage. Malkiel et al (1999) state that it is not uncommon for stock prices to strive for 25% in a single day transaction. By taking a “disaggregated look at the volatility of stock prices”, Malkiel et al (1999) reach a conclusion that, market as a whole, does not increase but actually stays stable over the sampling time period (1999).

Their study rather focuses on individual stock price movements, which is suggested to have, sometimes, extreme volatility and unpredictable.

Campbell, Lettau, Malkiel and Xu (2001) confirm this trend of individual stock price movements. The study uses a disaggregate approach to study the “volatility of common stocks at the market, industry and firm level”. It is also concluded that, indeed, stock price volatility at individual level relative to market volatility is highly and statistically significant.

#### 5.4. The ARCH and GARCH model approach for estimating volatility

According to Reider (2009), main purposes for forecasting volatility are to manage risk, allocate assets and to gain wealth. Risk management requires measuring the potential gains/losses of a portfolio or individual stock investment. Estimations are needed for accessing volatilities and correlations. In asset allocation, the Markowitz approach to minimise risk for “a given level of expected returns” is becoming “a standard approach” (see Reider, 2009).

The Autoregressive conditional heteroskedasticity (“ARCH”) was firstly introduced by Engel (1982). The “AR” part comes from a fact that the ARCH models are autoregressive models in squared returns.

In an ARCH (1) model:

$$(1) \quad \sigma_t^2 = \alpha_0 + \alpha_1 a_{t-1}^2$$

Defining residual return at time t as

$$(2) \quad a_t = \sigma_t \varepsilon_t$$

Where  $\varepsilon_t \sim N(0,1)$ ; and in equation (1),  $\alpha_0 > 0$  and  $\alpha_1 \geq 0$  refer to the positivity of variance; and  $\alpha_1 \leq 1$  represents stationary.

Bollerslev (2008) suggests that the success implementation of this model for forecasting purposes will add huge value to decision making process. However, it is difficult for

empirical study to process models with large numbers of parameters; hence the generalised ARCH (“GARCH”) model is developed so that the crisis that causes larger residual will not result in the similar type of persistence as in ARCH model.

*“..GARCH (p, q) reduces the number of lagged squared error terms (q) in the estimation process by involving the lag value of the lagged variance (p)...”*

(Ahmed, 2012, Impact of interest rate volatility on stock return of commercial bank)

Thus, GARCH (1,1) appears to be most efficient for most estimating situations, resulting in a gap between modern economic theories based on “continuous time setting” and “their discrete time series data” (Bollerslev, 1992).

## 6. DATA AND METHODOLOGY

### 6.1. Data description

This paper's data uses the daily index value of Vietnamese stock market from 01 January 2010 to 31 December 2015, makes up 625 observations. In this empirical study, variables comprise the macroeconomic announcements from U.S. and Vietnam Central Bank; and the announcement of interest rate changing in Vietnam.

Both U.S. and Vietnam's announcements are categorised into different types. The selected news, its representing denotation and frequency of releasing are as shown in Table 1 as follow:

**Table 1:** U.S.'s and Vietnam's macroeconomic announcements used in this paper.

VN news	Announcement of	Frequency	Day of announcement
VCPI	Consumer Price Index	Monthly	3 <sup>rd</sup> week of the month
VFDI	Foreign Direct Investment	Monthly	4 <sup>th</sup> week of the month
VGDP	Gross Domestic Product	Monthly	Month end
VOTHER	Others	N/A	N/A
INT	Interest rate	N/A	N/A
VCB	Vietnam Central Bank	N/A	N/A
US news	Announcement of	Frequency	Day of announcement
UCPI	Consumer Price Index	Monthly	Mon-Wed of the 4 <sup>th</sup> week of the month
UGDP	Gross Domestic Product	Monthly	27 <sup>th</sup> -31 <sup>st</sup> per month
UEMS	Employee Situation	Monthly	1 <sup>st</sup> week per month
UJOB	Jobless Claims	Weekly	Every Tuesday/Wednesday
UPPI	Producer Price Index	Monthly	15 <sup>th</sup> - 16 <sup>th</sup> per month
UOTHER	Others	N/A	N/A
US	US news	N/A	N/A

Total number of each macroeconomic type is as follow:

**Table 2:** Announcement counts by Vietnam and U.S.'s.

VCPI	VFDI	VGDP	VOTHER	INT
72	72	72	83	43

UCPI	UGDP	UEMS	UJOB	UPPI	UOTHER
70	67	69	257	71	287

## 6.2. Estimating stock return volatility

In this paper, daily stock price within tested timeline is observed. Daily stock return follows this model

$$(3) \quad RR_t = \ln\left(\frac{P_t}{P_{t-1}}\right)$$

Where  $RR_t$  refers to the periodic rate of return as of date  $t$ ;  $P_t$  and  $P_{t-1}$  represent stock price at date  $t$  and  $t-1$ , respectively.  $RR_t$  is determined as the continuously compounded return, taking natural log of stock return on date  $t$  over stock return on date  $t-1$ .

Another component to the GARCH model is the variance. Should the simple variance is being used as in equation (4)

$$(4) \quad \sigma_t^2 = \frac{1}{m} \sum_{i=1}^m RR_{t-1}^2$$

All sample returns will result in similar weight, this means return as of day  $t-1$  can place as much influence on the variance as return as of day  $t$  or  $t-2$ . Using the Exponentially Weighted Moving Average (“EWMA”) which suggests that recent returns have more influential (or weight) on the variance than earlier returns. Following assumption of RiskMetrics<sup>TM</sup>, a financial risk management company, this thesis uses a constant lambda of 0.94 or 94% for the process of weighting variance.

Weighting process as follow



$$(5) \quad \lambda_{t-1} = (1 - \lambda_t)\lambda_0$$

With  $\lambda_t$  refers to weight at time  $t$ ,  $\lambda_0$  being 0.94 or 94%. The latest observation's weight will be  $\lambda_t = (1 - \lambda_0)$  equals to 0.06 or 6%. The subsequent observations will be 94% of the weight on the day after, proportionate to lambda. The sum of total weight made during this process should equal to 1 or 100%.

In order to formulate GARCH model, a mean equation is required. This equation forecasts future fluctuations by analysing the lag structure. This mean equation is modelled as an AR process as previously studied by Ruppert and Matteson (2010) as follow:

$$(6) \quad \sigma_t^2 = \alpha + \beta R_{t-1} + \varepsilon . \varepsilon \sim N(0,1)$$

With all equations set up as above, an empirical model for GARCH (1,1) is determined as follow:

$$(7) \quad \sigma_t^2 = \gamma + \alpha * \varepsilon_{i,t-1} + \beta * \sigma_{i,t-1}^2$$

Whereas  $\varepsilon_{i,t-1}$  indicates square return of stock  $i$  at time lag  $t-1$ , and  $\sigma_{i,t-1}^2$  indicates the weighted variance of stock  $i$  at time lag  $t-1$ , or the period's forecast for conditional variance.

### 6.3. Methodology

In the first estimation function (equation 1), announcement  $i$  at time  $t$  is subject to the appearance of Central Bank's announcement. In equation (8), surprise Central Bank announcement is calculated as an absolute value of difference between actual announced interest rates and average market expectation rate. Stock prices volatility reacts symmetrically to both positive and negative surprises, which imply that the impact of surprises factor (no matter if positive or negative) has the same magnitude to stock prices.

$$(8) \quad \sigma_i^2 = \beta_0 + \beta_1 * S_{i,t}$$

In addition to equation (8), there are empirical evidences that global stock index reacts significantly to the macroeconomic announcement made in the U.S. (Kim, McKenzie and Faff, 2004; Vähämaa, Watza and Äijö, 2005 and Beber and Brandt, 2006; Nikkinen, Omran, Sahlström and Äijö, 2006). In this paper, dummy variable is used to analyse the effect of Vietnamese Central Bank's macroeconomic announcement into Vietnamese stock market.  $VCB_{i,t}$  stands for dummy variable where the announcement of all macroeconomic news is 1 and not is 0.

$$(9) \quad \sigma_i^2 = \beta_0 + \beta_1 * VCB_{i,t} + \varepsilon_{i,t}$$

From the time span of data, Vietnamese Central Bank releases many different types of macroeconomic news. However, there are only five types of news where release dates are patterned to be constant (Refer Table 1). Out of these five, three are deemed "economy-driven" news (Bloomberg, 2015). These news types are then used as dummy to be regressed against the index where:  $VCPI_{i,t}$ ,  $VFDI_{i,t}$ ,  $VGDP_{i,t}$  and  $VOTHER_{i,t}$  stand for news related to Consumer Price Index, Direct Foreign Investment, Gross Domestic Product and Other news release, respectively.

$$(10) \quad \sigma_i^2 = \beta_0 + \beta_1 * VCPI_{i,t} + \beta_2 * VFDI_{i,t} + \beta_3 * VGDP_{i,t} + \beta_4 * VOTHER_{i,t} + \varepsilon_{i,t}$$

Equation (10) holds the assumption that Equation (9) is not significant when estimating every single news release against market movement. Every news type weights differently and holds different influences impact towards the same target index. In agreeing with this view, Nikkinen et al (2006) study the macroeconomic influence of news release types and report different significant impact to different markets.

As mentioned in Introduction part, due to the nature of extremely weak in efficiency of Vietnamese index market, national Central Bank might not be the only factor to drive the stock return volatility. This paper provides theory that foreign financial factors might as well place impacts on stock movement in Vietnam stock index, namely U.S. news releases. As suggested from Nikkinen et al (2006) research, it is necessary to take

into account time lag between US' announcement time and Vietnamese's trading time. With difference of approximately 12 hours, this paper will apply  $\sigma_{i,t+1}^2$  whereas  $t+1$  represents the next trading day in Vietnam. Under the assumption that U.S. macroeconomic announcement places impact into Vietnamese stock market, the following assumption is used:

$$(11) \quad \sigma_{i,t+1}^2 = \beta_0 + \beta_1 * US_{i,t} + \varepsilon_{i,t}$$

In this equation,  $US_{i,t}$  refers to Dummy variable of macroeconomic announcements of U.S. (being 1 if there is announcement at time  $t$  and 0 if not).

Similarly to equation (10), different type of macroeconomic announcements' impacts will also be taken into account.

$$(12) \quad \sigma_{i,t+1}^2 = \beta_0 + \beta_1 * UCPI_{i,t} + \beta_2 * UGDP_{i,t} + \beta_3 * UEMS_{i,t} + \beta_4 * UJOB_{i,t} + \beta_5 * UPPI_{i,t} + \beta_6 * UOTHER_{i,t} + \varepsilon_{i,t}$$

Within the time frame of the data, U.S. releases various macroeconomic announcements. This paper estimates the most market influential news release type as defined by Bloomberg (Refer Table 1).  $UCPI_{i,t}$ ,  $UGDP_{i,t}$ ,  $UEMS_{i,t}$ ,  $UJOB_{i,t}$ ,  $UPPI_{i,t}$  and  $UOTHER_{i,t}$  stands for U.S. news release related to Consumer Price Index, Gross Domestic Product, Employment Situation, Jobless Claims and Other releases, respectively.

Amongst many factors that drive stock prices, interest rate stands out as one of the most appealing and pervasive factor (Foerster and Sapp, 2003). Depending on sectors and the nature of stocks, the effect of interest rate varies. Ahmet (2014) also studies and reports the correlation between exchange rates, interest rates and stock markets. Interest rate alternation is released by Vietnam Central Bank through the main website, covered by economic press and is often publicly announced with a decree through press conference. These events may place certain influences into the stock index. The following equation is to estimate the correlation between this type of unscheduled macroeconomic announcement.

$$(13) \quad \sigma_i^2 = \beta_0 + \beta_1 * INT_{i,t} + \varepsilon_{i,t}$$

Whereas  $INT_{i,t}$  refers to the dummy variable of interest rate changing announcement.

#### 6.4. Hypothesis

As discussed throughout reviewing previous studies, human behaviour and their reactions towards macroeconomic news releases contributes greatly to the fluctuations of markets and economies. Central Bank efficiency and transparency also contribute greatly to investors' confidence, which in turns, affect the market reactions. This section of the thesis creates hypotheses that will focus on different type of macroeconomic news announcements and the impacts they place into Vietnamese's stock market. Equation (9) – (13) also serves to quantify below hypotheses regarding the correlation between various types of macroeconomic news announcements and the Vietnamese stock market index.

*H<sub>1</sub>: Vietnamese stock market is affected by the Vietnamese's macroeconomic news announcements; and the correlations between Vietnamese stock market and those Vietnamese announcements are significant.*

*H<sub>2</sub>: Vietnamese stock market is affected by US' macroeconomic news announcements; and the correlations between Vietnamese stock market and those US announcements are significant.*

## 7. EMPIRICAL RESULTS

Empirical results analysis is started out by examining the influences of both U.S. and Vietnamese macroeconomic announcements into the Vietnamese stock market's volatility, which is forecasted by GARCH model. By summarising and interpreting the empirical results, this chapter also determines equation (9) – (13).

**Table 3:** Descriptive statistics of variables – U.S. macroeconomic news releases.

*U.S. macroeconomic news releases*

	US	UCPI	UGDP	UEMS	UJOB	UPPI	UOTHER
Frequency	54.8%	4.8%	4.6%	4.7%	17.2%	4.7%	19.2%

Total Observation: 821

**Table 4:** Descriptive statistics of variables – Vietnam macroeconomic news releases.

*Vietnam macroeconomic news releases*

	VCB	VCPI	VFDI	VGDP	VOTHER	INT
Frequency	20.1%	4.8%	4.8%	4.8%	6.72%	2.9%

Total Observation: 299

Table 3 and 4 above explain summarised descriptive statistics for the variables involved in this paper. Frequency of data refers to percentage of observation is noted during the time period. In Table 3, total US announcements collected within the observed period are 821, accounted for 54.8% appearance within the said time. In Table 4, Total Vietnamese's macroeconomic announcements collected are 299. The frequency of 20.1% represents the appearance of the Vietnamese's announcements within the period.

The first category to be analysed is whether the announcement of the news places an impact into the stock index. According to result in Table 5 all hypotheses related to

**Table 5:** Results of regressing dummy variables against stock market index volatility

<i>Vietnam Macro-economic news releases</i>							
	VCB	VCPI	VFDI	VGDP	VOTHER	INT	
<sup>1</sup> Coefficient	2.223	0.723	0.125	(6.152)	2.241	3.765	
<sup>1</sup> Std. Error	5.781	1083	0.133	10.83	10.15	13.82	
t-value	0.383	0.066	1.145	(0.568)	0.221	0.270	
p-value	0.701	0.947	0.153	0.148	0.825	0.787	
Observation	299	72	72	72	83	43	
<i>U.S. Macro-economic news releases</i>							
	US	UCPI	UGDP	UEMCO	UIMEX	UPPI	UOTHER
<sup>1</sup> Coefficient	2.312	6.634	0.165	(2.240)	1.250	(9.131)	66.50
<sup>1</sup> Std. Error	4.428	11.23	1.143	11.40	6.541	11.13	62.93
t-value	0.498	0.592*	0.014*	(0.215)	0.191	(0.819)	1.058
p-value	0.618	0.055*	0.098*	0.829	0.805	0.413	0.289
Observation	821	70	67	69	257	71	287

Each Hypothesis is corresponding to its own regression result as displayed on Table 3. Variables are regressed against Vietnamese stock market volatility proxied by GARCH.

<sup>1</sup>Coefficient and Standard Error are displayed at 0.000 or E-4.

Refer to Table 1 for news type classification.

\*\*\*, \*\* and \* denotes for estimates that are statistically significant at 1%, 5% and 10%, respectively.

Vietnamese and US' macroeconomic announcements do not have significant result impact to the stock market. Similarly, the announcement of interest rate and other macroeconomic news by Vietnamese Central Bank do not place significant impact into the market. In the later part of the report, different type of news are analysed separately and their correlation to the stock market will result differently.

## 7.1. Impacts of categorised news announcements from both Central Banks

### 7.1.1. Vietnamese announcements

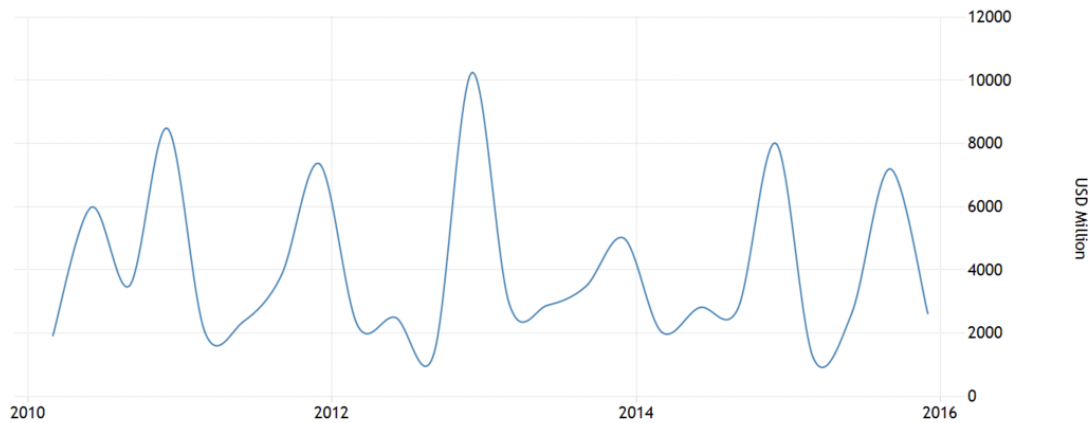
Announcements are classified into Vietnamese and U.S. groups where they are further divided into sub groups of announcement types. In Vietnamese segment, regressing dummy variables returns statistically significant correlation between all types of news announcements and the index. Overall, none of the announcement makes such significant impact into the market movement. The only new types worth mentioning are Foreign Direct Investment (FDI) and Gross Domestic Product (GDP) barely missing the 10% level (0.153 and 0.148, respectively). Empirical-wise, these news do not affect Vietnamese stock market, however these news are extremely important and should affect the market differently. This thesis believes that a different empirical approach will address the issue better. In general, injecting capital is treated as good news, however the difference in absolute value of amount being invested affects the market differently. Within the scope of this paper, it is difficult to state whether coefficient of FDI is a high or low value, and the impact following this coefficient is significant or not to the market. Figure 7 shows the flow of FDI into Vietnam within the researched time frame.

Vietnamese Government is attempting to reorganise economic structure and making investment offers more appealing to foreign investors in order to attract frequent, stable inflow of foreign capital (Dung, 2014). In 2010, FDI peak is reported to be USD 5.9 billion. It is thus can be explained as an overall low capital injection moves market negatively. Over the period, FDI has low start (USD 5.9 billion top peak in 2010) and



declined trend whilst the economy is recovering (USD 7.4 billion in 2012, drops from USD 8.5 billion).

This explanation corresponds to the stock market (Refer Figure 4). Stock market trend declines from the beginning of 2011 to lowest peak in the researched time, and rises only after 2012 has started.



**Figure 7:** Vietnamese FDI report January 2010 – Dec 2015. Source: Trading Economics, 2015.

Over the period of observation, Vietnamese Central Bank announces significant rises of GDP, which can be seen from Figure 8. 2015 GDP is not reviewed and announced as of the time of this thesis, however the rising trend explains the significant and positive impact that GDP announcements place into the market. Similarly to FDI, this stable growth rate of GDP per year matches the rising trend of stock market. Under the scope of this thesis, it can be reported that, all news releases from Vietnamese Central Bank has significant impact into the market.

#### 7.1.2. U.S. announcements

Apart from CPI and GDP, all other U.S.'s announcement categories are report to have no significant impact into the market. This result does not entirely follow this paper's envisioned studies, Nikkinen et al (2006) regress U.S.'s various announcements into different markets and report significance at 5% and 10% level in Asia markets (developed and emerging, excluding Vietnam's). In this paper, only GDP and CPI announcements influence Vietnamese market at 10% level.



**Figure 8:** Vietnamese FDI report January 2010 – December 2014. Source: Trading Economics, 2015.

U.S.’s announcements of GDP and other major macroeconomic news are nowadays big impacts into several markets. At the end of August 2015, when U.S. releases GDP revision (GDP expanded 3.7% year-on-year in April-June period; previously reported at merely 2.3%), Asia’s big players’ stock markets (China, Japan, South Korea) open higher, experience more trading volume and value, and rising index value (Arvinth, 2015). This cause/effect relationship needs to be investigated and provided with statistical proof, however it is safe to suggest that there exists correlation between U.S.’s specific “market moving” announcements and several different stock market indexes. This statement and this paper’s results are consistent with previous studies (Nikkinen et al, 2006; Äijö, 2008). Although there are markets that are not driven by U.S. announcements, as well as certain U.S. announcements which do not place impacts on market(s), it can be concluded that U.S.’s news releases are a big factor to different markets’ uncertainty at different levels, at least, in the recent years.

Nikkinen et al (2006) confirm the importance of Employment Situation and Jobless Claims to be few of the most important factors that moves markets. Interestingly, said factors are not at 1% level impact into Vietnamese stock market, in fact, their p-values are at 0.8.9 and 0.805 (for Employment Situation and Jobless Claims, respectively). Employment Situation related news are “market moving” factors as defined by Bloomberg, and it always stays a significantly big impact into US market and potentially other region markets that have strong connection with US, either via trading

or agreements. These news announcements do not place such important impact into the market is conflicting to prior researches, and this result should give way to future researches that dig deeper into the relationship between this factor and the market, using other approaches to quantify the correlation. Under the scope of this thesis, with limitations and restrictions, this process cannot be performed.

### 7.1.3. Vietnamese's interest rate changing announcements

The last hypothesis and last part of this paper's empirical results covers the impact of changing in interest rate into its own (Vietnamese) stock market. According to Table 3, result shows that there is a correlation at 10% level statistical significance between these factors into the market.

Interest rates and the decision to change these rates are extremely important factors to influence one country's stock index. Several researchers study and support this connection (See James, 1984; Sweeney and Warga, 1986; Choi, Elyasiani and Kopecky, 1992). Theoretically, changing in interest rate, although does affect stock markets, the effect is not immediately reflected to the intended stock market as Ho (2013) analyses and provides explanations. As interest rate rises, it is becoming more expensive to borrow money and finance the investments, potentially reducing market players until the rates are at more desirable levels, or a one-off chance to invest arises. Abide to this explanation, should Vietnamese Central Bank's original intention is to ease or boost markets and economy, the intended result should be a more volatile market following interest rate changing decisions.

This paper finds out that the impact of said factor into the market is at 10% level, it can be concluded that the market does react strongly to the news announcement and investors do expect changes as a result of those published news. Also according to Ho (2013), interest rates should be able to place a more important impact into the economy. Truong and Rowley (2009) conclude that, starting in 2008, Vietnam pledges its exchange rate to the US dollar and determines to maintain the low value of national currency. This helps securing the export route, which rises to be extremely significant. However, the problem starts when Vietnam sets its own interest rate in order to attract foreign direct investments. This finding is consistent with previous result from

concluding FDI's extremely statistical significance into Vietnamese market, while the interest rates changing decisions has less impact. Even after this paper's research period, problem remains unsolved. Nguyen (2013) reports more severe interest rate cuts. Although this sounds attractive to investors at first, economists believe that these decisions are unlikely to help Vietnam to "regain its spot as Asia's hottest emerging markets". Massive bad debts and non-performing loans are weighting down the economy. Most economists agree with how little impact the interest rates cutting decisions are (Nguyen, 2013; Chau, 2014; Hong, 2015). As concluded by Truong et al (2009), Vietnamese Central Bank is not independent and effective in its interest rate as it might seem at first glance.

## 8. LIMITATIONS AND CONCLUSION

This paper researches the impact of macroeconomic announcements by both Vietnamese and U.S. into the Vietnamese's stock index. Although there are completed studies that research the same areas, the reason that motivates this paper is due to the fact that, Vietnamese government is generally assumed to be insufficient with its policies and effectiveness. The author is genuinely interested in whether the traditional factors that affect markets volatilities also apply in the case of Vietnamese market. Per this paper's empirical results, copes with other economists' analysis, Vietnamese market maybe the appealing one in several views, the market itself is not stable enough to follow the rules and traditional correlations as found in other studies.

This paper is limited in terms of spread and approach. Data span is five years of daily stock market index, makes up only 1497 observed trading days. The influent variables are mostly reported on a monthly basis, which made up to approximately 70 observations in each category (821 with U.S and 299 with Vietnam's). The author believes that a longer period up to ten years, which essentially covers more macroeconomic announcements, will result in more interesting results. The suggested time frame will also cover the two economic crisis and the impact of macroeconomic announcements into said market will also be different.

It is highly recommended that, should future researches be conducted specifically for the Vietnamese market, these factors should be considered: using longer time data, comparable indicators (e.g. regress with similar emerging markets), following Äijö (2008) research methodology and include the *Good* and *Bad* nature of variables (announcements), incorporating other economic variables (exchange rates), considering the methodology to be reacting windows to the news releases, classifying more "market moving" news types, etc.

The author truly believes that, Vietnam, a challenging market to be analysed and managed, contains many opportunities to be researched and studied. There will be similar findings to previous studies and there will be results that are entirely different. Identifying problems is needed before solutions can be designed. Future researches in

this topic may help uncovering the needed knowledge and attention for Vietnamese government to concentrate on.

This paper investigates the impacts into Vietnamese's market index by various economic announcements. Using GARCH model to proxy volatilities in the market, regression results show that Vietnam is indeed an interesting market where rules and findings from previous studies do not necessarily follow.

Using Vietnamese and U.S.'s macroeconomic announcements, later categorised into sub groups by nature of announcements, this paper regresses those variables to the market volatility and address the paper's five hypotheses. Summary as follow:

*H<sub>1</sub>: Vietnamese stock market is affected by the Vietnamese's macroeconomic news announcements; and the correlations between Vietnamese stock market and those Vietnamese announcements are significant.*

Empirical result as obtained from Table 5 suggests that Vietnamese government could not have affected its stock market through any type of announcements or interest rate changing decisions. Whilst FDI and GDP announcements appear to be close to 10% significant level, this thesis concluded that this is not enough, and highly recommend future researchers to focus on this issue and look for alternative approaches. FDI and GDP are major new announcements, prior research papers show that the impacts made by one country or one organization can affect another country's market. Due to certain limitation, this thesis only applies dummy variation method and this may lead to insignificant result.

*H<sub>2</sub>: Vietnamese stock market is affected by US' macroeconomic news announcements; and the correlations between Vietnamese stock market and those US announcements are significant.*

Amongst seven type of news that are put to test in this thesis, only two news categories result in significant impact, which are CPI and GDP, both at 10% level. This result is consistent to Nikkinen (2006) and Äijö (2008) whose study inspires this paper. However, other major new announcements do not appear to affect Vietnamese stock

market strongly. This thesis also believes that future research with different approach might return results differently.

Overall, this paper reports Vietnam to be the interesting market to be considered for further analysis and studies. While there are certain results that follow previous researches' findings, most other empirical results suggest otherwise. This paper acknowledges its limitation in approaching and analysing method within limited time frame, and suggests additional approaches as well as extended researching times to be carried out in future researches.

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